Languages and Linguistics

SEMIOTICS

Theory and Applications

Steven C. Hamel
Editor

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SEMIOTICS: THEORY AND APPLICATIONS

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PREFACE

Semiotics is the study of sign processes (semiosis), or signification and communication, signs and symbols, and is usually divided into three branches: Semantics, Syntactics, and Pragmatics. Semiotics is frequently seen as having important anthropological dimensions. In general, semiotic theories take signs or sign systems as their object of study: the communication of information in living organisms is covered in biosemiotics or zoosemiosis. This book discusses the theory and application of semiotics across a broad spectrum and has gathered current research from around the globe.

Chapter 1 - The objective of this chapter is to present how changes in the material culture of schools can signify the transition from modern to post modern schooling. The material culture of schools is perceived here as consisting of the architecture of the corresponding buildings as well as of the material objects (i.e. furniture and equipment) within these buildings. We draw on the key notions of classification and framing borrowed from the seminal work of Basil Bernstein in the field of sociology of education which translate relations of power and control respectively.

Classification examines the relations between categories, whether these categories are between institutions, social groups, discourses, or practices. By definition, strong classification formulates well-defined boundaries, whereas weak classification results in blurred or more permeable boundaries between such categories. In other words strong classification is predicated on the rule ‘things must be kept apart’ while weak classification on the rule ‘things must be put together’. In this chapter we are especially interested in exploring the symbolic boundaries which are inscribed in the form of material boundaries in the design of school space between categories like: a) school as an institution and its social environment, b) different social groups acting within it, c) different knowledge domains (subjects) and d) different practices.

Framing refers to the controls on communication that take place within school. If the material culture of a school promotes explicitly regulated use or to put it differently the criteria for competent use of school space are both explicit and specific, framing is strong. Framing is weak in the case that such regulation is either absent or covert.

The notions of classification and framing become operational on the basis of an inventory of multiple semiotic resources signifying symbolic boundaries and potential uses and communications within the school space.

The relevant semiotic choices are typified into two distinct registers, one corresponding to modern (characterized by strong classification and framing) and the other to post modern

(characterized by weak classification and framing) schooling. The two registers are illustrated by reference to specific case studies. Finally, potential implications for structuring learners' identities as well as for policy making will be discussed.

Chapter 2 - The paper will start from the assumption that semiotics today has advanced well beyond the early insights of Peirce and Saussure, both of whom looked at signs rather atomistically and in a decontextualised manner. Furthermore these thinkers tended to view the icon, index and symbol as different kinds of signs. Such views are untenable today.

Firstly, it needs to be shown what the nature of contextualisation entails, as a shift from signification to cognitive semiosis. This implies both intertextuality and intersubjectivity as a result both of the evolution of the species and the further evolution of its culture. Highly evolved culture is made up of a complex of implicit and explicit intertextual relations, resulting in increasing levels of *abstraction* that demand concretisation through the hermeneutic activity of a constantly transforming subjectivity. This needs to be theorised so as to show up the nature of the symbolic order, which nevertheless incorporates the iconic and indexical within itself. This incorporation means that the iconic-indexical dynamics of zoosemiotics retain a presence within symbolic human semiosis.

It will be shown that this insight is prefigured as the 'animal kingdom of the spirit' in Hegel's *Phenomenology* and that this raises the possibility of a more fully realised symbolic realm in the further evolution of culture. This possibility flows from the fact that human subjectivity may be expanded to a greater consciousness of the iconic-indexical animality that is embedded in the symbolic order. This cannot mean an evasion of the iconic-indexical realm but a greater awareness of it to be achieved through powers of reflectivity.

Chapter 3 - The writing cure, otherwise known as expressive writing, is widely accepted as an effective intervention. Hundreds of studies have shown that writing about one's thoughts and feelings for 3 days, with at least 15 minutes a day, has beneficial effects on physical and mental health. Yet, after more than two decades of research, there remains a large gap between evidence and explanation for the phenomenon. The problem, we suggest, lies in the general neglect to gain a deeper understanding of the basic building blocks of the writing cure, namely language. This vacuum can be filled by Peircean semiotics. Peirce's triadic circuitry of the sign is explicated and applied to the development of a taxonomy of expressions of self and emotions. This taxonomy has been implemented by a pattern matching language analysis program, SSWC (Sundararajan-Schubert Word Count) to test our theory-based predictions of the health consequences of language use. Two empirical studies of the writing cure that utilized SSWC for textual analysis are presented as demonstration of the heuristic value of applied semiotics.

The writing cure has had an impressive track record since its first introduction by Pennebaker (Pennebaker, 1985; Pennebaker and Beall, 1986) in the eighties. For the past two decades, hundreds of studies have shown that writing about one's thoughts and feelings has beneficial effects on physical and mental health (Frattaroli, 2006). But why? What is it about language that its utilization for emotion expression has consequences for health? This question has never been addressed by the extant theories of the writing cure (e.g., Bootzin, 1997; King, 2002; Pennebaker, Mayne, and Francis, 1997). An explanation that seems to have the most empirical support (Frattaroli, 2006) is emotion exposure theory (Sloan and Marx, 2004), which by considering language use as an instance of exposure therapy tells us more about the latter than language per se. Another widely accepted explanation is narrative structure (Smyth, True, and Souto, 2001), which claims that verbal expression facilitates the

transformation of experiences and memories into a structured “story” (Pennebaker and Seagal, 1999). But Graybeal, Sexton, and Pennebaker (2002) found no correlation between narrativity and health benefits. The use of different types of words has also been investigated (Campbell and Pennebaker, 2003). The finding is that the use of emotion words was not consistently correlated with self-reported emotionality, and that “style words”-- such as function words and pronouns-- were more relevant to health status. Not based on any linguistic theory, such ad hoc distinctions of language use seem arbitrary, albeit empirically supported. To date, expressive writing remains a black box, in the words of Laura King: “First, expressive writing has health benefits. Second, no one really knows why” (King, 2002, p. 119). The problem, we suggest, lies in the general neglect to gain a deeper understanding of the basic building blocks of the writing cure, namely language. This vacuum can be filled by Peircean semiotics.

The exposition of Peircean semiotic consists of five sections. The introduction sets the stage by casting the language and health equation in the context of Shannon’s ideal code, which is informationally the most complex and energetically the least costly. Peirce’s triadic circuitry of the sign is subsequently introduced as an algorithm of complexity that extends Shannon’s information theory. Next, we introduce a language analysis program, SSWC (Sundararajan-Schubert Word Count), which implements a proposed taxonomy, derived from Peircean semiotics, of different types of language use with varying degrees of complexity. The penultimate section presents two empirical studies that showed how language analysis by means of SSWC can shed some light on the language and health connection across different conditions. The conclusion discusses the potential contributions of Peircean semiotics to theory and research on the writing cure.

Chapter 4 - The fields of semiotics and psychology overlap to such an extent that it seems impossible for either to flourish alone. Yet their relationship has been one largely of mutual neglect or hostility. Mainstream psychology's negative attitude towards semiotics can be attributed to four interrelated factors: psychology's subscription to the science/meaning divide; psychology's combination of scientific practicalism and metatheoretical confusion; the view that semiotics is inextricably wedded to ideologies opposed to scientific realism; and the view that semiotics has little concern with the sign *user*. These factors help to explain why recent attempts at semiotics-psychology rapprochement have met with mixed success, and why so little of that work has filtered through to mainstream scientific psychology and its research programs. A solution lies in taking seriously psychology's explicit (but sometimes faltering) commitment to realism. Within a coherent realist framework, integrating semiotics with psychology offers a number of contributions to mainstream psychological research, the most salient of which are: clarifying the irreducible tripartite relational nature of meaning; extricating the legitimate concerns of representation in the information sciences from incoherent epistemological representationism; applying the Peircean distinctions between different types of sign (viz. icon, index, and symbol) to solve problems in information representation research; using iconicity as the bridge between conceptual metaphor and nonconventional symbolic phenomena; and promoting increased methodological sophistication by underscoring the scientific legitimacy of nonquantitative methods.

Chapter 5 - This paper analyzes how ‘the problem of school violence’ is causally represented in Israeli newspapers. Common propositions are uncovered about the causes for this widespread social problem and, as such, they are understood to constitute a relative and site-specific, but nonetheless empirically legitimate, representation of this particular

Israeli discursive construction. This approach is semiotically adopted in opposition to many others that tend to speak of 'discursive constructions' in very general ways. In contrast, regular causal attributions that constituted 'talking about Israeli school violence' are documented based on their emergence from within a long term study of three Israeli newspapers. They are then also explored as they are reflexively interrelated in Israeli cultural terms. That is, they are considered in terms of how they are supported and/or challenged by Israeli ideological beliefs. Reflexive relations of constraint, support and opposition are then investigated by looking at the internal dynamics of the causal propositions that constitute this construction in relation to others in Israel today. In this way, the general link between regular linguistic practices and cultural ideology is explored in this particular case study. It is proposed that this specific case study has implications for the general cross-cultural study of discursive ideological constructs both practically and methodologically. The study then documents a second-order, indexical system that links (and strengthens) causal attributions about the problem of school violence in Israel to a (relative) speaker's/writer's conservative vs. liberal political identity. The study then closes with a discussion of some of the general methodological and theoretical implications drawn from this semiotic case study.

Chapter 6 - The general topic of this contribution is *semioethics*, widely regarded as one of the most significant developments in semiotics after the turn of the 21st century, and along with the *existential semiotics* of Eero Tarasti (2000) a sign of an ethical turn within semiotics. The term semioethics, which signifies not least the emergence of a sense of global responsibility, was introduced by Susan Petrilli and Augusto Ponzio in 2003, and Petrilli in particular is associated with this emerging scholarly field. The semioethics interviews, conducted by Norwegian-born Tartu semiotician Morten Tønnessen, starts out (in four separate interview articles) with Professor John Deely, a prominent American scholar known among other works for *The Four Ages of Understanding: The first Postmodern Survey of Philosophy from Ancient Times to the Turn of the 20th Century* (Deely 2001a). Deely, a semiotician as well as a philosopher, has joined Susan Petrilli and Augusto Ponzio in their endeavour by grounding the notion of semioethics in philosophical terms.

Topics include the responsibility of humankind, individuals and governments, the place of culture as part of and yet distinct from nature, the semiotic side of modern economic and technological development, the future prospects of human understanding and morality in the light of current economic and political developments, and philosophy – the distinction between ontology and epistemology, and the terminology of rights, included – reviewed in terms of (Peircean) semiotics. In the course of the interview, Deely relates not only to Peirce but further to Petrilli, to Thomas Sebeok, to the biologist Jakob von Uexküll (1864-1944) and to phenomenologist Edmund Husserl. The human condition is examined time over again, drawing on a rich reference material from philosophy as well as from various sciences and scholarly disciplines.

Chapter 7 - A Four–Level Semiotics Discourse Analysis framework is proposed to understand meaning making when scientific theories are used as explanatory models in Science Education contexts such as classrooms. This Discourse Analysis framework is derived from a semiotics perspective of scientific knowledge being interpreted as signed information and from functional linguistics approaches as articulated by M.A. K. Halliday and J. Lemke. Halliday's and Lemke's approaches to Discourse analysis are organized around three generalized semiotic meanings that relate to social action, roles of people, and organization of the text or sign. However, to understand how different signs (referred to as

semiotic modalities) are used to construe meanings in Science Discourse, I argue that in addition to Halliday's and Lemke's three-level typology, a fourth aspect of meaning, the epistemological, is necessary. The epistemological aspect of meaning will refer to the nature of science, including the values involved in constructing scientific theories/knowledge. A historical analysis of the creation of scientific knowledge shows that shared values shape the nature of scientific knowledge. Hence, the epistemological aspect is integral to meaning making in Science Discourse. The application of this Four-Level Semiotics Discourse Analysis framework is illustrated within two physics teachers' teaching practices. Analysis of the way these physics teachers signify and communicate scientific knowledge and the nature of science through multiple modalities such as verbal language and visual diagrams is presented. The proposed analytical framework has the potential to guide semiotics research in the Science Education field and illuminate meaning making in Science Discourse. It furthers the field of semiotics by considering how signs communicate epistemological aspects of meaning.

Chapter 8 - Living systems are self-maintained semiotic structures open for material and energy flows but "closed for efficient causation" (Robert Rosen). The factor which introduces the organizational invariance and generates such a closure has a fundamentally semiotic nature.

The system having the semiotic parameter of organizational invariance physically exhibits stable non-equilibrium and is able to transform and evolve according to basic symmetric and combinatorial rules. The living process is self-referential: the biological system in its development and reaction to external stimuli makes an internal choice by reducing indeterminacy of the potential field in interaction with the environment. In other words, the system measures itself as embedded into the recognized part of the environment, the *Umwelt*.

This reflective action is based on the semiotic structure of living system, which includes the inherited description with rigid grammar and the flexible combinatorial rearrangements generating possibilities of internal choice. The inherited description itself can evolve towards incorporation of the environmental inputs as recognized (i.e. signified) by the system. The social evolution starts when the parameters designating the world as a whole and representing the actual infinity are encoded within the semiotic system. This allows the semiotic expansion of the *Umwelt* by using the external elements as labor tools, by directing human-driven evolution, and by discovering new energy sources.

Chapter 9 - Within the broad domain of Cognitive Linguistics, empirical methods do not yet attract deserved attraction to become a dominant tendency. Therefore, *Corpus-based Approaches to Metaphor and Metonymy* (edited by Anatol Stefanowitsch and Stefan Th. Gries) makes a vital contribution by providing corpus-based studies into a most important subfield of cognitive linguistics, Conceptual Metaphor Theory. Meanwhile, *Corpus-based Approaches to Metaphor and Metonymy* is a companion volume to *Metaphor and Metonymy at the Crossroads: A cognitive perspective* (2000), edited by Antonio Barcelona, and *Metaphor and Metonymy in Comparison and Contrast* (2003), edited by René Dirven and Ralf Pörings. It is obvious that the intriguing phenomenon of metaphor and metonymy has been the pet subject of cognitive linguists. But these previous researches are mainly on the differences and similarities between metaphor and metonymy, and are traditional in their intuitive or introspective approaches. In the book under review, instead, the researchers argue for the objectivist basis of linguistic descriptions by "laying the methodological foundations

for a strong emphasis on authentic data and the empirical verification of many of the fascinating theoretical claims" (1). The contributions present case studies of metaphor and metonymy involving structural, textual, contextual, cross-linguistic, (cross-)cultural, social, and/or ideological aspects. By challenging and refining established theories, and putting forward frameworks for conducting corpus studies, the collection makes a timely, valuable and inspiring contribution to the development of cognitive corpus research. In the following sections I will summarize general conclusions this volume highlights, with particular consideration for approaches and methodologies in the identification and retrieval of metaphors and metonymies. Then I will elaborate on some essential problems revealed by the contributions with respect to corpus research.

Chapter 10 - This chapter introduces the basic semiotic concepts of sign, sign vehicle, meaning content, meaning giving and shared meaning as understood in the European semiotic tradition, and investigates the role of semiotic tools as sign vehicles in mediating in-service teachers' mathematical problem solving. Our particular interest is to interpret the basic semiotic concepts from the cultural historical perspective for the analysis of discourses. The participants in our study were a group of teachers participating in an in-service course whose pedagogy draws on the sociocultural perspective. A specific discourse analysis method to unravel the nature of the semiotic tool as a sign vehicle was developed for the study. The dimensions of the discourse analysis method, grounded in the discourse data of the study, were discourse moves, the role of the semiotic vehicle and the cultural focus of interaction. The results of the study suggest that socially shared meaning making around the semiotic sign vehicle consisted of three types of content episodes, namely problem solving, clarification through mathematizing and clarification through hands on activities. Four different participant roles emerged in the analysis of discourse moves. These roles were the tutor, clarifier, questioner and silent supporter. On the whole, the semiotic sign vehicle and discourse moves investigated in this study supported socially shared meaning making and hence teacher learning in the problem solving situation in this study.

Chapter 11 - Law is the field in which today the application of semiotics remains essential. It has furthermore "interaction" as a fundamental concept and guiding principle for its social activities. However, legal discourse leaves important philosophical implications of this principle untouched. The concept of interaction, theme of this commentary, shows a *static* character despite its suggestion of dynamics, and a *rigid sender-receiver* scheme qualifies its idea of interaction as "action between (*inter*) actors". These do, however, not fit our experience that relating to others equals the unfolding of a dynamic vision and interpretation of life! That *other* mode of experience is expressed with the concept of "interactivity", which this commentary forwards as a semiotic alternative to "interaction". The process of "being in a state of interactivity" thus changes the substance of "interaction" when semiotics is applied to law.

Chapter 12 - Stylistics is the systematic study of the ways in which meaning is created by linguistic means in literature and other types of text. It arose from a wish to make literary criticism more "scientific" by anchoring the analysis of literature more solidly in the actual grammar and lexis of the texts put up for analysis. Since the first major flourishing of stylistics in the 1960s, different linguistic paradigms and other academic trends of the times have caused the field to branch off into a great variety of sub-fields such as formalist stylistics, functionalist stylistics, cognitive stylistics, corpus stylistics, feminist stylistics and others, which all from each their perspective pivot around linguistic aspects of meaning-

making. Gradually, the range of text types that stylisticians engage with have furthermore expanded to also comprise non-fictional texts such as news reports, advertising, doctor-patient discourse, academic writing, etc. While forceful in its rigour and systematism, the traditional stylistic approach (whether of a formalist, functionalist, cognitive or other orientation) has until recently largely failed to embrace meanings which are created by semiotic systems other than the verbal. By fusing the theories, methodologies and practices of stylistics and multimodal semiotics, *multimodal stylistics* is a new direction in the field which aims to develop analytical frameworks that will allow systematic analysis of literature and other types of text which, in addition to wording, employ semiotic modes such as e.g. typography, layout, visual images and colour for their meaning-making. It is the aim of this article to provide a brief introduction to this new semiotic trend in stylistics, its promises, problems and areas which need to be explored.

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Chapter 1

SIGNIFYING THE TRANSITION FROM MODERN TO POST-MODERN SCHOOLING THROUGH ANALYZING CHANGES IN THE MATERIAL CULTURE OF SCHOOLS

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ABSTRACT

The objective of this chapter is to present how changes in the material culture of schools can signify the transition from modern to post modern schooling. The material culture of schools is perceived here as consisting of the architecture of the corresponding buildings as well as of the material objects (i.e. furniture and equipment) within these buildings. We draw on the key notions of classification and framing borrowed from the seminal work of Basil Bernstein in the field of sociology of education which translate relations of power and control respectively.

Classification examines the relations between categories, whether these categories are between institutions, social groups, discourses, or practices. By definition, strong classification formulates well-defined boundaries, whereas weak classification results in blurred or more permeable boundaries between such categories. In other words strong classification is predicated on the rule 'things must be kept apart' while weak classification on the rule 'things must be put together'. In this chapter we are especially interested in exploring the symbolic boundaries which are inscribed in the form of material boundaries in the design of school space between categories like: a) school as an institution and its social environment, b) different social groups acting within it, c) different knowledge domains (subjects) and d) different practices.

Framing refers to the controls on communication that take place within school. If the material culture of a school promotes explicitly regulated use or to put it differently the criteria for competent use of school space are both explicit and specific, framing is strong. Framing is weak in the case that such regulation is either absent or covert.

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The notions of classification and framing become operational on the basis of an inventory of multiple semiotic resources signifying symbolic boundaries and potential uses and communications within the school space.

The relevant semiotic choices are typified into two distinct registers, one corresponding to modern (characterized by strong classification and framing) and the other to post modern (characterized by weak classification and framing) schooling. The two registers are illustrated by reference to specific case studies. Finally, potential implications for structuring learners' identities as well as for policy making will be discussed.

1. INTRODUCTION: SETTING THE THEORETICAL GROUND

Teachers and students, in classrooms and schools work, with and through objects and materials all the time, while moving around the school space. Yet these aspects of schooling remain a largely obscure or ignored area of study in educational studies. As Lawn and Grosvenor, (2005) point out all material aspects of schooling are active, constituting social agents as they expand the range of human action and mediate meanings between teachers and pupils. Meaning-making and learning are obviously spatial phenomena and space is implicated in pedagogical practices at all levels.

Adopting this theoretical position as a starting point the objective of this chapter is to present how changes in the material culture of schools can signify the transition from modern to post modern schooling. Indeed, at a very general level it is possible to conceive schools as worlds of signs (Hawkes, 1977). In a sense adapting to cultural change is a process of adapting to changing systems of signification.

The material culture of schooling resides in those material aspects which distinguish schools from other social institutions, and is perceived here as consisting of the architecture of the corresponding premises as well as of the various objects and artifacts (i.e. furniture, decoration, equipment, wall displays, etc) within these premises.

In the literature, the analysis of material culture of social institutions like school seems to oscillate between one of the twin poles of technological determinism or/and social constructivism (Roderick, 2001). On the pole of technological determinism functional accounts constitute the orthodoxy (Cooper et al., 1980). These accounts share a viewpoint, a consensus that centres on an underlying proposition namely that the goal of efficiently productive work is most readily fulfilled in functionally appropriate physical settings. Thus, they contend, design is directed towards providing such settings. This argument stems from the functionalist doctrine, a major impetus of which is that, in contrast to the so-called formalistic revivals of nineteenth century architectural 'styles', the forms of modern architecture are to be derived from the functions performed or served by buildings and artifacts. In the context of the spatial use of buildings, functionalist claims stem from a belief that there is a casual relationship between a physical environment and the behaviour of its occupants.

Exponents of the approach seldom refer explicitly to, let alone analyse, the social circumstances and relationships, especially the power relations, that give rise to and, sustain specific material arrangements within social institutions.

Gibson's notion of *affordance* can be usefully deployed as means of giving theoretical shape to an intermediary approach somewhere between technological determinism and socio-

cultural constructivism (Gibson, 1979). This concept has become increasingly prominent in recent sociological and ergo-phenomenological discussions of the significance of domestic objects (see Hutchby, 2001; Norman, 2000). Hutchby argues that "affordances are functional and relational aspects which frame, while not determining, the possibilities for agentic action in relation to an object" (Hutchby, 2001, p. 444). In Gibson's work, the concept of affordance derives from an attempt to understand the immediate phenomenological significance of ordinary objects. Ordinary objects are viewed as pregnant with meaning. For Gibson, each perceptual layout affords a particular kind of activity, and so for him the most basic meanings of the world are already perceptually "there" and readily available to "resonate" with the organism's needs and wider demands for meaning. For example furniture affords more than an array of practical and survival-orientated significances—chairs for sitting-on, shelves for putting-things-on, and so on. Additional affordances of furniture could be those of acting as status symbol and/or sign of taste, imposing a social intercourse of specific type, etc.

Despite the fact that the pole of technological determinism has dominated for quite a long period of time, it is only recently that we have witnessed a burgeoning body of empirical studies, from social and cognitive sciences, which has begun to delineate the ways in which objects are socially constructed and feature in social relations and activities. This kind of approach corresponds to the aforementioned pole of social constructivism.

The last two decades have witnessed a resurgence of interest in exploring the spatial contours of socio-cultural life (Kostogriz, 2006) especially in relation to urban (e.g. Wells, 2007; Huyssen, 2003; Weszkalnys, 2007) or domestic spaces (e.g. Lefebvre, 1971; Miller, 2001; Kress and van Leeuwen, 2001) and far less in relation to school spaces (e.g. Solomon, 1992; Lawn and Grosvenor, 2005). Although the "spatial turn" (Soja, 2000) in geopolitical and cultural studies has directed researchers' attention to how spatial arrangements operate as a constitutive dimension of social life, the implications of these studies for educational research still remain largely underutilized.

There is a significant ethnographic material that runs from Durkheim and Mauss's *Primitive Classification* (1963) and much of Levi-Strauss's work, to Bourdieu's (1979) early essay on the Kabyle house. Certain material forms, such as house structures or the layout of villages, seem to offer privileged sites for the expression or concretization of social structures and cultural meanings.

Among the various contributions falling within this theoretical trend, we distinguish those of Lefebvre and Foucault. Following Marx, these thinkers rely on the assumption that the general meaning of an artefact is a technological device which, in combination with labour use, transforms the consciousness of those who use it and the society in which it is used.

Lefebvre (1991) supplemented the idea of objective space with the social production of spatiality, maintaining that every society produces its own spatiality in relation to its mode of economic and ideological production. Lefebvre laid arguments for the integrality of space with human existence. His book *The Production of Space* (Lefebvre, 1991) is the most creative contribution to an understanding of social space which involves three interrelated dimensions—socio-cultural practices, representations, and imaginations—that have an impact on the ways we understand and use space and on the ways we are positioned by it.

These concerns have been extended through the historical analysis of the docile body to social structure and power in work of Michel Foucault (1977, 1986) and sociologically in the notions of *habitus* by Pierre Bourdieu (1972).

Foucault's (1980) insistence on the fact that "a whole history remains to be written of spaces—which would at the same time be the history of powers . . . from the great strategies of geo-politics to the little tactics of the habitat" (p. 149) opens up the spatiality of representations in conjunction with the questions of power-knowledge-discourse.

Foucault understands institutions such as schools, prisons, the military or asylums as sites of discipline. These institutions function up to a certain extent for merely 'disciplining' the body. This is a more efficient way of exerting power. Rather than being immediate, direct and targeting only a very few, this new regime of power is disseminated in a myriad of different channels and applied through an invisible gaze, which targets and controls the many. These new 'technologies of power,' Foucault argues, emerged in and with such institutions as the military, prisons and schools, which functioned as 'normalizing' institutions. Spatial forms such as city squares, classrooms, gated communities, shopping malls, or prisons produce particular power effects and may enable or constrain certain actions. The key concept of *bio-power* is useful here. *Bio-power* consists of all those technologies of power that are exercised indirectly upon the body for normalizing it, ranking it, cataloguing it, marking it, training it, supervising it, torturing it, forcing it to carry out tasks, etc, or in one word to transform it into a 'docile body" (Foucault, 1977). Material culture of social institutions like schools plays an important role in naturalizing these forms of power relations.

Within the framework of social constructivism, one finds interesting sociological contributions aiming at linking material culture with social order. For instance, one can consider Bourdieu's analysis (Bourdieu, 1979) of living rooms, as one of the most complete studies on this theme. While his sophisticated statistical technique succeeds in framing groups of objects, significantly related to different "life-styles" and social status, it completely fails to record the linking patterns of these objects in their social spaces, patterns that, according to Baudrillard (Baudrillard, 1972) are deeply related to the dominant values of social groups and strata.

Massey summarizing the main tenet of the social constructivism movement argued that to be in space is not just to be situated somewhere, but rather to participate in distinct cultural-semiotic activities anchored to, and mediated by, particular material objects and textual representations of one's situationality. Places emerge from these activities as the constellations of "culturally specific ideas" about the world and lived experiences of being embodied in it (Massey, 1994).

This study clearly falls within the theoretical milieu circumscribed by the aforementioned works inspired by social constructivism. We have adopted an approach according to which analyzing material culture using semiotic tools can reveal widely held beliefs, attitudes and views of a given social community, in our case of a school community. This approach stems from a definition of culture as the whole of the signifying practices of a community, or using the word of Raymond Williams "culture is the signifying system through which…a social order is communicated, reproduced, experienced and explored" (1981, p.13). A similar view is expressed by Geertz who sees culture "as the webs of signification in which humanity is suspended" (1975, p.5).

According to this approach, material culture apart from the functional needs it renders at a denotative level, serves as a medium of signification involving social and cultural value practices closely associated with a particular type of schooling at a connotative level.

School artifacts are not only beautiful and useful things, they are also meaningful things. They are made to reflect status, personality, taste, etc. In other words they are not only

inanimate objects, they are embodiments of myths, ideas, and ideologies. Their utility far exceeds their use: they refer to a whole universe of significations. Therefore, artifacts used in schools and their components could be regarded as signs. Thus, school space is approached here as an archival space that renders spatial-social-political information visible.

Following this line of argument one can juxtapose the material culture of schools with the well established pedagogic notion of a pervasive 'hidden curriculum'. The 'visible but hidden curriculum' is important because it reflects implicit powerful forces that shape everyday school activities. A fuller explanation lies in an understanding of school culture. Halpin and Croft, (1963) applied the term 'organizational climate' to educational settings, transplanting longstanding concepts from studies of organizations. Subsequently a wide range of metaphors, for example, climate, ethos, atmosphere, character, tone and culture were used to evoke the uniqueness of complex organizations like hospitals, banks and schools. Ogbonna's definition of organizational culture captured the essence of these metaphors:

"… the interweaving of the individual into a community and the collective programming of the mind that distinguishes members of one known group from another. It is the values, norms, beliefs and customs that an individual holds in common with members of the social unit or group." (Ogbonna 1993, p.42).

Therefore, the material culture of schooling 'unquestioned and unconscious' (Schein 1992, p.239) forms a 'hidden curriculum' that is all the more powerful because it is visible but unseen. Material technologies are not neutral and do not arrive in the school free from purpose and ideology. Places may function as condensations and concretizations of historical experience.

In the following section we will describe the most basic features of two ideal types of schooling that can be identified over the last century, namely the modern and post-modern schooling respectively. The features of these two ideal types will be 'translated' to the theoretical language developed by Basil Bernstein. Then we will present an inventory of various semiotic resources related to the material culture of schools that could be used for tracing the cultural shift from the one type of schooling to the other. The two registers are illustrated by reference to specific case studies. Finally, potential implications for structuring learners' identities as well as for policy making will be discussed.

2. MODERN AND POST-MODERN SCHOOLING: A BERNSTEINIAN ANALYSIS

In order to better understand and interpret how school practices have evolved, a theoretical framework is needed. The work of Basil Bernstein in the field of sociology of education offers such a framework, and, in particular, his notion of the *pedagogic discourse* is particularly helpful to the analysis. Specifically, according to Bernstein, pedagogic discourse is a single discourse tending to regulate issues of knowledge, pedagogy, assessment and social relations within any educational institution (Bernstein, 2000). Therefore, the notion of the pedagogic discourse allows the identification of three crucial features for identifying ideal types of schooling, namely: a) the criteria for content selection, b) the objectives foregrounded and the associated modes of assessment, and c) the kind of social relationships established within the corresponding school communities.

Taking into account all three dimensions, one can identify two ideal type educational programs, broadly reflecting the socio-cultural shifts in knowledge and cultural reproduction in the period from the aftermath of the second world war to nowadays. In effect we use a Foucauldian approach according to which history is not a continuous, smooth, progressive and developmental process. Instead history is divided in phases that specific forms of rationality and regimes of truth prevail (Foucault, 1981). Therefore we seek for the 'effective history' of schooling, a view of the past that emphasizes discontinuity, rupture and displacement of not 'institutions', 'theories' or 'ideologies', but 'practices', with the aim of grasping the socio-cultural conditions which make these acceptable at a given historical period.

Of course, discursive shifts are necessarily difficult to fix, therefore the terminology and the periodization introduced need to be interpreted in a flexible way. Specifically, the characteristic features of each ideal type should not be treated as the only ones occurring in the corresponding historical period but as mainly policy trends. In the next section each one of the two ideal types will be described in more detail.

2.1. The First Ideal Type: Modern Schooling (Aftermath of the Second World War Until the Mid Seventies)

The first ideal type of schooling corresponds to the prevailing socio-cultural climate of the period from the aftermaths of the second world war until approximately the mid-seventies. It seems to resonate well with the notion of modernity and more specifically with its tenets about the existence of universal and absolute truths, the faith in grand narratives such as the continual progress of the sciences and of techniques as well as the rational division of industrial work (Habermas, 1981; Giddens, 1991). At the political level modernity is superimposed over postwar welfarism and equality of opportunities initiatives. This ideal type of schooling is mainly characterized by:

a) selection of the content to be taught on the basis of epistemic criteria i.e. on the basis of prevailing conceptual and methodological frameworks in each separate discipline,
b) knowledge based objectives and competence models of assessment, and
c) explicitly hierarchical social relationships between persons, subjects or whole programs, i.e. emphasis on transmission, lower social positioning of learners with respect to teachers who represent highly specialized and high status knowledge domains (Koulaidis and Dimopoulos, 2006).

a. Content Selection

The content to be taught in the education programs falling closer to this ideal type is selected on the basis of internal criteria of each epistemic community of what constitutes valid knowledge and valid methodologies for producing new such knowledge. Therefore particular emphasis is given on the presentation of the conceptual network of each specialized discipline, as well as on the grasp of the essential procedures employed in it for making knowledge claims. In other words what is attempted to be transmitted in this case is the

vertical discourse of a knowledge domain which takes the form of a coherent, explicit, systematically principled knowledge structure, hierarchically organized. The principle of the structuring of the esoteric knowledge constituting the basis for the relevant content selection 'moves the realizations towards more and more general propositions which integrate knowledge at lower levels and across an expanding range of apparently different phenomena' (Bernstein, 1996, p.173). This form of content selection corresponds to specializations maintaining strict boundaries vis-à-vis other fields of knowledge, a condition which in turn favors social uniformity, and strict delimitation of academic fields from other social fields of action.

c. Objectives and Mode of Assessment

The objectives to be accomplished in the education programs lying closer to this first ideal type have mainly to do with the grasp of knowledge structures (ranging from surface to deep ones) or with the ability to apply various methodological approaches of each specialized knowledge domain. The objectives of this kind are aligned with a competence based model of assessment (Bernstein, 1996). According to this model the pedagogic practice is focused on the learner, and the progress he/she makes as he/she learns. Development is recorded through intense observation and monitoring of the individual. Comparisons are often drawn between the progressive sequence of development established within pedagogic settings and 'natural' processes of maturation occurring outside the educational contexts. The dominating field determining the objectives for each developmental stage of the learner tends to be the conceptual one (Piaget) while other fields like those of psyche (Freud) or language (Chomsky) are occasionally also taken into consideration (Bernstein, 1996).

The adoption of a competence based model of evaluation commands preference for knowledge based objectives. This is a natural consequence of the fact that the content is transmitted on the basis of highly hierarchical and vertically organized knowledge structures of specialized knowledge disciplines, thus highlighting the need for assessing appropriate levels of knowledge of particular age or ability groups appropriately.

c. The Social Relationships Established

The high specialization of the content in the corresponding programs preserves the insulation between esoteric knowledge domains and every-day practical forms of knowledge. In this way what eventually is preserved is power and social hierarchies between persons, subjects and whole programs. Specifically, the clear separation between esoteric and practical and/ or everyday knowledge in this case preserves explicit hierarchical social relationships and unequal distribution of power between expert addressers and non-expert addressees as well as between subjects (e.g. maths and music) or whole programs (e.g. vocational and theoretical courses) of different epistemic status.

These explicitly established hierarchical social relationships have direct implications for the social positions made available for participants in the relevant communication-pedagogic process. This process is based on a unidirectional model of knowledge transmission from the knowledgeable experts (teachers) to the passive and powerless non-expert students. In conclusion, traditional pedagogy of transmission of pre-specified knowledge, prevails in this ideal type, while teachers tend to maintain strict control over selection, transmission and evaluation of knowledge.

2.2. The Second Ideal Type: Post Modern Schooling (Mid Seventies Until Today)

The second ideal-type of schooling corresponds to the prevailing socio-cultural climate of the period from the mid-seventies until today. This ideal type seems to be deeply shaped by the notion of post-modernity which has dominated the positions put forward by the vast majority of the agencies/agents of symbolic control during this period. Specifically at the level of theory, *post-modernity* is usually associated with heightened degrees of fragmentation, pluralism, individualism and relativism (Lyotard, 1984). At the political level post-modernity is superimposed over initiatives for extending individuals' rights, enhanced accountability and promotion of the market values. These influences have contributed this ideal type to be characterized by:

a) selection of the content to be delivered on the basis of social and market criteria,
b) skills based objectives and performance models of assessment, and
c) implicitly hierarchical and diffuse social relationships between persons, subjects or whole programs (Koulaidis and Dimopoulos, 2006).

a. Content Selection

The content to be learned in the educational programs lying closer to this second ideal type is selected on the basis of social or market criteria. Therefore instead of promoting the epistemic integrity of specialized disciplines as is the case with the programs of the first ideal type, these programs seem mostly to stress the utilitarian aspects of various knowledge forms being integrated into a common framework. In this way, the content is a pastiche of elements originating from various knowledge domains (both academic and more practically oriented ones) and selected due to their suitability for dealing with local, segmental, context dependent, tacit and multi-layered problematic situations, arising either from social or market conditions. Using terms introduced by Bernstein, we would say that the programs belonging to this ideal type seem to promote a horizontal knowledge discourse. The emphasis here is given to various contexts of applications rather than to distinct subject areas.

b. Objectives and Mode of Assessment

The objectives set in the education programs belonging to this second ideal type are mainly related to skills and certain generic competencies rather than to knowledge. This type of objectives is grounded on the basis of performance based models of evaluation. Performance-based models focus on what is to be learned-the subject knowledge-and judge development more so in terms of the standard of output at the end of each educational cycle and less so in terms of inner control (Bernstein, 1996). The emphasis is upon what is absent in a learner's product against prototype, predefined and standardised products. This leads to explicit and specific criteria of evaluation.

The preference for skills based objectives follows directly from the instrumental nature of the corresponding programs and their orientation towards fulfilling usually pressing needs of either society or the market economy. In this case what is required is not the acquisition of knowledge structures but the certification of one's ability to carry out specific tasks, usually of quite practical nature. In extreme versions, these programmes aim at just cultivating a set

of flexible skills (genericism), rather than any coherent body of knowledge (Sarakinioti, Tsatsaroni and Stamelos, in press).

c. The social Relationships Established

In contrast with the programs of the first ideal type, the knowledge transmission process in this case is based on innovative pedagogies, according to which the educator shares part of his/her power (in the form of expertise) with the learners. Learners are regarded not as passive receivers of ready-made knowledge packages, but as responsible and resourceful individuals who are capable of contributing to the learning procedure according to their experiences and skills in a creative way. This differentiated perspective leads to implicitly hierarchical social relationships between: a) different subjects, b) whole programs and c) persons-representatives of different knowledge forms. The implicitness of the social relationships is due to the fact that unlikely to what happened in the programs of the first ideal type, the differential epistemic status of the various knowledge forms has ceased to exist. This basis has been replaced by the assessment of the utility of the various knowledge forms for dealing with the practical problems arising in the contingent contexts of the public domain. Therefore, it follows that the carriers (persons, subjects, programs) of the corresponding knowledge forms share power on a more equal basis. This does not imply by any mean that control over the learning process is taken over by the learners; it only means that the latter have more *apparent* control over it and its social base. In practice, this ideal type of schooling promotes forms of transmission pedagogy that combine teachers' strict control over selection, sequencing and pacing of the educational process, with students' 'active' engagement in a more socially equivalent basis though specific methods, e.g., 'project work' .

Table 1 summarises the most important differences of the two ideal types, analyzed in the preceding sections.

In order to describe the structural differences between the two aforementioned types of schooling in a theoretical language that allows the juxtaposition of the shifts in education with the shifts in other related fields of cultural reproduction we draw on the key notions of classification and framing borrowed from the seminal work of Basil Bernstein in the field of sociology of education.[1]

Table 1. The characteristics of the two ideal types of schooling

	Modern schooling (aftermath of second world war-mid seventies)	Post modern schooling (mid seventies-today)
Content Selection	Epistemic criteria	Social or Market criteria
Objectives	Knowledge based	Skills based
Assessment model	Competence model	Performance model
Social Relationships	Explicitly hierarchical	Implicitly hierarchical

[1] The theoretical language of Bernstein allows the analysis of various fields of cultural practices and the corresponding social relationships enacted through these fields in a comparable way. Thus, it is very suitable for analyzing shifts in the history of social institutions such as schooling in our case, in the context of a broader cultural milieu. In particular Bernsteinian theory is suitable for analyzing fields with a pedagogic rationale within which relations of pedagogic nature could be developed such as those between parents/children, teachers/pupils, doctors/patients, social workers/clients, but the analysis can be further extended so as to include the social relations of the work contexts of industry or commerce.

Classification examines the relations between categories, whether these categories are between institutions, social groups, discourses, or practices. By definition, strong classification formulates well-defined boundaries, whereas weak classification results in blurred or more permeable boundaries between such categories. In other words strong classification is predicated on the rule 'things must be kept apart' while weak classification on the rule 'things must be put together' (Bernstein, 1997). Classification is related to relations of power between agents affiliated to each category. Strong classification implying well defined borders between categories, leads in turn to fixed identities which tend to act as border guards maintaining the autonomy of their field of practice. On the contrary, weak classification constructs fluid negotiated identities which tend to act as mediators between different fields of practice.

In this chapter we are especially interested in exploring the symbolic boundaries which are inscribed in the form of material boundaries in the design of school space between the following categories: a)school as an institution and its social environment, b) different social groups acting within it, c) different knowledge domains (subjects) and d) different practices.

Framing on the other hand refers to the regulation of communication in the social relations through which the social division of labour is enacted. In the context of this chapter framing refers to the controls on communication that take place within school. At this point it is interesting to point out the distinction made by Bernstein (1977) between *instructional* and *regulative* discourse as constitutive parts of the pedagogic discourse. The former refers to selection, sequence, pacing and evaluation of school knowledge, whereas the latter refers to the principles of social order and identity formation. Where framing is strong, school (with its various manifestations as teaching staff, official curricula, school buildings, artefacts selected and placed within school space by school authorities, etc) has explicit control over the elements constituting the pedagogic discourse. Where framing is weak students have more apparent control over the pedagogic communication and its social base. It is possible for framing values-be they strong or weak-to vary with respect to the elements of the practice, so that, for example, you could have weak framing over pacing but strong framing over other aspects of the discourse.

It follows that adopting the Bernsteinian theoretical language, modern schooling seems to favor strong classifications and framings, while post modern schooling seems to be more compatible with a significant weakening of classifications and framings as far as the regulative discourse is concerned. On the contrary, as far as the instructional discourse is concerned, framing in post-modern schooling seems to be further strengthened. This trend is more evident in the case of assessment where students' achievements are typically assessed on the basis of centrally predetermined 'learning outcomes', described in terms of targets for acquiring competencies and skills.

The way we attempted to translate the notions of classification and framing in relation to material culture of schooling, clearly indicates that it is possible to identify elements of this culture that seem to fit more to the pedagogic requirements and standards of either modern or post-modern schooling.[2] The only area that it seems to be relatively immune by the material culture of schools is that of instructional discourse. On the contrary it seems that the social

[2] The sociological notions of classification and framing are very useful for analyzing systems of signs and linking them with the social order since they are conceptually homologous with the corresponding notions of paradigmatic and syntagmatic signs.

base of communications in school which constitutes the other dimension of framing i.e. the regulative discourse is influenced by the material environment of schools.

3. A Socio-Semiotic Inventory for Analyzing the Material Culture of Schools

In order to analyze the material culture of schools as a signifier of either of the two aforementioned registers we need to devise an inventory of multiple semiotic resources signifying symbolic boundaries and potential uses and communications within the school space.

We draw on Gramsci's concept of the inventory of traces as used by Said (1978). Said argues that the starting point of any critical elaboration is the consciousness of what something really is, and is 'knowing thyself ' as a product of the historical process to date, which has deposited in institutions an infinity of traces, without leaving an inventory.

3.1. Semiotic Resources for Classification

Starting from the semiotic resources that could be related to the notion of classification we focus on symbolic boundaries in a school context. These symbolic boundaries could be constructed by three basic functions namely *segregation*, *separation* and *contrast* (van Leeuwen, 2005).

Segregation can be defined as the situation where two or more elements occupy entirely different territories. Segregation is usually realized by partitions (e.g. solid walls, sliding doors, fences, use of plants as dividers, curtains, etc) which separate spaces and hence people, groups and/or activities associated with these spaces. There are two crucial characteristics that modulate the level of classification in this case. The first characteristic is the *permanence* of the corresponding partitions whereas the second one relates to their *permeability*. The more permanent a partition is (the archetype in this case is a wall), the more strongly classified are the people or the activities associated with the segregated spaces.

Furthermore, permeability has to do with the extent partitions allow communication between the segregated territories. Communication is mainly related to perception, either aural, or visual. Increased permeability signifies weaker framing allowing different groups of people to communicate and thus blurring their sense of distinctiveness.

The second mechanism through which symbolic boundaries are constructed is that of *contrast*. In this case, two elements culturally associated with different groups of people, practices, institutions, etc, differ in terms of a quality (e.g. as realized by colours, materials, shapes, sizes, or by any other formal feature). The different qualities act as emblems of different cultural identities, thus they are recognized as signifiers of different categories. The greater the number of the different qualities, the stronger is the classification.

The final mechanism that establishes symbolic boundaries in the context of material culture is *separation*. Two or more elements are separated by empty space, and this suggests that they should be seen as similar in some respects and different in others.

Apart from the aforementioned mechanisms, the compartmentalization of space which symbolically corresponds to the construction of semiotic boundaries is complemented by reference to the notion of the *informational value* of different spatial arrangements corresponding to horizontality (left/right and front/back), verticality (upper/lower parts) and centrality (centre/margin). According to Kress and van Leeuwen, (1996) these differentiated spatial arrangements tend to polarize and thus semiotize the space. This means that all three of these spatial arrangements not only create different distributions in space but they also provide coherence and meaningful structure to the elements comprising the material culture of a community since they carry specific culturally anchored meanings.

More specifically, as far as the horizontal polarization of space is concerned, according to Kress and van Leeuwen, (1996) throughout history and across different cultures, the distinction between left and right has become an important source of meanings and cultural values. Through mainly religious connotations right has come to be associated with positive moral values, whereas the opposite applies to left. In the horizontal axis the left part, according to western cultural conventions associated with the direction of eye-tracking during reading, corresponds to the informational value of the *given*, commonsensical and self-evident knowledge which acts as a starting point for the learner. On the contrary the right part is attached the informational value of the *new*.

With regards to the other dimension of horizontality what is placed in front is usually more highly valued and appreciated, while what is placed at the back is mainly of lower social value. Furthermore, in the vertical axis the upper section connotes the ideal or the *theoretical*, whereas the lower section is attributed the informational value of the more detailed and specific elaborations, corresponding to the *practical* forms of applied knowledge in real life contexts (Kress and vanLeeuwen, 1996). Using the Durkhemian dichotomy we could argue that the upper parts correspond to the sacred whereas the lower parts correspond to the profane.

Finally, centre and margin form another semiotic principle, a principle which can apply to the way buildings are arranged, the way items of furniture are arranged in a room; to the way people arrange themselves in rooms or objects are displayed on a surface. As van Leeuwen (2005) puts it "*if a composition makes significant use of the center, placing one element in the middle and the other elements around it-or placing elements around an 'empty' center-the center is presented as the nucleus of what is communicated, and the elements that flank it, the margins, are presented as in some sense subservient to it, or ancillary to it, or dependent on it*." (p.208).

In Table 2 below, all the aforementioned resources of material culture signifying classification are shown.

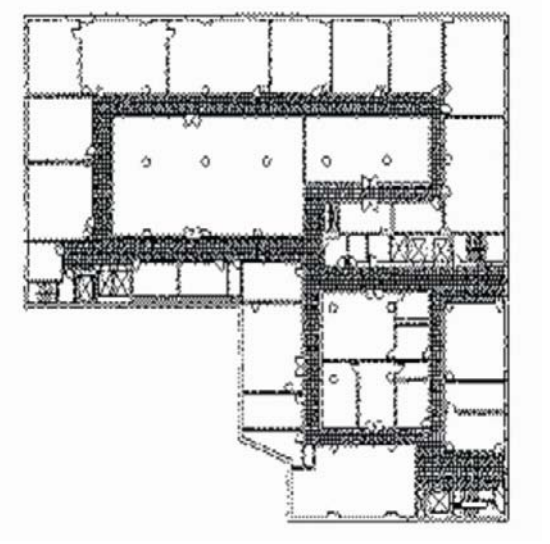
The following three case studies exemplify the different ways various combinations of the aforementioned semiotic resources can realize varying levels of classification.

Case study 1: Moving from cellular school space to open plan schools

Ian Cooper, (1982) tracing advice given by a UK government department on the design of school buildings over the period between early fifties and early eighties notes a gradual abandonment of the idea that a school was to be accommodated in a series of individual, self-contained classrooms connected by corridors: an idea which had served as the mainspring of school design for at least the previous 80 years. The archetype plan of this type of school took the form of a series of individual, self-contained classrooms connected by a corridor to a hall (see Figure 1).

Table 2. Semiotic resources for classification

Resource	Strong classification	Weak classification
Permanence of partitions	High (e.g. walls, fences, hedges)	Low (e.g. sliding doors, curtains, furniture, open plan floor-no partitions, virtual on line connections)
Permeability	Low (thick partitions made of opaque materials not allowing visual and aural connection)	High (thinner partitions made of semi-transparent or transparent materials enabling visual and aural connection)
Variability of qualities	High (different colours, materials, sizes, or other formal features)	Low (similar or same colours, materials, sizes, or other formal features)
Empty space	Large separation area (relatively to the size of the classified agents)	Small separation area (relatively to the size of the classified agents)
Degree of space polarization	High space polarization: Horizontal (left/right and front/back), Vertical (up/down) and Circular (center/periphery) polarization	No particular space polarization, isotropic material arrangements

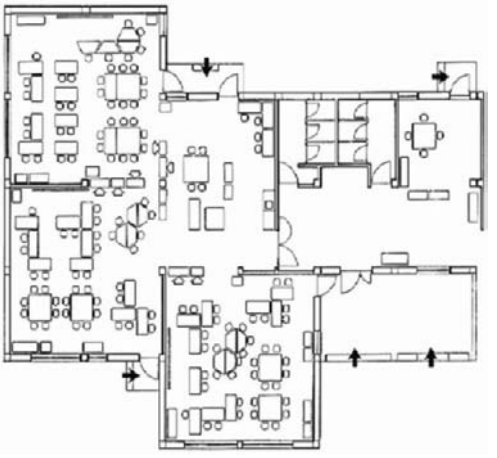


Source: Personal archive.

Figure 1. Floor plan of a modern school building in Greece (built in the early fifties).

This abandonment was signaled by calls for reduction in the partitions within buildings and a sustained drive toward school designs with what were described as open plan forms. The term ‘open plan’ is used to refer to plan forms in which the internal walls and doors are eliminated, to varying degrees, in order to promote what the Governmental Department described as ‘easier access between teaching areas’. The propagation of such ideas was not a phenomenon isolated to Britain and expression of similar sentiments about the effect of changing educational practices on school design was also voiced elsewhere, notably in the

United States where so-called progressive practices came to be characterized by the single epithet ‘open’ (Educational Facilities Laboratories, 1968).



Source: Personal archive.

Figure 2. Details of a possible layout for a nucleus in open space (with three “classrooms”).

For, as ardent exponents of these practices, argued open education is a way of thinking about children, about learning, and about knowledge. It is characterized by openness: doors are ajar, children come and go; classrooms are open, and children bring objects of interest in and take objects out; children move openly from place to place, from activity to activity (see Figure 2). This trend followed the rationale of large-scale building projects of the 1960s, combined with growing dynamism and diversity in society, where it became clear that time implies change and, especially in the planning of hospitals, universities and office buildings, a movement towards open structures became apparent. In the course of these building projects, architects have used a variety of design strategies including movable walls, non-bearing partitions, demountable partitions, modular mechanical and electrical systems, etc.

In a series of more recent policy documents than those examined by Cooper, (1982) connectivity is a key idea for modern school buildings architecture (e.g. DfES, 2002; BCSE and BESA, 2006; OECD, 2001, 2006, 2008). Connections can be virtual as well, where students work with others who are not physically collocated (through videoconferencing, for example) or who are separated by time (through asynchronous on line communication). Connections could be established from the campus to the outside world (a view of a natural landscape, for instance) or by allowing the outside world to view the campus. Connections can also be made through information. Displays can highlight departmental activities or provide a glimpse of world news, or environmental conditions.

OECD, (2006) influenced by the open plan movement, amended its definition of what was meant by the term ‘teaching area’ to include the whole of a school’s environment, rather than a series of individual [class] rooms in order to encompass these alterations in plan form. In the same vein because of the importance of student-faculty interaction, faculty offices are being located close to student spaces. Multiple departments are housed together to encourage interdisciplinary collaboration. Some campuses are establishing sub-campus environments that bring specific departments together. The idea that “All spaces are educational spaces”: classrooms, science labs, computer rooms, etc, but also library, gymnasium, circulation areas,

outdoor spaces, social area, dining/cafeteria, etc, has dominated post-modern school architecture. In the school buildings built under this new 'paradigm' a variety of different work environments and facilities to suit differing needs e.g. individual private spaces, communal spaces for teamwork, relaxation areas etc, co-exist. The main underlying and leading idea is that of the multi-purpose spaces which integrate variable services. Multiple-use spaces were proposed for efficiency and consecutive use of the same space by different classes to increase contact between disciplines.

The implication of this idea is to loosen the rigid and clearly defined various classifications existing in modern schooling like those between students of different ages (separated in different classrooms) or sexes (e.g. in British educational history the two sexes were usually segregated with walls and/or fences dividing the playground into two large sections, one for girls and the other for boys)[3], subjects (different spaces like gymnasium, science lab, computer room, art studios are allocated to different school subjects) or learning practices (e.g. the theoretical part of the lessons were delivered in the classrooms while the practical parts were exercised in the laboratories, or reading was mainly done in the library).[4]

In these conditions the experience of living and learning with difference is conceptualized as an open journey in which the very act of movement across spatial boundaries unlocks the fixity of meanings and identities and, hence, problematizes the spatial logic of bounded learning places.

Case study 2: Moving from the industrial standardized to the locally adapted school building

This shift is mostly related to the mechanism of contrast between the characteristics of the material culture of school as an institution and the characteristics of the local (community) material culture. This contrast can signify stronger or weaker classification between school and community.

The logic of modern schooling is very well expressed in the words of John Dewey who argued that school must be somewhat bounded from society to "fortify the mind against irrational tendencies current in the social environment" (Dewey, 1910, p. 25). This logic led to a highly standardized and quite distinguishable material culture of schooling. It was supposed that standardization and the corresponding institutionalization it implied, provided school with a special character which made it readily distinguishable from the rural or urban landscapes, it occupied. The most important manifestations of this phase were uniform and state controlled architectural standards for school buildings, search for the greatest possible

[3] In U.K the division of the sexes by the use of what we today call 'gender walls' was a policy that continued in many primary schools until after the adoption of coeducation (i.e. mixed-sex education) in the 1950s, but some schools still retain these walls (though not the policy of segregation). Where they exist, these walls provide another opportunity for children to demarcate the playground into smaller spaces (Armitage, 2005).

[4] The trend for increased connectivity or weaker classification is a clear realization of the post-modern ideal of *heterotopia* (Foucault 1986, 2000; Lefebvre 1991, 2003) which becomes gradually a reality through the open plan schools or even more through the foreseeable future of the virtual school. For Foucault (1986), heterotopias are places that are "capable of juxtaposing in a single real place several spaces, several sites that are in themselves incompatible" (p. 25).

The idea of the virtual school stems from the idea of the 'Virtual Office' which has emerged with the advent of cordless technology: mobile phones, laptop computers, pagers and electronic notebooks have made it possible to work anywhere. Also referred to as the 'Nomadic Office', the practice of 'sedentary' and 'nomadic' employees has been adopted by some organisations (Pelegrin-Genel, 1996). While sedentary employees are restricted to a single static workplace, nomadic workers conduct their work in many different places such as cars, trains, hotel rooms, airport lounges etc, using mobile technology.

universality of materials and apparatuses, deliberate avoidance of any feature that might provide a school unit with a unique identity (e.g. logos, flags, uniforms, names, colours, and other symbols that represent any local collective identity), and emphasis on functionality with its associated lack of any decorative element. All these features contributed a lot to the so called institutionalization of schools.

As Goffmann, (1961) reminds us, individuals in institutions are subject to an intense period of de-personalization, in which they are to substitute their previous identity with a new, institutional identity. In other ways the implication of this phase on the level of students' identities was to foreground their collectivity as a uniform and normalized group rather than their individuality and variation. Furthermore, this industrial phase in the production and reproduction of the material culture of schools tended to signify remarkable classification between school life and community life. In figure 3, a typical example of this kind of school is shown.

However, standardized plans and construction techniques were gradually replaced by tailor-made designs adapted to each specific site. As a result, considerable effort has been put so that each school built to be different, unlike the standardized models built between 1965 and 1970, which were all virtually identical.

This new phase came to serve the new policy imperatives for opening up schools to the wider community; and to extend opportunities for learning to the whole community (CABE 2007). Later, during the nineties, this phase was further reinforced by the momentum of sustainability as a horizontal social discourse undercutting many different domains of social life.

According to a definition jointly provided by the British Council for School Environments (BCSE) and the British Educational Suppliers Association (BESA) "*Sustainability means designing, constructing, operating and procuring schools in ways that minimize harm to the environment, and, where possible, improve the landscape in ways that encourage biodiversity. A sustainable school is also a school which supports the development of the local community, initiatives for regeneration and the 'whole child'*" (2006, p.7). This type of school eliminates its distinctiveness from its local community and thus it reduces its barriers with it. This can be realized through two main procedures.

Source: Personal archive.

Figure 3. An industrial standardized Greek high school.

Source: Personal archive.

Figure 4. School built in Cyprus according to a local architectural style.

The first has to do with the adaptation of the material aspects of schooling with the local environment, whereas the second is related to the creation of an image of domesticity, and thereby 'neutralize' the aspect of institutionalization. The first procedure involves the employment of environmentally sustainable features such as photovoltaic panels and geothermal heating or rainwater harvesting for re-use in sanitary appliances. Furthermore, considerable attempts are made to shape building elements so that they reflect and make use of a local or regional cultural building tradition (e.g. building materials are mostly indigenous, the architecture follows local styles). Figure 4 depicts a school in Cyprus built according to local architectural style.

In the same way, school spaces contain artefacts of a wide range of cultural origins and tell the story of community from the perspective of different cultural groups. This trend is fully aligned with the post-modernistic avowed concern for decoration of buildings, often a concern for semiotics or architecture as a form of quasi-linguistic communication, and often a strong historical content (Jencks, 1984, 1986).

On the other hand the second procedure for reducing the gap between school and community life involves the incorporation of a range of elements that replace industrial elements, which through their form, communicate a context fundamentally disagreeing with the stereotype of a dwelling place as an oasis of relaxation, idyllic peace and escape from psychical stresses connected with school work. Such elements could be for instance an emphasis on decoration corresponding to conflicting semiosis (according to the multiplicity of the cultural identities within school) aligned with post modern aesthetics, as well as the inclusion within school space of artifacts and furniture of domestic origin (e.g. sofas, coffee-tables, corners for personal reflection).[5] The emphasis on decoration over the functional and technical aspects of school premises allows the representation of the multiple cultural identities existing in the community rather than suppressing them under a cover of technical-institutional rationality. As Pink, (2004) argues visual decoration is a representation of

[5] For example, in Hellerup Skole in Copenhagen slippers are worn to preserve the wooden floors, maintain cleanliness, keep noise down and as the pupils leave their shoes at the door, prepare themselves for learning. This kind of transitional ritual resembles very much the entrance from a public to a domestic place (BCSE, 2006).

identity. The same role is played by the various features that tend to function as diacritica of local identities, thus linking school culture with local culture. Typical examples of such features are emblems, colours, statues of figures of local importance, mascots, etc.[6]

Source: Personal archive.

Figure 5. A de-institutionalized primary school in U.S.

In addition, the domestication of the material culture of schools signifies the fact that the distinction between school practices and ordinary domestic practices has become difficult to draw analytically. In Figure 5 below, we present an example of a school the material culture of which creates a domestic informal ambience.

Case study 3: Moving from highly polarized to more isotropic material arrangements of schooling

Modern schooling enacted its emphases on strict boundaries and demarcations between persons, subjects or activities, by producing highly polarized material arrangements with single focal points. These polarized arrangements attributed different cultural attributes to the entities they included according to the informational values each associated spatial composition carries (see the relevant analysis in the preceding section). In other words in modern schooling school space tended to be highly semiotized. The fact that traditionally teaching staff and school administration offices were placed on a higher level than classrooms or other teaching areas constitutes a typical example of this practice. This kind of arrangement signifies clearly marked hierarchical relationship between school administration and students.

Another example could be the typical seating arrangement one can find in the floor plan of a modern school (see Figure 6).

[6] School colors are a critical, though often overlooked item in the symbolic arsenal of schools, especially of the American high schools as a signifier of their attachment to a local culture (Staiger, 2005).

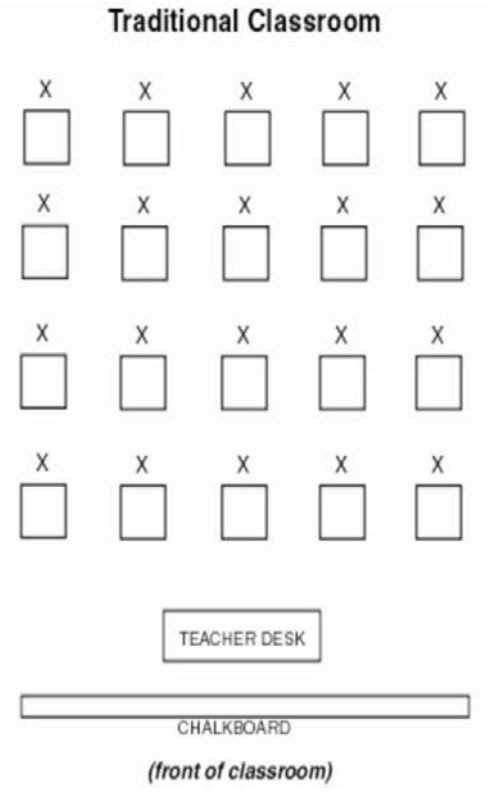


Figure 6. The floor plan of a typical classroom.

In this floor-plan one could discern a front-back polarization. The front part which is culturally more highly valued is comprised of the teacher desk as well as the chalkboard. Both these two elements signify school knowledge. The positioning of these two elements in the front of the classroom and separated from the space occupied by the seated students signifies a condition according to which school knowledge is something valuable that students have to cross a gap (an intellectual gap which is signified by a spatial gap) for acquiring it.

In contrast opposition with this practice of modern schooling, post-modern schooling blurs the boundaries by eliminating single focal points and de-semiotizing school space. In this way, the material arrangements in post-modern schooling tend to be more isotropic.

For example the floor plan of Figure 7 represents a multi-centered classroom which tends to construct less clear cut demarcations between school knowledge and students. In this case, if students need to work with more materials than fit on their desks, or with shared materials, centers are a good option. One can set up the various centers around the periphery of the room while allowing space for students to get back to their desks if necessary. In this model, the students should be able to complete the center activities mostly on their own, while the teacher circulates to trouble-shoot and observe. Therefore, in this classroom school knowledge materially symbolized by the various centers, teacher's desk as well as the two reading tables seems less distanced from students as learners. Classroom "front" is deemphasized (removing the lectern, for example) to create open, discussion-friendly space. Choice and placement of furniture allows students to see and hear each other.

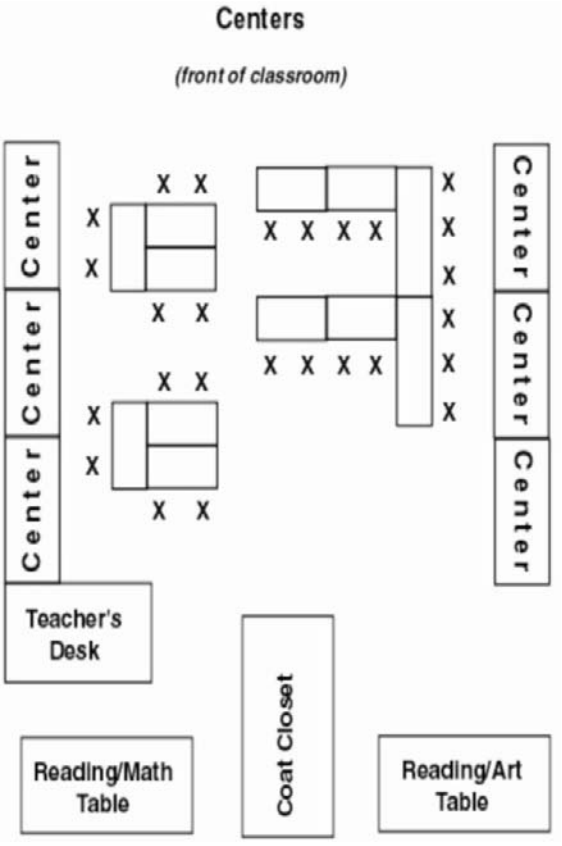


Figure 7. A multi-centered floor plan of a post modern classroom.

All three of the aforementioned case studies exemplify in many different ways the fundamental shift of weakening classifications as a feature characterizing the transition from modern to post modern schooling. This transition is very well captured in the words of Foucault who argues that "The present epoch will perhaps be above all the epoch of space. We are in the epoch of simultaneity: we are in the epoch of juxtaposition, the epoch of the near and the far, of the side-by-side, of the dispersed." Foucault (1986, p. 22).

3.2. Semiotic Resources for Framing

Social action and interaction are inextricably embedded within the material setting. This is exactly the reason why framing is a very relevant concept in examining the material culture of schooling.

According to the definition of framing, it follows that this concept corresponds to the degree of explicitness that the legitimate school code is communicated to its receivers (students). According to Foucault, (1977) schools can be regarded as 'normalizing' institutions exerting power. As Foucault writes: "[discipline] 'trains' the moving, confused, useless multitudes of bodies and forces them into a multiplicity of individual elements … [and] combinatory segments" (1977, p.170).

Thus, specific technologies of power enacted in school environment create a docile body that can be observed, normalized and ranked, and thus function effectively in the larger social body of which it is a part. Individualizing the bodies of the masses avoids dangerous aggregates and thus creates a more docile, manageable and politically incapacitated human being. For example, in schools, desks are organized in rows and columns, isolating individuals from each other and making them easier to observe.[7]

Such 'technologies of power' are effective because they permeate multiple facets of school life and thus naturalize power, which makes it difficult to provide surfaces for resistance. The omnipresence and subtlety of the technologies of power, where the locus of power is diffused corresponds to a state of weak framing. However, there are many cases where these technologies of power become easily discernible and detectable by a trained critical eye. These cases correspond to a state where the social control that schooling exerts on its subjects is visible and thus, framing is strong.

Using a combination of the Foucauldian and Bernsteinian theoretical frameworks as a starting point, it could be argued that framing is determined by the degree to which material aspects of schooling can be read as technologies of power attempting to transform young bodies into 'docile' students' bodies. These bodies must be trained and internalize the proper conduct in the school environment. In turn, this proper conduct mainly concerns students' mobility, modes of work, modes of communication as well as the latter's recognition of the hierarchical social relationships within the school community.

Following this line of argumentation, the level of framing promoted by the material culture of a school depends on:

a) how explicitly regulated is the use or to put it differently up to what extent the criteria for competent use of school space and artifacts are both explicit and specific,
b) the extent to which students' vision and mobility is controlled
c) the extent to which various objects can enter into different relationships to each other and
d) how far the various material aspects of school environment could be 'read' as signifiers of asymmetrical social relationships between teachers (or more generally schools) and students.

As far as the first dimension is concerned the higher the explicitness, the stronger framing. Framing is weak in the case that such regulation is either absent or covert. Bernstein claims that where the criteria for competent usage of the space are both explicit and specific, any deviation on the part of the user from the legitimate use is perceived as 'pollution' which is highly visible and thus easily traced and for this reason penalized (Bernstein, 2007). For example consider the case of a classroom where the desks are put in rows, the books are put in the bookcase in alphabetical order and there are drawers labeled with each student's name. Such a classroom constructs a space where deviance in the form of 'pollution' is highly visible. If a user (student) as much as leaves a personal mark (a failure to replace a book in its original position, a misplacement of his/her belongings to the drawer of another student, a messy arrangement of the desks) this constitutes pollution and such pollution is quickly

[7] The spatial segmentation is enhanced by temporal segmentation. A tightly regulated schedule of activities allows for easier management and comparability.

perceived. Therefore, one could argue that strong framing is equivalent to users' (students') surveillance.[8]

This kind of argumentation explains why non-teaching spaces are important because they are less formal than classrooms, are rarely the centre of attention and 'behind the scenes' rather than 'front of stage' (Goffman 1956) and therefore where actors feel out of the spotlight. Moreover, they constitute elements of hidden curricula and how 'organisations work when no one is looking' (Morgan 1997, p.145).

In summary we could argue that a school environment characterized by many embedded explicit and specific criteria of its legitimate use and proper conduct in it signifies strong framing. Material features that might realize this perspective could be: a) color coding of all services, b) signage, c) wall displays echoing the official voice of school[9] or d) labeling of artifacts or of proper places these artifacts should be put or stored.

As already mentioned framing is also related to the extent students' vision and mobility is controlled by the material arrangements of schooling. Visibility and spatial mobility, as Foucault (1977) has shown, are fundamentally linked to governmentality and control.

Certain forms of knowledge and control require a narrowing of vision. The great advantage of such tunnel vision is that it brings into very sharp focus certain limited aspects of an otherwise far more complex and unwieldy reality. This simplification, in turn, makes the phenomenon at the centre of the field of vision far more legible, and hence far more susceptible to careful measurement, calculation, and manipulation. A typical example of this narrowing and tunneling of vision is the placement of windows in classrooms. In older school buildings windows were placed at the higher parts of the classroom walls, far beyond students' eyesight level (Solomon, 1992). This was a purposeful choice so as not to allow students' gaze to be distracted by irrelevant stimuli from the outside world. A similar purpose is served by placing teacher in a central position in the classroom. This position which usually, as we have already seen, coincides with the frontal part of the classroom plays the role of a single focal point which aims at attracting students' gazes.

Apart though from the narrowing of vision, explicit control over students and thus strong framing is also realized by material conditions which tend to restrict students' mobility. On the contrary, when children's movements are self-regulated, school environment is characterized by weak framing. Features of a school environment that can control students' mobility are: a) orientation signs[10], b) reduced free space (e.g. students are seated in proximity to each other with little space between chairs), c) long and narrow corridors which

[8] According to Foucault's analysis of schools and other institutions one of the most effective technologies of power rests on the Bentham's notion of the panopticon: the capability of surveillance of the many by the invisible few (1977). In the panopticon, bodies are subject to a universal gaze but the inmate never knows for sure when the gaze occurs. The so-called "Prussian" school design, popular from 1873 onwards-both within and outside Germany-and still around today constitutes a typical example of this technology. This type of school has the top half of classroom walls glazed, to allow the headmaster to keep an eye on things (van Leeuwen, 2005).Through this technology of power rendering something noticeable appears to make it potentially problematic and worthy of further inquiry. In a very different vein, Sacks (1972) makes a similar point: "For Western Societies at least, being noticeable and being deviant seem intimately related. The notion that one is suspect whose appearance is such that he stands out, have the deepest foundations. Indeed, in Judeo-Christian mythology, human history proper begins with the awareness of Adam and Eve, that they are observable. The next bit of social information thereupon we learn is: to be observable is to be embarrassable." (pp. 280).

[9] In many schools one can still find wall displays in the form of epigraphs, visual representations, posters or other media containing dictums in the form of guidelines for proper behavior and morale.

[10] For example in Kings Avenue Primary School Lambeth a bright colour-coding system including a continuous yellow stripe in the studded rubber corridor flooring, provides orientation (BCSE, 2006).

impose a specific unidirectional path for everyone and no-one in particular[11], d) relatively limited area allocated to non-teaching spaces (e.g. a playground where free motion is allowed), e) restricted number of entrance or exit points, or f) mechanisms of access control (automated doors, photocells, etc).

These features are missing from post modern school buildings. The idea behind the reduced control of students' mobility in these buildings is that conditions of increased mobility allows teams to collaborate and also creates chance encounters, often the catalyst for emerging ideas. Spaces in this case are designed for facilitating interaction and brainstorming and encouraging informal communication serendipitous meetings, and impromptu conversations. In such spaces students and teachers who know one another only slightly may detain each other in broad pathways (not corridors) where paths intersect in an almost random way.

Apart from the control of vision and motion in school, framing is also related to families of items, which are significantly linked and "exposed" to social communication within "social spaces" (Baudrillard,1972; Bourdieu, 1979). In such a "social space" not only does each object have a denotation in itself, but it assumes special meanings deriving from the linkage to other objects, while the linking pattern is significant. As far as the linking patterns of school objects are concerned, the greater the number of different relationships these objects can enter into with each other the weaker the framing.

In this case weak framing corresponds to flexibility and adaptability as principles of organizing the material culture of schooling, thus empowering students to gain more control over its configuration. On the other hand strong framing corresponds to invariability and stability, which in turn mean that students are negated to challenge a pre-defined and pre-organized arrangement of their material environment. To put it differently school spaces characterized by weak framing tend to be organized around the principles of variability, reconfigurability, personalization thus bringing the learning subjects into the foreground. Instead spaces promoting strong framing tend to be organized around the principles of serialisation, standardisation, and duplication thus bringing the absolute nature of the objects into the foreground.

The flexibility and adaptability of the material aspects of schooling is delineated with pedagogies that should be tailored to the subject, the learners, and the intended outcomes. Student needs and learning preferences vary as well. Spaces that are flexible, accommodating different approaches and uses, improve the odds for effective learning.

Flexible spaces are defined by OECD as places that can adapt quickly and inexpensively to changes in the curriculum, to evolving pedagogical theory and practice, to the demands of the school community, and to the fast developments in ICT (CABE, 2007). In addition to the aforementioned requirements, flexible and minimally designed or even undersigned places are in accordance with learned centered pedagogies of post-modern schooling. According to numerous studies modification and access to natural un-designed areas were found to be important preferences for children (Francis, 1988). It is exactly this type of spaces that children seem to appropriate in the most dynamic way, expressing a desire to modify and change the landscape and an interest in claiming found spaces as their own (Day, 2007). On the contrary adults have been found to prefer more traditional environments which are safe, neat, and fixed.

[11] According to Koolhaas, (1994) corridors are intentionally asocial, and sociofugal.

Similar trends for more flexibility can be also traced in the design of workplaces. Specifically, workplaces today and in the future need to offer flexibility of both space and personnel, breaking away from hierarchical patterns of the past. They become dynamic to allow the interchange of ideas and maximum communication which will in turn inspire creative thought and dynamic interaction to generate innovative ideas (Anjum, Paul and Ashcroft, 2005).

The shift of organisational set up from a static hierarchical structure to a more fluid team-working arrangement implies the need for simplicity and flexibility in furniture design as well. For example many pieces of furniture in school buildings are modular and suspended from demountable partitions. The original iron desks have been replaced by wheeled light desks.

Under the influence of this generalized organizational culture nowadays school buildings are designed with some features intended to maximize flexibility. The school building is never finished; members of the school community experience it and re-build it over time. This ongoing adaptation of the school environments is also aligned with a more general trend of an increased interest in user participation in the shaping of living environments. There is growing conviction in a number of quarters that the child's view on learning environments should be considered (Burke and Grosvenor, 2003; Clark et al., 2003; DfES, 2002).[12]

In a flexible and adaptable school environment one can find elements like: easily movable objects (e.g. light or wheeled furniture, movable displays)[13], variability of learning environments, temporary use surfaces (e.g. temporary writing surfaces), adjustable lighting, temperature or sound volume or demountable partitions.

Finally, framing has to do with the extent social relations between students and school as an institution are explicitly hierarchical in nature. The more explicitly hierarchical these relations are, the stronger the framing becomes. However, social hierarchical relationships could be signified by a variety of material aspects. It is commonplace in studies of material culture that different objects, materials, or characteristics like size, shine, style, etc can act as signifiers of differentiated social status. For example, a teacher's luxurious leather chair contrasted with his/her students wooden cheap chairs could become a symbol of his/her superior status and authority. In addition, important data about individual or group space is directly related to membership or status: the amount and kind of space allocated to a member of a cultural system reflects his/her status in the structure of that system. For instance, the area of space allocated to teacher in the classroom of Figure 6, being relatively larger than those allocated to each individual student could be read as a marker of the superior social position of the former with respect to the latter. Similar significations of hierarchical social relationships could be realized by a marked differentiation between the dressing codes of teachers (i.e. formal dress code) and students (i.e. casual dress code signifying a rebellious spirit of youth culture).

[12] Nowadays, pupil views and pupil voices are buzz words in education contexts and they are driving many initiatives and policies, as well as the process of school development and evaluation (Flutter & Rudduck, 2004). This movement for the student voice to be heard and recognized is underpinned by a philosophical shift within the wider community to listen to the views of children initiated by the UN Convention on the Rights of the Child (1989).

[13] Hellerup Skole, Copenhagen, Denmark is an exemplary case as far as adaptability is concerned. In this school a series of wooden central staircases double as seating and performance spaces (BCSE, 2006).

In Table 3, all the aforementioned resources of material culture signifying framing are shown.

Table 3. Semiotic resources for framing

Resource	Strong framing	Weak framing
Degree of explicitness and specificity of the criteria for competent use of school space and artifacts	High (color coding of services, signage, wall displays echoing the official voice of school, labeling)	Low (no color coding, no sign posts, empty walls, no labeling)
Weight of objects	High (difficult to be moved)	Low (easy to be moved)
Mobility of objects	Low (bolted furniture, non-revolving chairs, tables, etc, fixed surfaces, fixed and permanent partitions)	High (wheeled furniture, revolving chairs, tables, etc, sliding surfaces, demountable partitions)
Variability of learning environment	Austere, uniform environment comprised of few objects of single functionality	Multi-sensory environment comprised of many objects of variable functionality
Permanence of use	Permanent use (e.g. permanent display or writing surfaces)	Temporary use (e.g. temporary display or witting surfaces like a white board for instance)
Adjustability of indoors conditions (temperature, ventilation, lighting, sound volume, etc)	Non adjustable	Adjustable
Control of vision	High (single focal spaces, features of high salience like size, sharpness of focus, tonal contrast, colour contrast, or placement attracting vision, reduced or no visibility of the outside environment)	Low (multi-focal spaces, features of low salience, increased visibility of the outside environment)
Control of mobility	High (orientation signs, reduced free space, long and narrow corridors, low area allocated to non-teaching spaces, restricted number of entrance or exit points, mechanisms of access control like automated doors, photocells, etc)	Low (lack of orientation signs, increased free space, visually open settings which encourage social interaction, multiple exit/entrance points, free access)
Differentiation of material culture	High (luxurious vs cheap and/or ordinary materials, large vs restricted allocated areas, specialized objects vs objects of everyday use, formal vs casual dressing style, etc)	Low (similar quality of materials, similar areas allocated to different social groups, objects of similar category, similar dressing styles, etc)

The preceding analysis will be exemplified by two case studies presented below: one applying the inventory of semiotic resources to a classroom characterized by weak framing and one applying the same inventory to another classroom characterized by strong framing.

Case study 4: Analyzing the material culture of a classroom characterized by strong framing

Source: Personal archive.

Figure 8. A classroom characterized by strong framing.

The classroom presented in Figure 8 is characterized by strong framing. This evaluation is based on the following observations:

a) The criteria for the legitimate use of the classroom space are quite evident and explicit. Specifically, desks and chairs are ordered in an easily recognizable way, imposing certain seating arrangement of students' bodies. Furthermore, the thick wooden framework of the notice board at the back wall of the classroom circumscribes a well defined surface for the students to put their announcements or other texts echoing their voice.
b) The mobility allowed by the various material elements comprising classroom environment seems quite restricted. Desks which are the only visible pieces of furniture in this classroom seem quite heavy and are distributed with high density in space, thus not allowing easy reconfigurations of students' seating arrangements.
c) The classroom environment is characterized by high levels of uniformity, containing only identical desks, chairs and empty white walls (with the exception of the notice board). The climate of uniformity and austerity is further reinforced by the school uniform worn by all the students.
d) The material arrangements tend to also restrict significantly students' vision significantly. First of all, students' seating is arranged in such a way so the teacher becomes the focal point of their vision while at the same time preventing the eye-contact between the classmates.[14] Secondly, the notice board has high salience due to its large size, colour contrast with the white surrounding wall and its central

[14] It is worth noting at this point that despite the fact that the seating arrangement attempts to control students' vision as shown in the Figure, quite a significant number of them, especially those sitting at desks at the back of the classroom does not conform to this intended outcome. The conflict between the legitimate behavior imposed or invited by school materiality and the behavior of students in reality is an issue further up taken in the conclusion section.

placement and thus it is highly likely to attract students' gaze. Finally, the closed shutters in the far left hand corner (just below air conditioning machine) do not allow students to have visual contact with the outside environment (only some attenuated sun rays are let into the classroom).

e) Similar high levels of control also exist as far as students' mobility is concerned. The classroom is overcrowded with desks so that there is littke space left for students to move around. In reality the narrow corridors formed between the rows of desks constitute the only space allowing students to freely move.

f) The material culture of this particular classroom does present significant differentiations implying differential social status between teachers and students. Specifically, all the students are seated in similar desks, share a uniform school dress code, and are allocated an equal small amount of space. On the contrary the missing (but easily imagined in the front part of this classroom teacher) must at least have more space allocated to him/her and must be differentiated by his/her students by having a personal (not uniform) dress code.

Case study 5: Analyzing the material culture of a classroom characterized by weak framing

In sharp contrast with the classroom of the previous case study, the material culture of the classroom represented in Figure 9 clearly implies weak framing.

Source: Personal archive.

Figure 9. A classroom characterized by weak framing.

The features that contribute the most in the weakening of framing in this case are:

a) There does not seem to be any obvious or easily recognizable criteria of space use in this classroom. Specifically, there are no features directing students' behavior in preferred ways. This is possibly the reason that in this particular depiction students seem to be seated in a rather arbitrary way.

b) Students' seating arrangement seems readily adaptable since in the classroom there are only three revolving round tables and a large number of light wooden chairs which can be quite easily moved.
c) The learning environment is multi-sensory consisting of a large number of artifacts with variable functionality. A quick inspection shows that in this classroom one can find three wall displays, a laboratory bench (against which the teacher leans), two sets of printed leaflets and a PC screen on the red work bench in the forefront, two pieces of furniture used for storage (a series of drawers on the far right of the picture and one cupboard on the upper surface of which a student on the left seems to take notes on) and two grey netbooks on the two revolving tables.
d) The classroom contains at least two temporary writing surfaces, one whiteboard at the front (just behind the teacher) and one PC screen on the red surface at the forefront of figure 9.
e) The material environment encourages increased students' mobility and vision. Specifically, the classroom is a visually open setting with hardly any barrier restricting eye-contact between students, students and teacher or students and material objects. Furthermore, the transparent large sized windows at the left hand side allow students' gazes to travel outside the classroom. Similar low levels of control also apply to the students' mobility. This is realized by: the multiple access points leading into the classroom (one can identify at least three such points in the figure), the large free area at the back of the classroom, the wide spaces separating the various items of furniture and students' irregular seating arrangement.
f) The only element that seems to contribute to a somehow stronger framing is a marked difference in some qualities of the material culture of the classroom signifying explicit hierarchical relationships between the teacher and her students. Such qualities concern the leather covered iron chair of the teacher, in contrast with the wooden chairs of the students, the big office against which the teacher leans as opposed to the round tables that most of the students share, as well as the personal dress (causal) code of the teacher in contrast with the uniform school dress code of the students.

CONCLUSION: IMPLICATIONS FOR LEARNERS AND EDUCATIONAL POLICY

From the preceding analysis, it has been hopefully become clear that the pedagogic transition from modern to post-modern schooling has been accompanied by a radical change in the material culture of schools. The change can be briefly described as a trend towards weakening classifications and framing especially as far as the regulative discourse is concerned. In essence the change in the material culture of schools has followed such a direction so as to enable the realization of the different educational ideals of each phase.

This finding by itself is a clear demonstration of the fact that school buildings are not inert containers of the educational process, but shape it in decisive ways. Teachers' and pupils' everyday behaviours shape and in turn are shaped by school culture which is manifested visually in the material environment as well as the patterned behaviours that constitute social structure. However, this by no means implies that school material culture

considered as a text cannot be read in oppositional ways. It is true though that school place like any place is practised by its inhabitants through the local appropriation and counter-codification of associated signs, symbols, and myths. What is often omitted from accounts of school space is the generative possibility of the 'performances' through which bodies decipher, enact and concretise a place and the knowledge vested in it.

A conclusion of major importance that a significant number of studies have come to is that the design does not determine the teacher's practice (McMillan, 1983; Rivlin and Rothenberg, 1976). Bennett et al. (1980) include a case study of a comparison of practice in two identically designed units, containing the same number of students, with dramatically different teaching styles and organization. They argue that 'expertise and philosophy of the staff are the central determinants, not the design of the building' (p. 222).

However, the interrelation of consciousness and material conditions is a thread linking many theoretical traditions from Marxism to post-structuralism. Lefebvre was one prominent thinker who laid arguments for the integrality of space with human existence. According to Lefebvre space is not akin to a mere frame (as in the frame of a painting) or a neutral container. "Space is social morphology . . . [space] is to lived experience what form itself is to the living organism" (1991, pp. 93-94). In other words, space substantiates and dynamically defines lived experience for physical bodies in a physical world. Lefebvre's work is the most creative contribution which provides a framework that treats the activities of materiality, representation, and imagination as dialectically constitutive of each other (Stephen, 2003).

Therefore, material culture of schooling has profound implications for the long term process of identity formation of both teachers and students. Here, we are going to be restricted only to the implications for students. In order to better understand these implications we could draw on the grid-group theory developed by the social anthropologist Mary Douglas, over the course of her long and distinguished career (Douglas, 1973). Based on this theory Douglas, (1997) in her essay "In defense of shopping" distinguishes four mutually exclusive identities. She explained that individuals in all cultures (hence in school culture as well) have to decide who they are (what group they belong to) and what they should do (follow the rules of the group or negotiate them).

Therefore according to these two criteria one could distinguish the four identities shown in Figure 10.

As Thompson et al., (1990) point out "Strong group boundaries with minimal prescriptions produce social relations that are egalitarian…When an individual's social environment is characterized by strong group boundaries and binding prescriptions, the resulting social relations are hierarchical (sometimes known as hierarchical elitist)….Individuals who are bounded by neither group incorporation nor prescribed roles inhabit an individualistic social context. In such an environment all boundaries are provisional and subject to negotiation….People who find themselves subject to binding prescriptions and are excluded from group membership exemplify the fatalistic way of life. Fatalists are controlled from without" (1990, p.6-7).

It is hard for one not to notice the equivalence between the theoretical notions of *group* and *grid* of Douglas' theory with the corresponding notions of classification and framing of Bernsteinian theory. Thus, it follows that at the level of students' identities post-modern schooling tends to construct individualists while modern schooling tends to form hierarchical elitists.

		GROUP *Strength of Boundaries*	
		Weak	**Strong**
GRID *Rules & Prescriptions*	**Many**	Fatalists	Elitists (Hierarchical elitists)
	Few	Individualists	Egalitarian

Figure 10. The four identities according to Grid-Group Theory.

In the later case strong classifications and framing of the modern schooling tend to celebrate the reproduction of the past (tradition). The condensed message promoted by the material culture of modern school is that students should "leave the space as they found it" which corresponds to the all pervasiveness of school authority (Bernstein, 1997). On the contrary in the conditions of post-modern schooling (weak classifications and framings) there is an interruption of a previous order and the condensed message promoted by the material culture in this case is "modify the space according to your personal needs".

This transition in the socialization process taking place in school is also evident in the educational policy documents issued by transnational and international bodies like OECD which reflect the new model student who should become what Kenway *et al* (2006) call 'technopreneur'. Kenway *et al* (2006) described the technopreneur as an "agent that spurs society to take advantage of existing scattered and dispersed knowledge' and who 'generates and harnesses new technological knowledge, and discovers entirely new bodies of resources that had been hitherto overlooked'" (p. 41). In its neo-liberal form, technopreneur thus corresponds to the actions of certain techniques of self (the dispositions to mobility, flexibility and risk taking).

The transition from modern to post-modern schooling is further in accordance with *globalization* which is commonly understood as a process of "time–space compression" characterized by flows of capital, goods, people, culture, and information (Harvey, 1990; Castells, 1996; Giddens, 2002) thus having as prerequisites weaker boundaries and controls (rules).

When considering identities one should not forget that there is always an issue of how school culture is compared with the home culture of students. Bernstein has studied the communication modalities enacted by families and schools for explaining class regulated differential school success (Bernstein, 1970). The same line of argumentation can be also transferred in the pedagogic code relayed by the material culture of homes and schools. As many researchers have shown the coding of material environment is strongly dependent on the social class (Baudrillard, 1972, 1996, Bourdieu, 1979, Secondulfo, 1997). For example according to Secondulfo, (1997) in a domestic environment one can discern see two linking patterns or "communication strategies" at work: the center-edge strategy, in which objects in the room are always arranged according to the presence of a center, as a metaphoric image of order and hierarchy; and the "filling-up" strategy, filling every space with objects (but in a

multi-centered way), as a metaphoric image of wealth. Usually, these strategies are typical of the lower-middle class or the upper-middle class.

Furthermore, the domestic environment of a labour family is more likely to be characterized by sparse space. In order then this sparse space to become as functional as possible it must be characterised by strong classifications and framings (i.e. all the members of the family must know at every time where to go, what to do and in what way). Any deviation from this model could lead to a collapse of familial harmony. On the contrary the domestic environment of an upper middle class family is characterized by ample space, thus allowing its members to negotiate its uses and the rules for this without necessarily disrupting their relationships.

Thus, it follows that the material culture of post-modern schooling seems to favour more students coming from upper social class families. In other words the way this type of school allows students from privileged classes to socialize, unlike with what is happening with students from the disadvantaged classes, is very much aligned with the way these students are initially socialized in their homes.

Apart from the aforementioned social implication one could identify two further implications as far as educational policy is concerned. The first implication relates to the internal contradiction between the predominance of performance models of assessment in post modern schooling and the weak framing promoted by the relative coding of material environment in this type. Specifically, weak framing of the material aspects of schooling means less explicit control over students and thus creates an atmosphere that encourages the latter to express more freely their inner self. It is exactly under these conditions that the competence model which puts more emphasis on teachers' readings of signs of internal development of students, regardless of whether this development is on a cognitive, affective or social level could be more easily applied. On the contrary, strong framing and the standardization of modern schooling would seem more compatible with the currently dominant performance models of assessment and their emphasis on standardized and objectified preferred texts as students' products.

Therefore, it can be concluded that a core educational process, that of evaluation seems to function in opposition to the coding of school materiality during the two distinct phases examined in this chapter.

A further internal conflict lies in the relationship between public financing of the educational system and the cost of post-modern school buildings. While many existing school buildings are obsolete reflecting the ideals of modern schooling, rising operating costs and short supply of funds have made the mass construction of post modern school buildings almost prohibitive. This is due to the fact that post-modern schooling with the surplus of space it requires, as well as the requirements associated with it for local adaptation and customization to the multiple needs of its users has a much higher construction cost. This possibly explains why the transition in the material culture of schooling is much more evident as rhetoric at the level of recommendations put forward by various policy bodies (e.g. OECD, national authorities) than as tangible reality on the level of the majority of individual school buildings (Dudek, 2000).

In this sense, it seems that post-modern schooling at the moment is a deep cultural trend embracing many different aspects of education like curricula, modes of assessment, learning materials as well as material culture of schools. The implications of this trend run deep and can influence both teachers and learners on a consciousness level. Without this transformation

in consciousness, any attempt to redesign pedagogical places, whether material or semiotic, will only achieve an external and superficial change.

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Chapter 2

BEYOND SIGNIFICATION: THE CO-EVOLUTION OF SUBJECT AND SEMIOSIS

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ABSTRACT

The paper will start from the assumption that semiotics today has advanced well beyond the early insights of Peirce and Saussure, both of whom looked at signs rather atomistically and in a decontextualised manner. Furthermore these thinkers tended to view the icon, index and symbol as different kinds of signs. Such views are untenable today.

Firstly, it needs to be shown what the nature of contextualisation entails, as a shift from signification to cognitive semiosis. This implies both intertextuality and intersubjectivity as a result both of the evolution of the species and the further evolution of its culture. Highly evolved culture is made up of a complex of implicit and explicit intertextual relations, resulting in increasing levels of *abstraction* that demand concretisation through the hermeneutic activity of a constantly transforming subjectivity. This needs to be theorised so as to show up the nature of the symbolic order, which nevertheless incorporates the iconic and indexical within itself. This incorporation means that the iconic-indexical dynamics of zoosemiotics retain a presence within symbolic human semiosis.

It will be shown that this insight is prefigured as the 'animal kingdom of the spirit' in Hegel's *Phenomenology* and that this raises the possibility of a more fully realised symbolic realm in the further evolution of culture. This possibility flows from the fact that human subjectivity may be expanded to a greater consciousness of the iconic-indexical animality that is embedded in the symbolic order. This cannot mean an evasion of the iconic-indexical realm but a greater awareness of it to be achieved through powers of reflectivity.

1. INTRODUCTION

My intentions in this chapter are to define the nature of a research programme on the co-evolution of subject and semiosis, to indicate those parts of the programme where certain progress has been made in a number of disciplines and where reasonably confident statements can be made, and finally to provide an imaginative construction of those areas that may be ready to disclose themselves at some point in the future and which seem to beckon us towards new research endeavours. My introductory remarks will be brief, with only a few observations on the Peircean and Saussurean roots of semiotics, as well as some of the limitations of the original semiotics associated with these thinkers. This means that much of the last century or more of research and debate must be taken as one vast premise and even certain topics that appear to touch on my own area of interest, for example the relationship between post-structuralism and semiotics, must remain unexamined here. Those are topics for another occasion.

What I would like to do is to proceed fairly directly, via a short overview of the field of zoosemiotics, with particular reference to the work of René Thom, towards drawing certain lines of continuity between the zoosemiotics of the animal kingdom and the symbolic realm of human semiosis. From there I will proceed to a critical examination of the symbolic order and especially of certain understandings associated with the notion of 'unlimited semiosis'. I would like to draw particular attention to certain aporiae inherent in the development of semiosis and to show how these are problematic for communication and for human agency in general. In particular I draw attention to hermeneutic problems that derive from escalating levels of abstraction in discourse processes, which may in fact have a natural limit, and I attempt to show how this is implicated in the difficulties I have with unlimited semiosis and the apparently infinite chain of interpretants that defines it.

This sets the scene for a historical treatment of subjectivity. It is shown that the symbolic realm is not cut off from the iconic and indexical principles that define zoosemiotics. Using an approach derived from Hegelian logic I show how it is that the distinction between symbol on the one hand, and icon and index on the other, is also internal to the symbolic order itself. By this means I am able to show, in a way that I believe to be fairly original, how it is that animal semiotics are necessarily perpetuated within the human symbolic order. It is the continuing domination of the iconic and indexical principles within the symbolic that can help us to understand the shapes of subjectivity that have emerged historically.

So the fundamental point of departure remains with the iconic, indexical and symbolic principles. This famous triad, which appears in Peirce, Saussure and virtually throughout the semiotics literature, can no longer be understood as a taxonomy of three types of signs, as originally suggested by Peirce.[1] On this we might agree with Eco (1976, p. 178), although perhaps not for the reason that he provides. He says that "no satisfactory definition can be found for them in the present context", i.e. within his own theory of codes. Rather than discarding this triad though, and the insights associated with it, we should rather understand that it indicates three general *aspects* that a given sign might have. Thus I speak of a semiotic *triad,* not a "trichotomy" in the manner of Eco; the analogy that my choice is meant to suggest is the triad of notes that *together* make up a basic musical chord. It will be shown that in human semiosis these three aspects are invariably co-present, while in the semiotics

[1] See 'What is a sign?' (§3).

relating to other species the third aspect, the symbolic, is either absent or much less developed. The nature of human learning consequently differs from that of other species where the operation of the index is innately specified to a greater extent, so

> ... unlike the mechanical operations of fixed, predetermined tropisms that are genetically hard-wired behavioral patterns belonging to animals and lower organisms, human drives are determinative. That is, they are endowed with a degree of freedom manipulated by the agency of the ego, an ego that operates on manifold levels of conscious and unconscious activity. (Mills, 2004, p. 675)

But the degree of continuity that exists between the environment of the various animal species and that of the human should not be denied either, since "the human *Umwelt* is first of all an animal *Umwelt*, a species-specific objective world, but it is based on a biologically under-determined *Innenwelt* or modeling system" (Deely, 2004, p. 20). In the theoretical perspective that is outlined below the icon, index and symbol are crucial in defining the continuity and discontinuity between the animal and human worlds. It is the symbolic order that fills out the space of biological under-determining mentioned by Deely. However, in remaining within this familiar terminology we should not necessarily envisage a return to Peirce or to Saussure, both of whom looked at signs rather atomistically and in a relatively decontextualised manner.

'Sign' in Peircean terminology sometimes appears to mean what Saussure calls a 'signifier' rather than a sign,[2] but this is neither clear nor consistent in the Peircean literature. Nor is it clear that what Peirce calls an 'object' is a conceptual entity such as what Saussure calls a 'signified'. It may be that, or it may be a perceptual object.[3] But such ambiguities should not be accepted in a semiotic terminology today. It is mildly ironic also that Peirce's notion of 'interpretant' has been notoriously open to divergent interpretations, a fact that Eco (1976, p. 71) regards as something of a strength because it is said to allow for 'unlimited semiosis'. But the latter notion is precisely one that needs to be interrogated critically. Let us concede nevertheless that Peirce raised the important question of interpretation via his interpretants – and potentially therefore also the question of subjectivity in semiotics – and move on from there.

While Peirce may have admitted subjectivity into his semiotics via the interpretant, the chief problem with Saussure may be that his highly systemic approach set up in effect an opposition between system and subject. Pêcheux (1983, p. 37) complained that for Saussure the idea was "*something impossible except as completely subjective and individual*" and "hence the opposition between the creative subjectivity of *parole* and the systematic objectivity of *langue*." There is no doubt that it was the latter that interested Saussure most and which therefore turned out to be decisive for structuralist linguistics and semiotics, especially the semiotics of the Parisian school of Greimas and his associates (Greimas, 1989; Greimas and Courtès, 1989; Greimas and Rastier, 1968).

[2] In 'What is a sign?' (§2) Peirce defines a sign as that which "conveys to a mind an idea about a thing". See also 'On representations'.

[3] See for example the discussion of objects in 'Some consequences of four incapacities claimed for man'. See also Deely (2000, pp. 18-19) on the distinction between 'thing' and 'object'. Object is clearly endowed with significance when distinguished from thing in this way, but a further distinction is needed in order to arrive at the signified of the symbolic order, as a conceptual entity. The term 'object' will not do for all of these.

Among the many problems associated with this legacy is that it has left us with a chasm in theory between two types of meaning, one which is radically decontextualised as an individual sign, and one which is contextualised in a discourse, whether as a clause, proposition, referring expression, speech act, intention, or whatever else might be involved in situated concrete expression. But we should not have to accept the limitation created by such a separation in semiotic theory and it is precisely an aim of this paper to show how it may be bridged, not by a theory of codes, but rather by a cognitive-evolutionary semiotics.

This will require a certain depth of analysis, in which evolutionary concepts are taken for granted to some extent and in which social or cultural evolution is similarly presupposed. Such depth is found firstly in the evolutionary semiotics of René Thom, which provides us with the framework for understanding the passage from zoosemiotics to human semiotics. Further depth will then appear with borrowings from psychoanalysis and the philosophy of the subject in order to show how it is that the symbolic order has been constituted as human subjectivity.

2. THE ANIMAL KINGDOM AND THE SYMBOLIC REALM

2.1. Zoosemiotics

The iconic is that fundamental aspect of the sign whereby something is represented in an entirely non-arbitrary manner. This includes such phenomena as the imprint in a plastic medium, such as a footprint in the sand, or the reflection in a mirror. But in fact it also includes the full range of phenomena of perception. Animal organisms have an inner representation of their environment, for example a mapping of the surrounding territory. Features of the environment are imprinted or reflected, so to speak, onto the perceptual apparatus of the organism, either fleetingly or more enduringly as memory. This inner representation cannot be arbitrary if the organism is to survive; it must of necessity be iconic in nature, i.e. based on the principle of isomorphism, which is the essential aspect of the "genesis of the image" (Thom, 1983, p. 262).

But not every image in the environment is particularly *significant* to the organism, or *pregnant*, in Thom's terminology. Thus the image created by a reflection in water or an imprint in the sand may not be endowed with meaning; only as an *index* does this become the case. The index includes the iconic aspect within itself, but adds the aspect of significance that is absent from the iconic on its own, which is precisely why we should be careful of examining each of these aspects entirely separately in semiotics. The index is of overwhelming importance in zoosemiotics. It is based on associations, some learned and some innate, among the various objects of perception that are of interest to the organism, especially those relating to potential prey, pasture, predator or mate. Certain objects obtain their interest for the animal due to an association, for example the spoor, whether visual, olfactory or auditory, which indicates the path of a pursued prey. Thom explains this association by saying that the index "is always an actant which is, or has been, in contact with its object, if it is not actually part of it" (1983, p. 267).

Clearly then in the animal kingdom the iconic and the indexical form an inseparable dyad in the production of signs, but also, as Thom (1983, p. 268) says, we can consider these as the

first "humble, but real, manifestation of the symbolic function", with the difference that in animals it is "biological finality" that has the power to generate the symbol, whereas "this no longer holds true in man, where the smoothness property, this transitivity of the index, spreads, even to objects and to concepts which are *biologically indifferent*" (Thom, 1983, p. 269, emphasis added). This enhanced transitivity, which characterises the symbolic realm proper, is definitive of a whole range of questions in the humanities; one thinks of issues ranging from fetishism in psychoanalysis to the tropes of metaphor and metonymy in literary and cultural studies.

But before we turn to this symbolic realm we should note that the indexical principle, insofar as it links cause with effect or signified with signifier is also the basis of the combinatorial capacity of semiotic systems, that of language in particular. The fact that two things are associated, smoke with fire, or a certain smell with food, means that there is already a meaningful conjoining of mental objects at a very basic level. This combinatorial capacity is most highly developed in the human symbolic order but it is by no means absent in the animal kingdom.

The experimental data cited by Hurford (2007, 2008) suggests that there is a fundamental pre-linguistic and pre-human distinction between certain activities of the dorsal and ventral cortical streams (see also Givón, 2008). The distinction consists in the identification by the organism of a unique individual (dorsal stream), about which something is thought or 'predicated' (ventral stream). The unique individual could simply be a visual stimulus of some kind, while the ventral activity corresponds with identification of that stimulus as a class of object, or as an object having some sort of quality or attribute, such as large/small, prey/predator, etc. The important point is that two different *types* of perception occur and that these are integrated into *one mental object*, which may be the most fundamental form of ideation, underlying what is commonly called the proposition in human language and cognition. Thus the combinatorial basis of ideation, as well as its unity, can it seems be noticed in pre-linguistic creatures as part of the indexical order.

There must be a considerable distance travelled, however, in the evolution of the cognitive faculty in the process of hominisation, since it has resulted in much more complex expressions of meaning than these, including the possibility that there can be a meaningful expression freed from the identification of a unique individual or stimulus in the immediate environment, so that "human language allows the description of a distant process (in space and time) and frees the mind from the tyranny of the 'here and now' to which the animal remains subject" (Thom, 1983, p. 275). This crucial aspect we will deal with shortly under the rubric of abstraction.

2.2. The Symbolic Realm

The symbolic order involves a massive expansion of the capacity to manipulate and combine signs. The symbolic is defined in terms of several related capacities: firstly the capacity for a more contingent relationship between the signifier and that which is signified – we should not claim, however, that such relationships are always and entirely arbitrary; secondly the capacity to retain and distribute a very large number of these signifiers differentially across various meanings; thirdly the capacity to manipulate and aggregate them in a wide range of combinatorial forms, from multidimensional structures in mental space to

topographical forms in four-dimensional space-time, to the single dimension of the linear utterance. Sebeok (1999) accounts for this in terms of a two-stage emergence:

> … language emerged as an evolutionary adaptation over two million years ago, in the guise of a mute semiotic modeling system – briefly a tool wherewith hominids analyze their surroundings - and was thus present in Homo habilis and all successor species. Speech, the paramount linear display of language in the vocal-auditory mode, appeared as a secondary exaptation probably less than 100,000 years ago, the minimum time required to adjust a species-specific mechanism for encoding sentences with a matching mechanism for decoding and interpreting them in another brain. The fine-tuning process continues. (p. 92)

The symbolic system par excellence is language. The challenge for us is to understand how it is that symbolic resources, such as the vast resources of the world's languages, simultaneously contain and depend upon the iconic and indexical aspects of signs and yet go beyond these. This is a vast topic and the present paper cannot do much more than clarify its nature, especially in showing how this 'going beyond' constitutes precisely what we call subjectivity. Surely we will see that the ongoing evolution of this subjective-semiotic constellation has consequences that can be described as more profound than mere "fine-tuning".

How does the symbolic emerge out of the pre-symbolic, yet retain the pre-symbolic moments as parts of itself? As Wildgen (1982, p. 20) puts it, "these aspects are ordered insofar as Index uses iconic principles and Symbol makes use of iconic and indexical devices". So in hominisation the iconic and indexical are somehow taken up into a new synthesis, the symbolic order. A distinguishing characteristic of this symbolic order, as we will see, is the power of *abstraction*. A sign that does not go beyond the indexical principle is relatively immediate and concrete, even though it may be learned and even arbitrary like the sound of the bell to Pavlov's dogs. The bell here is not at all part of a modeling system, in the sense of Sebeok, let alone being anything akin to speech. Sebeok (1999, p. 92) cites Thom as saying that language arises to fulfill two needs, firstly realising the permanence of the ego, and secondly as an expression of the regulatory mechanisms of the social group. It is indeed tempting to see in this dualism a restatement of the modeling/speech distinction.

Now where Thom explains the emergence of the abstract as the merging of territorial maps into one unified conception of space, thereby bringing about the unified ego in man, we might go further and understand, more generally, how it is that powers of abstraction make concepts, and hence the entire symbolic order possible. It is not just the fact that we can have a general notion of space beyond the maps of distinct territorial spaces that is decisive for the emergence of the symbolic, but rather that, analogously to this, we can generalise any and every sort of phenomenon into a universal category.

In this process we see why it is that the signified, to use Saussure's term, must precede the existence of a signifier: Salience and pregnance are preconditions for a sign to exist at all. Where the symbol will be with its 'arbitrary' signifier, object recognition and object significance must already be. It is the emergence of a meaning which necessitates that a signifier should become linked to it, rather than the other way round, and this emergence of a meaning and its mental fastening to a signifier is the beginning of the process of abstraction that defines the symbolic order. Take for example the case of little pieces of deep fried potato that someone is starting to produce; their objective form is salient and their image is pregnant

with associations of pleasurable satisfaction of hunger. One has experienced them several times, and from these several experiences one has abstracted a category – a signified is in place – and now a signifier is needed in order to ask someone to provide an instantiation of the category. It does not matter too much whether the signifier is going to be *chips*, *french fries*, *fritos* or *skyfies*, as long as a serving can be ordered.

A way to understand these onomasiological processes is by means of the distinction between type and token. Once a cognitive architecture has developed that can hold these two separate and distinct, then the processes of symbolisation can proceed. Let us consider the possibility that the animal mind, even at its highest level of development, cannot hold this distinction, so that for the pre-human creature every instance of its prey, for example, is identical with the category of prey. This is entirely consistent with the principles of salience and pregnance. Thom (1983, pp. 273-274) has an original way of explaining this, by saying that the hungry predator *is* its prey, in that it is entirely possessed by the internalised image of its prey (what to the human would rather be an ideal *type*), and when an instance of this type is perceived, externally, then the type vanishes, as it were, to be entirely replaced by the particular token. Since the one merges completely with, or substitutes completely for, the other, the two are not held distinct at any stage. The animal will not produce a symbol, like *chips*, that stands for the object in general, i.e. for the type rather than the various tokens that instantiate it.

As Thom says, "man is freed from the enthrallment of things by giving them names" (1983, p. 274). The essential Saussurean insight is that it is a matter of relative indifference as to what these various names are, just as long as there is a sufficient number of different names for different ideal types. Man can at any and every stage keep type and token distinct due to the symbols that have been formed out of each idealised type, the precondition for all other processes of abstraction. Stjernfelt (2002, p. 341) has this way of putting the matter:

> Higher animals may not only recognize tokens as instantiations of types, they may make use of these types to symbolize, to reason, argue, use diagrams. Probably, the special human privilege is abstraction, making it possible for us to make explicit and contemplate such types, reasonings, diagrams with any particular token placed in brackets and thus facilitating control, experiment, and quick development of these signs.

There is a consequence of this abstraction that is highly characteristic of the symbolic order, which is the power for various kinds of self-reflexivity. Among the things that can be described by a universal category is any and every aspect of language itself; language is in this sense self-referential and self-reflexive.[4] One can refer in one's discourse, for example, to a past instance of discourse, what someone said or wrote, their choice of words, and what they might have meant. One can identify saliences and pregnances in this discourse and *nominalise* them, just as one does with other sorts of objects, thereby 'capturing' the indexicality of their interrelationships, but now far removed from the concrete immediacy of animal indexicality. It is part of our challenge to understand this more fully.

The symbolic has so to speak 'reflected into itself' its own natural history in the ascent of man. The very *difference* of the symbolic from the iconic-indexical is in fact subsumed within the symbolic order as part of itself. This can perhaps best be understood in terms of the

[4] "*Semiosis explains itself by itself*; this continual circularity is the normal condition of signification" (Eco 1976, p. 71). See also Jakobson (1960) on the 'metalingual function'.

Hegelian notion of 'limit'. Let us use Žižek's (2008, p. 110) admirably clear exposition of this:

> *Boundary* is the external limitation of an object, its qualitative confines which confer upon its identity (an object is "itself" only within these confines, in so far as it fulfils a set of qualitative conditions); whereas *limit* results from a "reflection-into-itself" of the boundary: it emerges when the determinateness which defines the identity of an object is reflected into this object itself and assumes the shape of its own unattainable limit, of which the object can never fully become, of what it can only approach into (bad) infinity – in other words, limit is what the object *ought to* (although it never actually *can*) become. In the course of the dialectical progression, every boundary proves itself a limit: apropos of every identity, we are sooner or later bound to experience how its condition of possibility (the boundary that delimits its conditions) is simultaneously its condition of impossibility.

Earlier I alluded to the problems that result from classifying icon, index and symbol as purely externally related categories. A more sophisticated logic is required, one that also goes beyond current but relatively crude notions of fuzzy boundaries, prototype effects, etc. Adopting the Hegelian logic above can take us a long way in transcending such limitations and it will have major consequences for the argument still to follow.

Boundary in our context means that the symbol is simply differentiated from the index and the icon, but to stop there would raise all the difficulties that I have mentioned. Instead we must consider the symbolic order as having its own boundary reflected into itself as a limit; this means that the boundary between the symbolic on the one hand and the iconic-indexical on the other is experienced as part of the *internal* structure of the symbolic.[5] To put it simply, the symbolic is apparently quite distinct from the types of signs that characterise the animal kingdom, but in actuality it is not so; it always carries the indexical and the iconic within itself as that from which it must always be trying to distinguish itself, to free itself, but from which it never entirely can. This has enormous consequences for the understanding of human semiosis and the stubborn tendency of subjectivity not to advance beyond what, adopting Hegelian terminology, we might call an 'animal kingdom of the spirit'.

In this way natural evolution is recapitulated in the human cultural evolution that emerges from it, as a co-evolution of subject and semiosis. The generalised capacity for abstraction that defines this co-evolution has something of the character of infinitude about it and one might easily adopt Umberto Eco's (1976) usage, following Peirce, of 'unlimited semiosis', but there is something aporetic at the heart of the symbolic order that manifests itself as a limit, a 'limit of interpretation', to use again one of Eco's own memorable titles, which should cause us to beware of a spurious infinity (with all its potential illusions) that has been mentioned in the Žižek quotation. We shall return shortly to this aporia, which relates to the question of hyper-abstraction, and which must sometimes recall us from the giddy heights of limitlessness.

So let us re-imagine the nature of the icon, not in its animal context now, but already within the human symbolic order. Recall that one type of icon is the imprint within a plastic medium, for example a footprint in the sand, which takes on salience as a visual gestalt. What

[5] Cf. Hegel (*Shorter Logic*, § 92): "We cannot therefore regard the limit as only external to being which is then and there. It rather goes through and through the whole of such existence. The view of limit, as merely an external characteristic of being-there-and-then, arises from a confusion of quantitative with qualitative limit. Here we are speaking primarily of the qualitative limit."

sort of 'imprint' one may ask is made by semiotic objects, including linguistic objects, that one may want to refer to, and what sort of medium is it that is suited to receiving such an imprint? As Thom explains the iconic principle, "the image becomes memory" and "the receiver system has to possess very special dynamic properties" (1983, p. 263).

In the literature on cognitive architecture we have become used to the terms 'episodic memory' and 'semantic memory', and these may be apt in this context. Let us take the activity of reading as a paradigm case.

2.3. Texts and Semiosis

We know that texts are processed in such a way that the mind retains certain features of a text for spans of time and that these timespans can vary greatly, from a fraction of a second to a number of decades. When reading for comprehension one performs certain operations that are not aimed at retaining verbatim text, but rather aimed at retaining summative representations of the text. This will also vary greatly according to the intention of the reader and his or her competence, but if a text is processed and retained at all we would expect some cognitive modeling of its referent to be retained in episodic memory, together with some knowledge about its own organisation or macrostructure. We would also expect that the reading of texts would have a bearing on the network of related meanings that make up semantic memory, although these meanings may be entirely abstracted from the memories of any specific text.

What may be included under the iconic here? Any representation must have an iconic aspect, and in this case we would say that any of these memories of a text, or derived from a text, are iconic insofar as they are directly motivated by the form of the text itself. But just as with any iconic representation they can be deformed to a point where they no longer bear an isomorphic relation to the original, for example in memory impairment. The purest iconic representation of a text would no doubt be a verbatim recall of the entire text, since this does not involve the variation implicit in the work of interpretation. This would be the mind's equivalent of a camera shot of the text, so to speak, almost pure iconicity. The indexical aspect in such a case would be shrunken virtually to vanishing point, consisting perhaps only in the association of these contents of the mind with an original source outside itself.

But when a text has been processed in the more usual way, for comprehension, the role of the indexical aspect naturally becomes greatly expanded, and with this comes variation in understanding and interpretation by different readers. Whereas the iconic within the symbolic order consists simply in the fact of retention of semiotic material in the mind, the indexical is more complex and analytical than this, in that diverse aspects of this semiotic object are associated with various other mental contents. In the case of a text these associations are quasi-infinite in number as we enter the domain of 'unlimited semiosis'. It will not be possible or desirable here to try to provide a taxonomy of the various possibilities and a few examples will have to suffice. A word used by an author, for example, may have *connotations* due to certain associations in the mind of a reader. A text being processed will inevitably be *generic* in some of its features, in which case it may be associated in the mind with other texts of a similar type. A text may *allude* to another text known to the reader, or *refer* to some object or state of affairs known to the reader. The text may recapitulate *propositions* that are known to be characteristic of certain types of argument. The *author* may be familiar to the

reader. And so on. These are among the various indexical aspects of the 'verbal signs' making up a text.

Let it be noted that semiosis goes well beyond the mere signification that one associates with the simple relation between signifier and signified, e.g. a word and its meaning. The ideational content of expressions and their textual combination cannot be reduced to this simple relation. Rather what is involved is an ideational complex that is much more than the sum of the various signs that were used in the composition of the text. The ideational structures range from meanings at a micro level, such as the level of a clause, up to a macro level, which would be formed as a (subjective) summary or model of the text as a whole, or indeed of a number of related texts. It is not really useful then to refer to a text, as a whole or any of its constituent expressions, as a sign, nor to refer to its manifold of meaning potentials as signification. Signification is a term that should probably retain its Saussurean association of decontextualised *langue* (cf. Rastier, 1998, p. 196), while ideation is contrasted with this as a synthetic product of mind. But there is a difficulty in this analytical distinction that we will have to address in the next section.

2.4. Abstraction

Abstraction can be shown to occur in at least three degrees:

Abstraction$_a$: This abstraction is present in the derivation of the meanings of *all* categories, even those that we associate with 'concrete nouns'. It is the process whereby categories of concrete objects or qualities are separated, by a process of idealisation, from the individual instantiations of the category (types from tokens). In cognition such categories can generally be simulated as image schemas (Lakoff, 1987). They can also be demonstrated to a language learner through acts of ostensive definition: 'that is a chair', 'this is a table', etc. They also exhibit prototype effects, whereby one member of a category is a better exemplar of the category than another, i.e. more typical.

Abstraction$_b$: Here we have to do with abstract nominals of the common kind. The abstraction here is the process whereby an idealised narrative schema comes to form the meaning for a lexical item. Narrative schemata of this kind are idealised from narratives about common situations. The abstract category that emerges in such a process does not correspond to any class of physical objects and cannot be simulated or defined ostensively as in the case of *abstraction*$_a$. But something rather like ostensive definition is possible. One may help to create the narrative schema by telling a little story and then saying 'that is *charity*' or 'that is *disappointment*'. In this way categories at this degree of abstraction can be defined in a quasi-ostensive way, so that the deictic gesture points, so to speak, at the story that has been told, rather than at an object (Benzon and Hays, 1990; Wood, 2006, 2009).

Abstraction$_c$: This is hyper-abstraction. Hyper-abstract concepts cannot be demonstrated or defined through basic narratives (let alone through acts of ostention) without severe reduction of their meanings. Their meanings are constituted via bodies of heterogeneous discourse, the more complex the concept the more heterogeneous the discourse that constitutes its meaning.

A simple idealised narrative schema will not do for the meanings of these words. A concept like *globalisation* may indeed be explicated or defined by one or two macro-propositions, but it will inevitably be found that those propositions themselves contain highly abstract terms (*capital*, *finance*, *trade*, *nations*, *politics*, *international borders*, *export-import*, etc.). Thus we do not yet touch ground, as it were, by such processes of definition; rather we throw up more abstractions that are equally in need of definition. This is where the difficulty with 'unlimited semiosis' arises. It is also where we reach the aporiae of interpretation that were mentioned earlier and which act to place a limit upon semiosis.

The problem is that the meanings of hyper-abstract words are defined by all the contexts in which the subject has encountered them before, and this will vary from one individual to another. Consider a word like *romantic* for example. One might use this word without regard to the contexts in which one's interlocutor has encountered it before. Does he or she know anything about the chivalric romance, the cult of the medieval, courtly love, *sturm und drang*, Byron or Shelley, Beethoven or Chopin, the gothic novel, the various manifestations of the romantic in popular culture from Mills and Boon love stories to detective fiction to Hollywood/Bollywood 'romantic comedies' to the language of travel to exotic ('romantic') destinations, etc.? The fact is that a subject's understanding of such a term is nothing other than the residue of prior discourse to which he or she has been exposed (Wood, 2006, 2009). This is what makes abstraction of my third type hyper-abstraction. Unlike those abstractions of the second type, one cannot define *romantic* by means of a simple narrative schema. Rather its various meanings are tossed about unstably on the waves and currents of prior discourse, which all of us, without exception, have experienced only partially.

Once one has to do with hyper-abstract terms an indeterminacy in interpretation arises, which cannot be simply remedied by recourse to any rules or approved procedures of interpretation. The limitlessness of interpretation that is found at this point may indeed be a 'bad infinity'; bad in the precise sense that it represents the breakdown of common understanding and allows for a range of (mis)understandings that are potentially infinite in number. This comes about because there is no telling exactly what interpretation another will arrive at as the result of the use of such words.[6]

While these words are signifiers and thus part of systematic *langue*, they are at the same time dependant for their meanings on prior processing of discourse (this is also true of abstraction$_b$, but to a less problematic extent). This problem by no means requires us to abandon our distinction between text meanings (ideation) and word meanings (signification); on the contrary it is only via this distinction that the problem really comes to light.

A hyper-abstract word has *nothing* other than the experience of prior discourse to furnish its meaning for a subject, and this meaning will consequently vary from one individual to another, perhaps only slightly, perhaps greatly. This is where the theory of prototype effects – whereby the consensual meanings of such words as *dog*, *cat*, *table*, *chair*, etc. are explained – breaks down. Unpredictable variation in the meanings of the more abstract terms, by contrast, comes about just because this meaning is strongly affected by one's prior experience of text interpretation. Rather than the neat radial structure of prototype effects, we have rather a range of meaning that is unstable and subject to unpredictable variation. It is also no doubt for this reason that abstract nominals can often be used to impress or to deceive, so that this very indeterminacy in meaning is in fact exploited.

[6] In Austin's terms, one will not be able to predict the perlocutionary effect upon one's interlocutor.

The less abstract words combine their relatively stable signifieds by means of syntactic structures to create the ideational forms that serve as the meanings of clauses, sentences, texts. Hyper-abstract words, by contrast, are actually dependent upon previously constructed ideational forms of this kind to serve as their signifieds. This is the true frontier of 'unlimited semiosis'. In this light, understanding itself appears as a limit, something which is always being approximated rather than attained.

The price that human beings pay for their symbolic capacity becomes apparent the more highly developed their culture has become, in other words the more hyper-abstract terms it has been able to generate. If this were not so there would never be a serious hermeneutic problem.[7] This is the fate of subjectivity as 'unlimited semiosis'; it was always there at the aporetic heart of the symbolic order,[8] but its appearance as a problem becomes more apparent as subjectivity reaches crisis points in its maturity. We should perhaps have faith enough to think that we will meet the challenge represented by the threatening abyss of semantic indeterminacy, but let us try also in a semiotic fashion to understand the path that has led us to this.

From a logical point of view the problem with the notion of unlimited semiosis is that it does not make clear whether it is a qualitative or quantitative infinity that is at issue. If it is taken as a purely quantitative limitlessness, it is easy to see how this would exhaust the mind and defy interpretation.[9] Such an infinite opposes itself absolutely to the finite (as its other). But the truer infinite is that which admits the limit and coexists with it;[10] it is the infinite of determination, of continual becoming, of the object that is always in the process of becoming itself but never quite reaches this limit in any final way. 'Unlimited semiosis' has this aporia within it: As soon as it has become unlimited, meaning will break down; and as soon as meaning has been restored, this means that it must have become limited again. Hence applying a purely quantitative infinity here would mean a semiosis that is actually the opposite of itself, sheer meaninglessness.

The recursive mechanism in language that gives birth to hyper-abstraction is found according to Thom (1983, p. 176) in mathematical discovery: "a direct extension of this mechanism of symbolic creation … the mathematician sometimes sees an expression, or a relation, turning up again and again with an embarrassing insistence", so that he will "introduce a new symbol to condense this expression into a single form and so continue the work on a new basis." In this passage, Thom shows how this recursion and advancement to new levels of abstraction occurs in relation to mathematical semiosis. The principle of abstraction here is that a proposition or set of propositions is represented by a new sign or

[7] Cf. Benzon and Hays (1990, p. 298): "cultures differ in their capacity to order and generate abstract concepts," and "there are abstract ideas that cannot occur in the thinking of an Eskimo, or even a literate Florentine, or, for that matter, Darwin, Freud or Einstein."

[8] One thinks of a Socrates endlessly pondering over the meanings of abstract words such as *justice*, *the good*, and so on.

[9] Hegel (*Shorter Logic*, § 94): "In the attempt to contemplate such an infinite, our thought, we are commonly informed, must sink exhausted. It is true indeed that we must abandon the unending contemplation, not however because the occupation is too sublime, but because it is too tedious."

[10] Hegel (*Science of Logic*, § 293): "According to this, the unity of the finite and infinite is not an external bringing together of them, nor an incongruous combination alien to their own nature in which there would be joined together determinations inherently separate and opposed, each having a simple affirmative being independent of the other and incompatible with it; but each is in its own self this unity, and this only as a sublating of its own self in which neither would have the advantage over the other of having an in-itself and an affirmative determinate being. As has already been shown, finitude is only as a transcending of itself; it therefore contains infinity, the other of itself."

nominal expression, which itself enters into new propositions in its turn, thereby raising the level of abstraction. It is in these accretions of discourse that are nominalised and instantiated as abstract expressions that the full potential of the symbolic order, as well as its aporiae, must be located. Just as Thom's new mathematical form has a group of preceding others as its meaning, just so in language must we retrace our steps into prior discourse in order to find the original meanings of certain nominal expressions we use.

Thom says that creating a new symbol like this "promotes a kind of tearing away, with the establishing of a new semantic field which will be the support of the new actant and so free the mental movement from the obsessional presences which impede it" (1983, p. 276). Just so with language in general; a new symbol arises which allows the mind to fly free of the obsessional particulars of its previous moments. But what we have added to this sometimes fanciful imagery of semiosis without limit is the caution that this freedom requires that we be able to trace our way back whence we came and to show others the same path, lest we forget what we mean. The ability or opportunity to do this, however, cannot always be taken for granted.

2.5. Agency and Subjectivity

The inner limit of the symbolic order has been raised here in two ways, in the pitfalls inherent in the human power of abstraction, and also in the fact that the iconic and indexical order of the animal kingdom is by no means abolished in the human leap into abstraction. All in all this represents a formidable constellation of issues to be understood.

The human subject, in the transition to the symbolic order, has been freed from the species limitations of other creatures, only to reproduce within its own semiosis the entire range of indexical relations that regulate those other species, including predation, mating games, power struggles ('pecking order', etc.), competition, deception, as well as the forming of cultures, alliances and regimes of self-regulation that are characteristic in the animal kingdom in and across various species, but now all within the single human species. Yet if there is to be freedom from this pure animality of the spirit then there must be potentials for this freedom to be found within the symbolic order. If this were not the case then there would be no powers within the symbolic order that were truly superior to those of the indexical order that defines zoosemiotics. Our powers of abstraction, despite their aporetic limits, must surely have some potential for liberation from this spiritual-animal kingdom. Let us then consider what a specifically human agency may entail and how this relates to semiosis.

The semiotic path, via which the animal kingdom of the spirit, as well as any ethical life beyond it, may be realised, is characterised here as a triune process of introjectivity, projectivity and reflectivity (cf. Emirbayer and Mische, 1998, p. 971). To characterise each briefly: Introjectivity is taken to cover somewhat more than the similar term in psychoanalysis. It is generally the construction of subjectivity through symbolic means and the construction of a world of knowledge through dialogue with others; it is part of autopoiesis. Projectivity is the work of imagination, together with intention, motivation and purpose. It is the activity of the will and desire in relation to external objects and states of affairs. Reflectivity involves judgment and practical wisdom. It involves taking stock of what one is doing, alone or with others, and it involves a consideration of ends and means.

It is these two triads, of introjectivity, projectivity and reflectivity on the one hand, and the iconic, indexical and symbolic on the other, that in their complex articulation, and in the historical developments that illustrate them, may give us a theoretical perspective on the co-evolution of subject and semiosis.

There is an interesting parallel between these two triads. Just as the symbolic order is definitive of the human subject, in constrast to the animal kingdom, and contains within it the iconic and the indexical, so too is the reflective order definitive of human agency and contains within it the introjective and projective dimensions. In other words humble forms of introjectivity and projectivity can be discerned in the animal kingdom, but not of reflective judgment, and it is in terms of the latter notion that we may hope to go beyond the animal kingdom of the spirit. The macro-level point that suggests itself then is that a specifically human agency is reflective and that this reflectivity is inherently symbolic.

2.6. Semiosis and Psychoanalysis

It is worth making some observations in passing concerning psychoanalytic theory, since in its own way it is profoundly a theory of semiosis, even though my aim here cannot be a full exploration of this idea.

Nevertheless the convergence of some of my terminology, particularly introjectivity and projectivity, with that of psychoanalysis is not to be avoided nor its significance denied. Many (or perhaps all) of the associative mechanisms explained in psychoanalysis are indexical in nature, such as 'displacement' and 'condensation'. And in many schools of psychoanalytic therapy (especially the 'Hungarian school' of Ferenczi, Abraham, Torok and Rand) the possibility of symbolisation, described as *introjection*, is equated with a process of inaugurated mourning that is healing in its nature.[11] This is by no means external to my meaning. As Yassa (2002, p. 90) summarises:

> The central idea running through the body of the Abraham and Torok work is that of the prerequisites for the emergence of subjectivity. The question of how a unique individual comes into being is only superficially simple. They approach this question at several different levels of the experience of subjectivity, and with the help of their specific concept of introjection – seen as the key to every aspect of psychic life.

The process of the development of subjectivity through the mediation of the symbolic order is precisely what I intend in my own use of the term introjectivity. With regard to the meaning of this term in Abraham and Torok there is little discrepancy between their usage and what I propose.[12]

The position regarding *projection* in psychoanalysis is slightly more complicated. Abraham and Torok do not appear to have employed this term to nearly the same extent as introjection, and they did not propagate the formal symmetry in the opposition between

[11] Cf. Freud on 'Mourning and melancholia' (1987, pp. 245-268, originally 1917).

[12] However this cannot be said of all schools of psychoanalysis, in some of which (occasionally including Freud himself), this term is not used with anything like the same degree of precision or consistency. .See especially Abraham and Torok's critique of Melanie Klein and others (1994, pp. 125-138, originally 1972). Notice how this implies a critique of Freud's own inconsistent usage, for example in 'Instincts and their vicissitudes' (1987, p. 133, originally 1915).

introjection and projection that one sometimes finds in Freud (e.g. 1987, p. 133) or in Kleinian psychoanalysts such as Hinshelwood (1995).[13] In any event, the common psychoanalytical understanding of projection as a splitting off of a part of the ego which is then transferred to and discovered in another, e.g. the analyst, can be easily incorporated into the notion of projectivity as understood here, albeit as part of a broader meaning.

One other interesting point needs to be highlighted regarding the symbolic order from the point of view of psychoanalytic theory, one which is highly illustrative of the role of the indexical within it. Rand and Torok (1993) point out a certain inconsistency in Freud's approach to the symbolic, whereby he fails to distinguish consistently between "personal meanings" and "the use of universal symbolism" (1993, p. 570), sometimes even altering the emphasis on one of these relative to the other in successive editions of the same text, such as *The Interpretation of Dreams.* The authors make their preference clear: "The method of permanent symbolic keys is no match for deciphering the verbal and affective distortions of a dream's unique, individual meaning" (1993, p. 578).

The matter at issue here is that of the status of personal meanings or personal associations. Associations of this kind are indexical in an individually subjective sense. So, for example, for the analyst to tell the dreamer that a severed tree invariably symbolises castration may turn out to be quite baseless and misleading when in the individual case it might really mean that a branch of the genealogical family tree has been cut off and lost. This is clearly a very important point, and yet when Rand and Torok (1993, p. 578) quote Freud on this question, we must surely wonder *with him* about his own ambivalence towards it:

> We may expect that the analysis of dreams will lead us to a knowledge of man's archaic heritage, of what is physically innate in him. Dreams and neuroses seem to have preserved more mental antiquities than we could have imagined possible; so that psycho-analysis may claim a high place among the sciences which are concerned with the reconstruction of the earliest and most obscure periods of the beginnings of the human race.

The author of this passage from the fifth edition of *The Interpretation of Dreams* is the same Freud that the authors quote (1993, p. 573) from the fourth edition as saying:

> Indeed dreams are so closely related to linguistic expression that Ferenczi (1910) has truly remarked that every tongue has its own dream-language. It is impossible as a rule to translate a dream into a foreign language.

Is it not possible to argue, contra Rand and Torok, that these positions are not necessarily incompatible? I am not in a position to settle this question here, but let us consider what it might mean to accept both positions as Freud might have liked to do. Clearly the latter quotation reflects the view that Rand and Torok would like to uphold, in which it is the case that certain images, objects or words have obtained their significance for the individual as a result of strong associations in his or her experience, almost as if in a 'private language'. The former quotation, by contrast, puts the matter in a more universal and evolutionary perspective.

[13] This alleged symmetry was similarly rejected by Lacan, on the grounds that **projection** is an *imaginary* mechanism, while introjection is a *symbolic* process. See *Encyclopedia of Lacanian Psychoanalysis*, accessed at http://nosubject.com/Projection on 3 February 2010.

Could it not be the case that in the process of hominisation certain (archetypal) symbols of a universal significance have been retained by the species, analogous to the instinctive indices of the animal? Such a notion, which is commonly although not necessarily associated with the name of Jung, is not inherently implausible or 'mystical'. Mills (2000), for example, in describing how the ego emerges from the unconscious, argues that it cannot do so *ex nihilo* and that what is at stake is really a separation within the unconscious itself, which culminates in a division between an *innate* preconception on the one hand and a realisation that takes place in *experience* on the other. Citing passages such as the following, he draws attention to a notion of the unconscious found in Hegel's anthropological work, an 'underworld of spirit' or 'nocturnal abyss', that predates the discoveries of psychoanalysis:

> To grasp intelligence as this night-like mine or pit in which is stored a world of infinitely many images and representations, yet without being in consciousness, is from the one point of view the universal postulate which bids us treat the notion as concrete, in the way we treat, for example, the germ as affirmatively containing, in virtual possibility, all the qualities that come into existence in the subsequent development of the tree. (Hegel *Philosophy of Mind*, § 453)

If we were to accept a set of archetypal indices, we would be postulating an archaic semiotic realm that is specific to the human species, deriving no doubt from its earliest semi-animal stage of development, but which is overlaid by a later semiotic layer, as it were, another indexical realm that is not instinctual in nature, but rather motivated by experience. Once this is admitted, however, we notice that both of these possibilities are in fact already in place in the animal kingdom, albeit to a limited extent and in a different balance for each species. A great many species have some ability to acquire knowledge of indexical relationships on the basis of experience in addition to those indices that are clearly instinctual, albeit without the emergence of an ego capable of conscious reflection on such experience.[14]

By retaining these two notions in tension with each other, relating as they do to the universal and the particular, we may gain a better notion of the animal in man and a better idea of how it is that subjectivity emerges from this through semiosis.

And, just as Abraham (1987) shows how 'phantoms' are created and passed on in family history, as much through the unsaid as through the said, we must surely imagine that through the operation of taboos this happens within broader cultures as well, in civil society. So, in human cognition, we may find here again a triadic rather than dyadic division in the derivation of these 'symbols' – really indices within the symbolic order, since they are all motivated by concrete associations – between those of the species, the culture and the individual. None of this is meant to detract from the importance accorded by Rand and Torok to "the willingness of psychoanalysis to welcome people into their own personal creations" (1993, p. 577), and one may add, the value of helping them to verbalise these personal creations in the work of enriching subjectivity through introjection.

In our aspiration to rise above the indexical within the symbolic order this cannot entail a leaving behind of the indexical but rather consists in making the indexical, whether the sum total of mental associations or any part thereof, our own object of reflective thought. And this might include the heritage derived from both our species being and our culture. After all 'personal creation' is not necessarily the work of the individual all-alone.

[14] "By the thirteenth century, Thomas Aquinas had concluded that animals make use of signs, both natural and those founded on second nature, or custom" (Sebeok, 1999, p. 93).

In psychological terms one might say that the dialectic of introjection and projection brings about a synthesis in reflection, i.e. a conscious awareness, via symbolic means, of what has previously been achieved or created in subjectivity, also through symbolic means. Reflection is, at each moment that it appears, a further fulfillment of the symbolic, in that one achieves a certain freedom precisely in each new awareness of what is determinate in one's development. We might then say with Hegel:

> As consciousness has for its object the stage which preceded it, viz. the natural soul (§ 413), so mind has or rather makes consciousness its object: i.e. whereas consciousness is only the virtual identity of the ego with its other (§ 415), the mind realizes that identity as the concrete unity which it and it only knows. Its productions are governed by the principle of all reason that the contents are at once potentially existent, and are the mind's own, in freedom. *(Philosophy of Mind,* § 443)

In the spirit of the above, and in the spirit also of psychoanalytical reflection, let us consider the possibility that the further potential of the symbolic order lies in the achievement of greater freedom through reflecting back on the shapes that subjectivity has hitherto assumed.

3. SEMIOSIS AS THE HISTORY OF SUBJECTIVITY

3.1. Coercion and Suppression of Subjectivity

Let us begin this with a consideration of what *lack* of freedom might mean from a semiotic point of view. Let us imagine a mode of social being based on pure coercion.

Coercion here refers to the subordination of the will to some outside force or agency, for example the law as an imperative ("thou shalt" or "thou ought"), where this law is experienced as a completely objective reality exterior to the individual. A community that was based upon the law as pure coercion, in which its human constituents were faced by an apparently inhuman force that determined their every action, would equate to slavery. To the extent that law manifested itself as coercion, it would be symbolically empty, since the rule of such a law would mean that even if you did not know or understand it – you had no internal representation of it – you would nevertheless be subjected to it, physically. Thus it would not truly be part of the symbolic order.[15]

In terms of the agency triad, one might say that each moment in this triad is severely limited in such a scenario. In terms of introjection this might approach nil, in the sense that virtually no symbolised thought processes other than mechanical carrying out of orders is required and the symbolic resources of the internal life of the slave must surely be restricted accordingly. Similarly with projection; no imaginative construction of the world is posited besides the outcome of the immediate task, and therefore it would seem that any reflection on the part of the slave cannot be relevant to his life project, since there can be no project as such. But Hegel's dialectic of the lord and bondsman in the *Phenomenology* shows that such

[15] In Peircean terminology this is not yet a transition from 'secondness' to the 'thirdness' of semiotic activity. See 'What is a sign?'

an absolute state of affairs is not reasonable. There is a glimmer of recognition between the master and the slave in their communication and therefore in actuality there is semiosis. In fashioning the object of labour, the slave achieves a measure of independence, an awareness of self and of the master's dependence on that labour and the essential know-how that goes with it. The master comes to a recognition of his own dependence on the slave, and the semiosis that occurs in this relationship must therefore be co-extensive with the dialectic that leads to the ultimate dissolution of such a relationship.

So in practice law generally cannot be this pure exteriority, except at moments of brutal conquest, as has been seen at certain points in history, since its inhuman aspect would be all too apparent, as indeed it is to slaves. Therefore it comes to involve some or other notion of citizen participation, even if such citizens are a minority of the total community, or even where their powers of participation are limited or unequally distributed, as in parts of ancient Greece or in South Africa until recently. The law must become subjective rather than a purely exterior objectivity.

3.2. Internal Representation and Subjective Morality

In subjective morality the law is internally represented within each individual and the need for continual coercion is overcome in this way. This morality is a sense of right and of duty. Semiotically here we see a preponderance of the iconic within the symbolic order in the way in which the law is reproduced internally.

We should imagine a typical 'good subject',[16] the one who identifies completely with the discourse that dominates him or her. Just because the law is internally represented, the individual knows which are right and wrong actions and he or she acts accordingly. It is apparent that from the point of view of this perfectly moral individual consequences of actions are less important than their essential rightness. To have acted rightly, according to deontic prescription, is to have done one's duty, and this duty is prescribed by the law for certain categories of situations involving persons and things. Thus the correct action for each situation is something known *in advance* and coercion is not needed for social order. One is reminded by one's conscience or one's sense of civic or religious duty. This sense is copied iconically, one might say, within the receptive plasticity of each subject's mind.

Introjectivity and projectivity in the case of the good subject are both governed by a prevailing doxa, so that the good subject, as an ideal type, does not imagine a world, and his or her own actions within it, that has not been derived from this doxa. Consequently, in the purest form of this subjectivity, reflectivity consists in a type of self-valuation whereby the individual judges his or her own success in bringing actions into line with those envisaged in the moral law.

The instability in the standpoint of subjective morality comes in due course from the very imperfection of the system of categorisation on which it depends. The concrete contingencies of actual situations will always elude the abstract way in which they have been categorised in the moral discourse and give rise to the moral dilemma: 'is this one of these situations or one

[16] The terms 'good subject' and 'bad subject' are borrowed from Pêcheux (1983). In my usage they refer to those individual subjects who identify with the law by conviction, on the one hand, and those who perceive the law as only a formal constraint, quite apart from any convictions that they may or may not have, on the other. In the latter case one must at least postulate a certain gap between any personal ethics and positive moral law.

of those?' and, consequently, 'should I therefore act in this way or in that way?' More seriously, such thinking may come to pose the question of whether there are situations that simply do not fit the received categories at all.

Historically and politically, subjective morality arises as an expanding form of citizenship. It is expected that a citizen acts out of a sense of duty rather than as a result of coercion. Morality is propagated; it is distributed throughout society. It applies to everyone and in this sense everyone can be seen as equal. There is a certain liberation in this; insofar as the individual is autonomous and formally equal to every other, he or she can go about in society knowing the right things to do and to say in respect of the persons and things to be encountered in social situations. The citizen, female as well as male, is freed to go out and to buy and to sell within the security of the known and universally accepted moral law, since it has its iconic reproduction within each individual. The room for subjective interpretation is kept narrow, due to the very form of deontic prescription, the *maxim*. It is in these semiotic aspects that one may discover the limits of subjective morality.

First it may be observed that representation is inseparable from the development of the techniques of representation. Subjective morality is historically not separable from events such as the invention of writing and then the printing press, for example. Because morality is universally propagated, it requires a means of propagation, and it is the duty of the citizen to partake in this dissemination of the moral law. An illustration of this emphasis on representational technique is seen in the scribe who laboriously makes copies of the Bible, or the Islamic *hafiz* who memorises the entire *Qur'an* by heart. These are among the most striking ways in which iconicity asserts its presence within the symbolic order.

But also in a less extreme manner than in such examples, subjective morality, as a form of representation, depends on an internal model of the external world as a set of cognitively modelled social situations and actions, which are brought into being by *definition* rather than pure experience and which will at some point come into conflict with experience.[17] These would be cognitive models that have been constructed in moral discourse and which resemble typical situations insofar as these situations are imagined and projected within that discourse. They are typically defined and divided up by categories of law, those that are permissible, those that are prohibited, those that are obligatory, those that one should try to avoid, and so forth: One imagines the good subject activating these models and regulating actions according to the felicity of the fit between the encountered world and the subject's modeling of it. To be sure this is a form of reflection, albeit a very simple form based firmly on the iconic principle.

On the other hand one acts wrongly by having an imperfect representation of the law or by not acting in accordance with it; this is either a semiotic failing or a moral weakness on the part of the individual.

But the world may simply fail to resemble the subject's modeling of it, and so this iconic representation breaks down or loses its hold. Thus subjective morality is an inherently static mode of thought, which is unable to match the dynamism of the real world. It fixes social situations as static models, which have been derived at some time in the past, even though the world is constantly changing into something else. The models become less and less isomorphic with reality as time passes.

[17] The abstract way in which this moral discourse proceeds is wonderfully shown up in Hegel's short essay 'Who thinks abstractly?'

Failure of subjective morality is in this sense a failure of the very mode of representation on which it depends, meaning that the simple moral dilemma turns eventually into something more general than that, an ambivalent, and perhaps relativist, attitude towards moral issues and a cynical attitude towards the law. This opens up the way for a 'bad subject' to take the historical stage. This bad subject, who is by nature a *cunning* subject, is one who has perceived the flaw in the iconic nature of morality and whose vocation is to live within the gap between the law as posited and his own experience of it as nugatory. He brings into being an 'animal kingdom of the spirit', based on the indexical principles that he has discovered for himself.

3.3. The Animal Kingdom of the Spirit: The Bad Subject

The animal kingdom of the spirit is one where the indexical principle is dominant within the symbolic order.

The key here is the notion of experience, shared experience in groups and individual experience. A group of individuals may find that their common experience of the world contradicts the way in which they had originally represented it (or, as it had been represented to them).[18] For example, due to the changing nature of the world young people may discover that the way they had initially represented the world through their education at the hands of elders does not match their own lived experience. They may then feel free to reject the moral part of that education.

As techniques of representation develop, and due to the reflexive nature of semiosis already discussed, these contradictions between the nature of the world and the way it had previously been represented can themselves be represented and communicated; i.e. one becomes conscious of this discrepancy and begins to communicate it with others.

Such subjects cannot *simply* follow the universal law, because the law itself is being refracted by the increasingly complex prism of society. For example, if the law is seen to serve particular or sectional interests rather than universal ones, then the law can no longer be simply and iconically represented in subjectivity. The law becomes part of a more complex internal representation, in which the sense of self may be radically separated from the purview of the law, a subjective constellation that may itself differ greatly from one individual to another. There are as many sources of such diversity as one might wish to discover: increasing division of labour, the generation gap, racial and ethnic dynamics, colonisation, gender, the changing nature of familial relations, and so forth.

Whereas in a society based entirely on subjective morality, the individual who does not conform to the law is seen as simply someone who is weak-willed, unwilling to properly internalise the law or too weak to obey it, a society based on moral ambivalence, by contrast, will by its very nature produce criminals, rebels, trouble-makers, non-conformists, freethinkers and theorists – all variants of the 'bad subject', the one whose personal ethics cannot be assumed to be identical with any officially propagated moral code. The dominating semiotic principle here is that of the index, which now concerns the relationships that signs have with other signs. One of my interests is to apply this principle to relationships among linguistic representations, such as propositions.

[18] See Rose (1981) on the contradiction between definition and experience.

Consider the possibility that to describe the world in a certain way is to identify oneself, so that a person who asserts x can be thought also to believe y. For example, because it is not uncommon for a person who supports the death penalty to be simultaneously opposed to abortion, one might come to expect that an individual who articulates the one opinion on life and death would also be found to hold the other. In this way one proposition can become linked to another. This of course is not a matter of logic and it is fallible. Just as Pavlov's dog may salivate at the sound of a bell and yet the food does not appear, so might someone who believes in the death penalty also be found to be pro-choice in the matter of abortion, contrary to one's expectations.

One identifies with certain propositions and opposes others. These patterns of identification and counter-identification vary from one individual (and group) to another, depending on their experiences and *interests*. Indexical relationships amongst propositions mean that certain propositions, through their collocations in discourse, *evoke* other propositions. These ideational collocations, as I explained earlier, are often themselves represented by abstract nouns. Thus someone interpreting a text will 'detect' that the author of it has interests either identical or opposed to his or her own; e.g. the person who articulates an opposition to abortion is assumed to be a 'right-winger', even in the absence of evidence that he or she is also conservative with respect to other propositions.

The cunning subject is one who interprets discourse and identifies persons, things and situations in terms of the differential interests and identities involved, although not necessarily with the full consciousness of doing so (or of being a subject of this kind). There are numerous portrayals of this subjectivity in art, especially in literature, and indeed it is not an unreasonable proposition to say that this preoccupation is constitutive of modern literature as such. One begins to notice in early modern literature such Shakespearean figures as Hamlet,[19] who is plunged into a situation of moral uncertainty, or Iago in *Othello*, who is cunning personified and an expert manipulator of the indices of his society.

In the nineteenth century novel, one has works such as Maupassant's *Bel Ami* and Zola's *Nana*, both of whose leading characters are expert social manipulators. But what makes both of the latter highly typical and illustrative is the way in which 'natural' sexual fetishism is blended with indices of a more socially constructed nature, thereby showing all the more strikingly the cunning subject as a true inhabitant of the spiritual-animal kingdom. In the light of competing interests, the law in this kingdom is seen to lose its universal character, since it appears to be nothing more than the product of a contest between individual wills, each of which may experience the formal definition of the law as being contradicted by particular experiences, and therefore as a legitimate object of manipulation rather than reverence. The way in which the chief protagonist in *Bel Ami* uses the agency of the law to entrap his adulterous wife as part of a broader ambitious scheme serves as a model of such cynical manipulation (given his own hyper-adulterous nature).

In this antinomian world the cunning subject who typically inhabits it is one that has internalised the originary relationship between lord and bondsman. According to Gillian Rose (1996, p. 73), this is the essential nature of modern subjectivity. Putting it simply, one may say that each subject is a potential slave to be made the object of exploitation by another, and

[19] Benzon's (1993) analysis of Hamlet, as well as other literary characters, is part of an important and relevant work on literary character in the evolution of culture.

the same subject is at one and the same time also a potential lord in search of a bondsman to enslave, in a continual contest of capture and deception, prey and predation.

Here a convergence between the philosophy of the subject and the theory of semiosis becomes very clear. Bourgeois subjectivity contains within itself the prior relationship of lord and bondsman just as the symbolic order contains within itself the icon and the index of the animal mind. Such is the nature of the spiritual-animal kingdom. Within the human mind/spirit, the drama of natural history is re-enacted, but with this difference, that whereas prey and predator tended to be of distinct species, the cunning subject is one who is always both, always attempting to be predator and always trying to avoid being prey, and doing so by reading the indexical signs. The subject who inhabits this morally ambivalent world is not *free*; he is driven by his own personality and limited by his own personal situation. He is free to pursue his own interests and to enjoy doing so only insofar as he is able successfully to frustrate the freedom of another, who would do the same to him.[20]

More specifically, he is unavoidably subject to certain semiotic dynamics that I will describe as the 'badge', the 'stigma' and the 'spoor'. What I have in mind with the badge is especially propositions such as 'I am a democrat', 'I am a lesbian', 'I am a Christian', and so on. They have the function of providing a guide from present discourse towards the appropriate set of propositions in prior discourse, with the view to indicating how the speaker is to be approached, in his or her own preferred way, and how his or her own present discourse is henceforth to be interpreted, precisely by drawing on those propositions from prior discourse (which are assumed to be known in common).

The stigma is essentially the same as the badge, but with the obvious difference that the propositions expressed are not forms of approbation, and therefore are far more likely to be expressed in the third (or second) person, rather than in the first as in the case of the badge. 'He is a communist', 'you are a snob', 'they are all guilty by association', etc, might all be examples of the stigma.

The spoor represents the actual *work* of the cunning subject. The cunning subject is the one who, being alert to associations between one expression and others, makes judgments of character, of opportunity, of danger, advantage, taste, political identity, etc., in the process of evaluating the other's discourse, while making his or her own connections between present and prior discourses (which are not necessarily shared with the interlocutor). One may say that such judgments are made on the basis of a spoor, that is, a set of associations that are not by any means made explicit in the discourse. The spoor is the trail that is followed by 'instinct' by the businessman, the politician, the criminal, the detective. The cunning subject is the one who must survive by the laws of the jungle, because despite the fact that the 'jungle' in this case is the symbolic realm, it is in fact the animal kingdom of the spirit, and the index continues to be its dominant mode of cognition as part of a struggle to master, rather than be mastered.

The inverse of the cunning subject is the moral individual who must continue to live according to the original ideal of the moral law even while positing a world from which it has long withdrawn. So, in open opposition to the cynicism of the cunning subject, there emerges the stoicism of the late moral subject, the one who must endure living in an alien world as an *unhappy consciousness* or as a *beautiful soul*. This fate is melancholia. It implies an inability

[20] Hegel (*Shorter Logic*, § 94): "the man who flees is not yet free: in fleeing he is still conditioned by that from which he flees." And, one might add, the man who pursues is also not free, from his compulsion.

for introjection and the work of mourning that we saw being offered in psychoanalysis. As such it may be said to involve a misrecognition of the limit in the symbolic order. In place of true reflection there arises instead an abstract morality in implacable opposition to an alien world, an opposition within the self that is now understood as 'the way of the world', and which can only be finally dissolved in a 'world beyond the world', in death or in heaven.[21]

3.4. Freedom as the Realisation of the Symbolic Realm

The further evolution of the subject, beyond such an impasse, must entail an awareness of the implications and limitations of the index-dominated semiosis that has created an animal kingdom of the spirit. Further than that it also implies the possibility of a less interested form of cognition.

Certain terms suggest themselves at this point as ways of characterising such unrealised possibility. The one is *speculative* thought, because this has been the term that has been used for the formulation of propositions that are to be investigated and tested, of possibilities that may realised in the future. However, because the term *speculative* is also used within everyday discourse for precisely the sorts of meaning that we are trying to go beyond – think here of the use of this word in the world of finance for example – one might prefer to substitute for it the term *ideal*.

'Ideal' here will stand for those sorts of propositions that realise the symbolic beyond the limitations of the indexical, in other words beyond the human capacities that have been historically predominant. But precisely because those animalian roots of the symbolic can never be entirely left behind, as already explained, we should perhaps speak of an 'impossible ideal' as the ultimate limit of the symbolic realm. This impossible ideal is the Hegelian limit that was discussed in the quotation from Žižek provided earlier. It is a limit that cannot be reached, and in the full awareness of this lies the *wisdom of comedy*, surely the decisive step beyond the animal kingdom of the spirit. In this connection Gillian Rose (1996, pp. 72-73) distinguishes between two notions of the comic:

> ... *the law* is no longer that of Greek ethical life; it is no longer tragic. Antigone stakes her life as the individual pathos of substantial life in collision with itself: She presents part of its truth and she acknowledges the part of that truth *which exceeds her*. By contrast modern law is that of *legal status*, where those with subjective rights and subjective ends deceive themselves and others that they act for the universal when they care only for their own interests. This is *the spiritual-animal kingdom*: It is comic, not in the sense of frank joviality or careless gaiety and self-mockery, but in the sense of bitter and repugnant intrigue by individuals who deceive others by seeming to share their interests and whose real interest is without substance. These modern comic characters are unmasked by others and not by their own self-dissolving inwardness of humor.

It is rather this "self-dissolving inwardness of humour" that Rose discovers in the Hegelian philosophy and in its very logic, a "*comedy of misrecognition*" (Rose, 1996, p. 75). It is humanity striving for a full realisation of the symbolic order in the consciousness that it must always fall short, that theory and practice will strain towards one another and yet never

[21] Or perhaps, like the character of Liza in Turgenev's *Home of the Gentry*, in the entry to a nunnery.

quite meet. In semiotic terms it indicates a fulfillment of the symbolic order, as a mode of transcendence of the indexical mode of representation, but with a simultaneous recognition of the impossibility of doing so in any final sense.

In coming to understand this here we may return to one of the earlier points connected with psychoanalysis and the rather beautiful expression of Rand and Torok cited there, about "the willingness of psychoanalysis to welcome people into their own personal creations" (1993, p. 577). These creations may well have come about below the radar of consciousness, as semi-animalian creations and defined by a purely indexical order, but via the potential of the symbolic order, and in dialogue with one another, we may be able to bring these creations to light. In so doing we might reasonably have hope of bringing to human subjectivity a renewed self-awareness and a renewed sense of vocation. This is what Rose calls "the comedy of absolute spirit, *inaugurated* mourning," and which she contrasts so well with the melancholia of "*aberrated* mourning" (1996, p. 71). This vocation is ultimately political, and must surely aim at dissolving both the spiritual-animal kingdom and the 'alien world' of the moral but unhappy consciousness that goes with it, in a new imaginary of personal creation, desire and recognition of the other.

In pursuit of such insights we have come across a new triad in theory, this time consisting of psychoanalysis, Rose's work on philosophy and representation, and the semiotics of the symbolic order. This has brought us a long way from Peirce and Saussure and the atomistically defined, decontextualised sign.

CONCLUSION

Freedom in this view that we are ending with is not reached by the transcending of boundaries into a spurious infinitude of semiosis; it lies in the capacity for an ever-enhancing consciousness of the nature of the limit. The pure abstraction contained in quantitative infinity undoubtedly must contribute to a despairing attitude towards the concept of freedom when it is illegitimately imported into qualitative domains of cognition. As I have shown, semiosis may be unlimited, but when it is expanded without limit, that is, into the embrace of excessive abstraction, it turns into its own opposite, the propagation of meaninglessness.[22] We need to explore rather the concrete freedom that may be ours from our awareness of the nature of the limit. Let me try to conclude with a statement about what this could mean, practically and in terms of semiotic research.

Psychoanalysis has made us aware of the psychic drama that underlies expressive manifestations of subjectivity. I believe that semiotics provides the principles for understanding the mechanisms that these psychic processes share with other domains of life, including naturally the animal kingdom. Although Freud and his followers were not founders of semiotics, the best exemplars of their work show a profound awareness of principles that must be defined as semiotic in nature. Psychoanalysts, such as those to whom I have referred, have pointed towards the liberating potentials of the symbolic order for human agency. Human agency means inter alia coming to terms with that which is experienced as oppressive

[22] We may perhaps pass over the question here of whether there are philosophies that actively choose to base themselves on such dubious ground.

in its apparent ineffability,[23] but which, through introjection and the reflectivity that it enables, we may come to understand. Through a process of inaugurated rather than aberrated mourning we have a path from melancholia to (comic) self-awareness. This awareness is awareness of the limits defined by our origins, but limits that we can come to know and which ultimately we can bring into the domain of an expanded agency. This in my view is where the unrealised potential of the symbolic order resides.

What the philosophy of the subject provides beyond this is an awareness of the *political* nature of the fulfillment of the symbolic order. I have described the impasse that is civil society, suspended as it is between two unfree subjectivities. On the one hand is the official morality of the state that supposedly is reflected in its legal processes, but which the cunning subject can see through, to a world of indexical signs that defines the *actual* makeup of civil society as a law of the jungle, and which official morality is quite unable to shape. This world is the *habitus* of the cunning subject, who, being compelled by its intrigues and the apparent impossibility of any other way of life, is not free. This antinomian world can also be seen by the beautiful soul, for whom it is an utterly alien world, and for whom the official morality, while perhaps essentially right, is a lost cause. The beautiful soul is also at an impasse as a result, and therefore is despairingly melancholic. These two major types of subject, and innumerable variations between them of course, have been portrayed over and over in modern literature, so that the question then must arise: What does it mean to have a deep awareness of subjectivity itself? What does it mean politically?

For one thing it suggests to us that semiosis, having produced these shapes of subjectivity historically, does not end there. It suggests further potentials in that we, having become aware of historical subjectivities, through literature, religion, philosophy and so forth, become educated about our selves and our origins. This *Bildung* is clearly part of the unrealised potential of the symbolic order. I cannot adumbrate the political implications of this here, but I would point to the symmetry between the healing power of symbolised introjection in psychoanalysis and the role that a similar process may play in society as a whole. This to me is the future of semiotic research, in helping us to understand how subjectivity may be enhanced through education in its broadest sense, in a process of social healing.

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[23] E.g. the 'crypt' and the 'phantom' in the Abraham and Torok work already cited.

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Chapter 3

LANGUAGE, EMOTION, AND HEALTH: A SEMIOTIC PERSPECTIVE ON THE WRITING CURE

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ABSTRACT

The writing cure, otherwise known as expressive writing, is widely accepted as an effective intervention. Hundreds of studies have shown that writing about one's thoughts and feelings for 3 days, with at least 15 minutes a day, has beneficial effects on physical and mental health. Yet, after more than two decades of research, there remains a large gap between evidence and explanation for the phenomenon. The problem, we suggest, lies in the general neglect to gain a deeper understanding of the basic building blocks of the writing cure, namely language. This vacuum can be filled by Peircean semiotics. Peirce's triadic circuitry of the sign is explicated and applied to the development of a taxonomy of expressions of self and emotions. This taxonomy has been implemented by a pattern matching language analysis program, SSWC (Sundararajan-Schubert Word Count) to test our theory-based predictions of the health consequences of language use. Two empirical studies of the writing cure that utilized SSWC for textual analysis are presented as demonstration of the heuristic value of applied semiotics.

The writing cure has had an impressive track record since its first introduction by Pennebaker (Pennebaker, 1985; Pennebaker and Beall, 1986) in the eighties. For the past two decades, hundreds of studies have shown that writing about one's thoughts and feelings has beneficial effects on physical and mental health (Frattaroli, 2006). But why? What is it about language that its utilization for emotion expression has consequences for health? This question has never been addressed by the extant theories of the writing cure (e.g., Bootzin, 1997; King, 2002; Pennebaker, Mayne, and Francis, 1997). An explanation that seems to have the most empirical support (Frattaroli, 2006) is emotion exposure theory (Sloan and Marx, 2004), which by considering language use as an

instance of exposure therapy tells us more about the latter than language per se. Another widely accepted explanation is narrative structure (Smyth, True, and Souto, 2001), which claims that verbal expression facilitates the transformation of experiences and memories into a structured "story" (Pennebaker and Seagal, 1999). But Graybeal, Sexton, and Pennebaker (2002) found no correlation between narrativity and health benefits. The use of different types of words has also been investigated (Campbell and Pennebaker, 2003). The finding is that the use of emotion words was not consistently correlated with self-reported emotionality, and that "style words"-- such as function words and pronouns-- were more relevant to health status. Not based on any linguistic theory, such ad hoc distinctions of language use seem arbitrary, albeit empirically supported. To date, expressive writing remains a black box, in the words of Laura King: "First, expressive writing has health benefits. Second, no one really knows why" (King, 2002, p. 119). The problem, we suggest, lies in the general neglect to gain a deeper understanding of the basic building blocks of the writing cure, namely language. This vacuum can be filled by Peircean semiotics.

The exposition of Peircean semiotic consists of five sections. The introduction sets the stage by casting the language and health equation in the context of Shannon's ideal code, which is informationally the most complex and energetically the least costly. Peirce's triadic circuitry of the sign is subsequently introduced as an algorithm of complexity that extends Shannon's information theory. Next, we introduce a language analysis program, SSWC (Sundararajan-Schubert Word Count), which implements a proposed taxonomy, derived from Peircean semiotics, of different types of language use with varying degrees of complexity. The penultimate section presents two empirical studies that showed how language analysis by means of SSWC can shed some light on the language and health connection across different conditions. The conclusion discusses the potential contributions of Peircean semiotics to theory and research on the writing cure.

INTRODUCTION

Consistent with Heidegger's dictum that "Man lives in language, as language" (cited in Ott, 1972, p. 169), Charles Sanders Peirce claims that the sign user and the sign have coalesced at a deeper level: "the word or sign which man uses *is* the man himself . . . . Thus my language is the sum total of myself" (Peirce, 1931-58, Vol.5, paragraph 314, emphasis in the original). It is this semiotic perspective that provides solid theoretical grounding for the language and health equation, rendering efficiency of the sign and health status intimately related. In the following investigation, we are guided by three insights that may be derived from Peircean semiotics: a. language is a sign, in the present context, a representation of emotion information; b. the quality of the sign matters for the sign user, in the present context, the quality of emotion representation has health consequences. Lastly, the quality of emotion representation can be modeled by the triadic circuitry of the sign.

The quality of the sign is a central concern of Charles Peirce (Sundararajan, 2008, Colapietro, 1989), but he did not spell out clearly the ramifications of this for the language and health equation. To investigate this question, we may situate the language and health connection in a larger context—the relationship between information and energy. The intimate connection between information and energy is suggested by Metcalfe and Mischel (1999), who have postulated two systems of emotion—"a cool, cognitive 'know' system and a hot, emotional 'go' system" (p. 3)--corresponding to information and arousal, which,

according to both Berlyne (1960) and Estes (1972), constitute two essential functions of any stimulus. Metcalfe and Mischel (1999) claim that the cool system is "complex", whereas the hot system is "simple" (p. 4). This point can be further elaborated by the inverse relationship between information and energy.

Energy is governed by the law of conservation, whereas information is concerned with successful transmission, which requires complexity, in terms of order and organization, to be successful. The inverse relationship between the two has been suggested by a number of writers. According to Shannon (Campbell, 1982), information with a high degree of order and organization renders energy useful or efficient, analogous to the cool system of Metcalfe and Mischel (1999), whereas entropy (disordered information) renders energy costly analogous to heat or the hot system of Metcalfe and Mischel (1999). David Bohm (1994) envisions a progression toward the optimal display of meaning in a representation that is informationally the most complex (satisfying the condition for transmission) and energetically the least costly (satisfying the principle of conservation). Consistent with the finding that psychophysiological arousal was associated with language disturbance as measured by reference errors (Burbridge, Larsen, and Barch, 2005), Metcalfe and Mischel (1999) claim that there is a compensatory and curvilinear relationship between level of activation/arousal and the degree to which complex, integrated behavior is possible. Extending this hypothesis, Labouvie-Vief and Marquez (2004) propose that dysregulated strong emotional activation results in "degradation" of complex representations (see also Labouvie-Vief, 2003). The causal chain can go either way: Higher degree of order or complexity in representation may either contribute to or result from regulated activation of emotion. Conversely, loss of complexity in representation may either contribute to or result from dysregulated activation. For instance, Zinken, Sundararajan, Butler and Skinner (2006, August) found a positive correlation between anxiety/depression and degradation of syntax in the writings of the clinical population.

Cast in the information and energy framework, the language and health connection becomes a testable equation: language representations that are informationally complex can be expected to be associated with the energy efficient cool system, whereas loss of complexity in language representation, the energy costly hot system. To test this hypothesis, we need to be able to measure the degree of complexity in language representations.

Complexity in language representation can be understood in terms of Shannon's ideal code (Campbell, 1982), which consists of an optimal blend of two opposite tendencies of information--variety and accuracy—resulting in the notion of redundancy as reliable variety. But Shannon's ideal code lacks specificity. For an algorithm of complexity that maps out explicitly the dynamisms involved, we turn to the semiotic notion of the sign, according to Charles Peirce.

PEIRCEAN SEMIOTICS

What is a sign? "A sign is an object which stands for another to some mind," says Peirce (cited in Fisch, 1982, Vol. 3, p. 66). Central to Peircean semiotics is the claim that a representation is always representation to a mind, which generates interpretations referred to as "interpretant."

Thus a sign consists of three elements: object, the sign proper, and interpretant. The interaction among these terms constitutes sign relation, which is a complex structure known as the triadic circuitry of the sign.

The Triadic Circuitry of the Sign

A triadic circuitry is implied in the following definition of the sign as "Anything which determines something else (its interpretant) to refer to an object to which itself refers (its object) in the same way, the interpretant becoming in turn a sign, and so on ad infinitum" (Peirce in Hoopes, 1991, p. 239). This can be illustrated by the sunflower.

A sunflower is not a real sign, but a proto-sign or representamen: "If a sunflower, in turning towards the sun [*object*], becomes by that very act fully capable . . . of reproducing a sunflower [*interpretant*] which turns in precisely corresponding ways toward the sun, and of doing so with the same reproductive power, the sunflower would become a Representamen [proto-sign] of the sun" (Peirce, 1961, 1: 274). This formulation seems to have anticipated what we know of DNA today. But the function of DNA is only a proto-sign. To be a full fledged sign, the interpretant has to be a mental, rather than a biological process. Nevertheless, the sunflower scenario has summed up the basic triadic structure of the sign, in which the relation between interpretant and object is an equivalent translation of the original sign-object relation. The Peircean notion of equivalent representation (Parmentier, 1994) is compatible with Shannon's notion of redundancy as reliable (equivalent) variety (translations). But reliable variety in information or equivalent representation in signs is an achievement, not a given as is the case with DNA, because it is a process that entails a dynamic integration of opposites.

The notion of integration in representation (Bucci, 1995; Teasdale and Barnard, 1993), and health (Krystal, 1988) has had a long tradition in psychology. The unique contribution of Charles Peirce (Hoopes, 1991) lies in making it clear that integration is a far more dynamic process than simply the combination of opposites. Integration is best understood in terms of complexity, which in dynamical systems theory is characterized by bipolar feedback (Sabelli, 2005). According to Sabelli (2005), a bipolar (both positive and negative) feedback which generates information is characterized by coexistence or alternation of synergy and antagonism.

The bipolar feedback in signs may be understood in terms of that between two opposite tendencies of information—accuracy and variety. This interplay of accuracy and variety is manifest in Peirce's claim that the semiotic process involves "two infinite series, the one back toward the object, the other forward toward the interpretant" (Peirce cited in Parmentier, 1994, p. 10). Parmentier (1994) explains:

> . . . the sign relation is constituted by the interlocking of a vector of representation pointing from the sign and interpretant toward the object and a vector of determination pointing from the object toward both sign and interpretant. (p. 25)

These two movements of the sign--one feeding forward generating an infinite series of interpretants; the other feeding backward pointing toward the object--can be graphically illustrated:

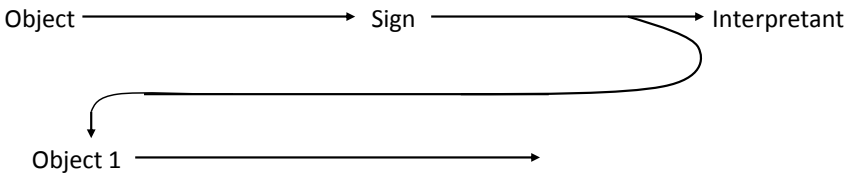
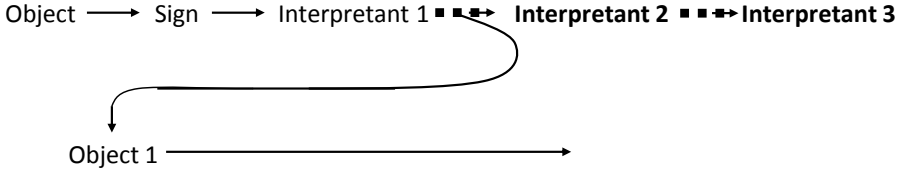


Figure 1a. The triadic circuitry of the sign.

In the feeding forward movement, the sign gives rise to the interpretant, which in turn acts like a sign to influence the next interpretant, ad infinitum. The feeding back loop is referred to by Wiley (1994) as a "reflexive undertow" (p. 27), which is manifest in the reentrant loops from the interpretant to the sign and the object. Corresponding to these two movements are two important functions of the sign: effector and sensor.

The effector function of the sign serves the purpose of variety by generating a potentially endless series of interpretations. By contrast, the sensor function of the sign monitors the accuracy of representation. This is done by the reflexive feedback loop that makes sure that the relation between interpretant and object is an equivalent translation of the original sign-object relation. These two movements of the sign that serve the two fundamental requirements of information--variety and accuracy—are hierarchically structured: The feeding forward movement is "upshifting"; the reflexive loop is "downshifting" (Lee,1997, pp. 131-132).

The upshifting movement to a symbolic level is experience distant, as the interpretant is one step removed from the object--a price it pays to capitalize on the generation of variety through interpretations. The downshifting movement is experience near, as it privileges fidelity to experience at the risk of rigidity or frugality in cognitive elaborations. Optimal sign function requires proper coordination or integration of these opposing tendencies. But integration may fail. For instance, the upshifting movement of interpretation may generate an increasingly experience distant interpretants, when the process becomes de-coupled from the reflexive movement back to experience. This is illustrated in the default processing of Figure 1b.



Note. In bold: default processing.

Figure 1b. Lack of integration in default information processing.

Cognate Ideas in Psychology

Complexity as modeled by the triadic circuitry of the sign is consistent with Don Tucker's (2007) core to shell formulation of the neural structure, which is summed up succinctly by Johnson (2007):

> The limbic core, with its dense interconnections and emotional valences, would present us with a holistic, feeling-rich, emotionally nuanced grasp of a situation. The more modular and highly differentiated sensory and motor regions of the shell (cortical) structure would permit the discrimination and differentiation that we call conceptualization. (pp. 100-101).

The integration between the subsymbolic limbic core and the symbolic-cortical systems is referred to by Tucker (2007) as a "vertical integration" which is defined as a "recursive processing" (p. 223) that consists of movements in two opposite directions: limbifugal and limbipetal.

> Limbifugal movement refers to Core to Shell connection: This is the feedforward movement toward increasing differentiation into specific and concrete forms.
>
> Limbipetal movement refers to Shell to Core connection: This is the feedback, reentrant loop toward integration and self-modification.

Together, limbifugal and limbipetal movements constitute one cycle of the recursive processing referred to as vertical integration: The result of neural network patterns traversing in both directions is the emergence of meaning. The connection between the two systems is not necessarily smooth and automatic. As Tucker (2007) points out, the relationship between the two systems is dialectical (as is characteristic of bipolar feedback):

> The consolidation process across the linked networks from shell to core is dialectical in that an inherent opposition of structural forms—fused versus separated—exists between the core and shell. . . . Each wave in the cycle of abstraction traverses this conflict in some way. In those rare optimal instances of the human mind, the dialectic is extended, recursive, and progressive. (pp. 224-225)

The notion of vertical integration is consistent with the hierarchical, staged model of memory (Conway and Pleydell-Pearce, 2000), which suggests that a retrieval strategy of "moving across rather than down the memory hierarchy" (Williams, Barnhofer, Crane, Hermans, Raes, Watkins, and Dalgleish, 2007, p. 136) constitutes failure in integration, as is illustrated in the default functioning in Figure 1b. A case in point is the truncated search of overgeneral retrieval of autobiographical memory that individuals suffering from depression, PTSD, or related disorders are found to be especially prone to. These individuals tend to capitalize on categorical memories (Birthdays make me happy) at the expense of event specific details (contextual details of a particular birthday). Cast in the framework of the triadic circuitry of the sign, the truncated search strategy of these individuals is a case of the lack of integration between the two movements of the sign: the experience-distant symbolic mode characteristic of the interpretant is running on overdrive, un-constrained by the reflexive undertow (Wiley, 1994) back to experience.

Theory Based Predictions on Language and Health

To recapitulate, the triadic circuitry of the sign consists of a bipolar feedback (Sabelli, 2005), characterized by mutual synergy and antagonism, between two opposite movements of the sign--generation of variety through symbolic, experience distant interpretation, on the one

hand; and monitoring of accuracy through the reflexive undertow (Wiley, 1994) back to experience, on the other. The result of this dynamic integration of two opposite movements is a fully developed sign, which according to Peirce consists of three modes of representation—icon, symbol, and index--each contributing uniquely to the overall efficiency of the sign (Deacon,1997). The icon embodies a relationship of contiguity between the representation and its object to ensure fidelity in representation; the symbol is one step removed from the object of representation to facilitate further elaboration through interpretations; and the index is a reference loop that counterbalances the abstract tendency of the symbol by calling attention to the object of representation. Equipped with these three modes of representation, a fully developed sign is therefore capable of integrating its multiple functions of representation--the concrete expression of experience (a function of the icon), understanding through elaboration and interpretation (a function of the symbol), and validation of subjective experience (the indexical function that calls attention to the object of representation).

Consistent with this model of representation is Clore and colleagues' (Clore, Ortony, and Foss,1987) structural definition of *bona fide* emotion concepts in terms of three referential foci—internal, mental, and affective: "the best examples of emotion words would be ones that refer to internal (as opposed to external) conditions, those that refer to mental (as opposed to physical) conditions, and those that have a significant focus on affect" (p. 752). The affective expression is iconic; the mental representation is symbolic; the internal focus is reflexive. Integration of these multiple referential foci in *bona fide* emotion concepts approximates a fully developed sign, according to Peirce, or the ideal code, according to Shannon, or to give the screw another turn, what is referred to by Pennebaker (1989) as high level thinking. However, as indicated by the foregoing analysis, optimal representations are an achievement rather than a given.

Since optimal representation of experience is dialectic at its very core, it requires the integration of two antithetical types of language use--one experience near (A), the other experience distant (B). The mutual constraint, characteristic of bipolar feedback, of A and B results in proper distance from experience (Scheff, 1979), which consists of the following types of language use:

A. attention to affect;
B. facilitative mental distance from experience.

Less than optimal representations of self and emotions are hypothesized to be symptomatic of a lack of integration of the two movements of the sign, with each going to extreme due to lack of mutual restraint, resulting in:

C. under-distance from experience;
D. over-distance from experience.

Based on the foregoing analysis of the inverse relationship between complexity in information and energy cost, the shifting balance between cool and hot systems in different types of language use is predicted to be as follows: Informationally complex, optimal representations of self and emotions (A and B) are predicted to be dominated by the cool system; loss of complexity in less than optimal representations of self and emotions (C and D)

is associated with activation of the hot system. We hypothesize that when the cool system is in dominance, the hot system is neutralized, resulting in the following effects:

a) Health benefits.
b) Information for free: An efficient sign is one that processes information at minimum energy cost. With complete neutralization of the hot system, emotion can be processed as simply information, with minimum arousal. This hypothesized low energy cost of the cool system is consistent with Damasio's (1999) notion of feelings as involving the "as if body loop," which bypasses the body proper, partially or entirely, a mechanism that "saves both time and energy" (p. 281).

By contrast, the hot system is hypothesized to have varying degrees of health costs, depending on its regulation by the cool system:

a) Partially neutralized activation: The hot system is neutralized to some extent by the cool system, resulting in a reduction of activation.
b) Regulated activation: Activation is evident, but with benefit outweighing the cost. This hypothesis is consistent with the notion of integration of hot and cool systems according to Metcalfe and Mischel (1999), who claim that the former can be harnessed in the service of the latter, for instance regulated activation of the hot system may boost working memory.
c) Dysregulated activation: When the hot system dominates and the cool system is inhibited, resulting in health cost.

SSWC: TOWARD A TAXONOMY OF SELF AND EMOTIONS

Based on the above formulation of the sign, a taxonomy of verbal expressions of self and emotions has been implemented by a pattern matching language analysis program, SSWC (Sundararajan-Schubert Word Count)(for a study of construct and external validity, see Sundararajan and Schubert, 2005). This program consists of fifteen categories of verbal expressions of self and emotions. The reason why representations of the self are included in our taxonomy of affective lexicon is because any emotion expression invariably involves the self (Lambie and Marcell, 2002).

We further propose that representations of the self are not confined to the first person pronoun "I" but extend to pronouns in general (it, they, you, and so on). This assumption is supported by the neuroimaging results which showed that self-relatedness evaluation involves a wide neural network, which relates any represented object to the representing subject (Legrand and Ruby, 2009).

For categorization of affective lexicon, we have consulted Lane (1991), and Clore, et al. (1987). The fifteen categories of self and emotions are grouped into the above mentioned four types of language use:

Optimal Representation of Emotion

Categories of language use that constitute optimal representation are expected to be under the sway of the cool system.

A. Attention to Affect

The following categories of expressions show an integration of three foci of reference in representation: mental, internal, and affective.

Affect Focal (happy/sad): These are the *bona fide* emotion terms. Dictionary for this category is based primarily on the affect-focal terms of Clore et al. (1987).

Valence focus (miserable/pleasant): This category indexes the valence dimension of emotions. Dictionary for this category consists of the word list of pleasant and unpleasant affect in Barrett and Russell (1998). Also included are word lists with highest scores on the Depth and Evaluation dimensions in Averill (1975, p. 17).

B. Facilitative Mental Distance from Experience

The basic premise of the Peircean semiotics is that the relationship between any two terms is always mediated by a third term. The inclusion of the third term--the other-- is what creates a mental distance from experience, which is necessary for the proper regulation of emotions. An element of the other is present in all of the following categories:

Detached Self (someone, they): This category is an index of the third person perspective, which reflects a detached intentional stance toward personal experiences.

Reflexive Self (ourselves, itself): The reflexive self has a triadic structure of self-other-self, which is a self to self recursiveness looping through the other. This triadic self-other-self recursivity entails the integration of two lower dimensional structures of self representation: self as identity ("I" and "me") and self as other ("they").

This category consists of two types of expressions: One is expressions of self-referentiality such as "itself." "Myself" however is excluded from this category, because representation of the self in this category is not an atomic self (an "I"), so much as an extended self that includes the other, a "we" (Wiley, 1994). The category of *Reflexive Self*, therefore, includes expressions--such as "our own," or "each other"—that evince a looping of the self through the other, resulting in an extended self.

External Attribution (sexy, wonderful): This category is based primarily on terms referred to by Clore et al. (1987) as "external conditions." The referential focus of these words is on the external attributions of the emotional states, a mode of processing which is hypothesized to constitute a facilitative mental distance that reduces the intensity of affect.

Less Than Optimal Representation of Emotion

Categories of language use that constitute less than optimal representation are expected to be under the sway of the hot system.

C. Under-Distance from Experience

This refers to a state of immersion in experience (Lambie and Marcel, 2002), resulting in representations that are deficient in mental reflection (Frijda, 2007).

Affected Self (me, "making me . . ."): This category indexes the perception of the self not as doer, but as being done to. This passive self is enmeshed in the experience, lacking the mental distance for reflection.

Somatic (headache): The dictionary for this category is based primarily on the word list of "physical and bodily states" in Clore et al. (1987). Words under this category are instances where the referential focus is primarily on the physical rather than mental or psychological conditions. Such representations are what Peirce refers to as indices. "An index is a sign which would, at once, lose the character which makes it a sign if its Object were removed, but would not lose that character if there were no Interpretant" (Peirce cited in Hoopes, 1991, p. 239). Peirce gives the example of the bullet-hole as a sign of a gun shot to show that indices have direct physical connections to the signified, a connection independent of an Interpretant: "for without the shot there would have been no hole; but there is a hole there, whether anybody has the sense to attribute it to a shot or not" (Peirce cited in Hoopes,1991, p. 240). By the same token, the assumption behind somatic complaints such as "hungry" is that they are indications of some physiological change, a condition that "truly" exists, regardless of whether it is recognized/interpreted as such or not. From the Peircean perspective, this alleged independence from the Interpretant explains why words denoting somatic concerns are usually deficient in their impetus for symbolic elaborations.

Violent Words (kill, rape, swear words): This category is composed of words of violent action and obscenities, which may be considered verbally acting out behaviors. This type of language use is deficient in mental reflection.

Emotion as action (love/hate, used as verb): Dictionary for this category consists of twenty-one "noncausative verbs" (such as love, hate, used as verb, in active, not passive, voice) from Clore et al. (1987, pp. 763-765). When emotion is represented as action, self reflexivity is missing. Peirce has noted that when a child wants to move a table, he is likely to be so absorbed in what he wills as to be oblivious to himself: "Does he think of himself as desiring, or only of the table as fit to be moved?" (1931-58, Vol. 5, paragraph 230). The same applies to expression of emotion as action. For instance, in "I hate him," the emoter is not self-reflexive, as his or her attention is absorbed by the qualities of the person as "fit" to be hated, no less than a table as "fit to be moved." Frijda (2005) makes a similar observation concerning infatuation as an instance of the first-order experience, where one is enthralled by a person's attractiveness, and considers "I love her" as an objective fact. Frijda goes on to say that in the immersed consciousness of the first-order experience, no subjectivity, no reference to the self is involved.

Suffering (devastated, traumatized): This category consists of verbs in passive voice--words that designate the extreme pole of the victim stance, which suggests a lack of psychological distance from the experience.

High Activation (excited, nervous): Words in this category are hypothesized to be indications of direct activation, unmitigated by any mental distance from experience. Dictionary for this category is based primarily on the word list of activated affect in Barrett and Russell (1998).

D. Over-Distance from Experience

Over-distance is defined as a defensive mental distance that compromises the fidelity of emotion representations by limiting the access to or the scope of experience. It may be part and parcel of the evaluative emotional processing, which has been found to be associated with reactivity (Low, Stanton, and Bower, 2008).

Focal Self (I, myself, my own): The linguistic use of "I" is indicative of focal attention to the self system, which is referred to by Kihlstrom, et al. as "an organized knowledge structure that stores what one knows about oneself. This would include semantic knowledge about one's physical and personality attributes, social status, and the like" (Kihlstrom, Mulvaney, Tobias, and Tobis, 2000, P. 67, note 1). Antithetical to the experiencing self, this representation of the self is hypothesized to entail direct access to semantic memory (Forgas, 2001), which detracts resources from online processing of emotional information.

Denial ("doesn't bother me"): This category is composed of expressions that indicate a distancing strategy that minimizes or represses the emotional impact of the experience.

Affect Non-Focal (cry, understanding): Dictionary for this category is based primarily on the affect non-focal terms in Clore et al. (1987). It consists of representations in which the referential focus has shifted from affectivity to cognitive and behavioral components of the experience. Also included in this category are clichés, such as "depressed" (Lane, 1991). It is hypothesized that a preponderance of *Affect Non-Focal* terms are the result of heuristic information search strategies and motivated processing as an attempt to control and limit the scope and impact of one's affective experience (Forgas, 2001). This hypothesis finds supportive evidence in one study (Sundararajan and Schubert, 2005), in which factor analysis revealed high loading of *Affect Non-Focal* terms on a factor called Emotional Management.

Low Activation (bored, drowsy): Dictionary for this category is based primarily on the word list of deactivated state in Barrett and Russell (1998). High frequency use of this type of expressions could be an indication of apathy or withdrawal as a result of the cool system coming de-coupled from the hot system, according to Metcalfe and Mischel (1999).

All the above categories are presented in terms of percentage, out of the total word count, of words that fall into a specific category. In addition, SSWC computes three global categories:

Word Count: The raw score that serves as an index of the length of the text.

Core Affect: The percentage, out of word count, of the sum total of words that fall into the following categories: *Valence Focus*, *High Activation*, and *Low Activation*.

Expressions of Self and Emotions (E): The percentage of the sum total of words used in all the SSWC categories minus Core Affect. Here we are following the advice of Russell (2003) to treat E and Core Affect separately.

EMPIRICAL STUDIES

To test this semiotic model of language and health, we re-analyzed two empirical studies of the writing cure. According to Metcalfe and Mischel (1999), the balance between the cool and hot systems is determined by stress and developmental phase, in addition to the individual's self-regulatory dynamics. The first study which used provoked stress to measure

reactivity can shed some light on the shifting balance between the two systems in the expressive writing of adults. The second study which consisted of children's writing addresses the developmental implications for our proposed model of language and health.

Group difference has been the main focus in studies of the writing cure, but this approach masks the individual differences in language use, as Fivush, Marin, Crawford, Reynolds, and Brewin (2007) point out rightly. To go beyond this well beaten path, we selected for our analysis two studies which had null results in terms of group differences—both control and expressive writing groups improved at follow up. The null results help to cast the issue of language and health into one urgent and sharply focused question: What good does expressive writing do? As Fivush, et al. (2007) took the individual differences approach to follow up on this question (see Study 2 below), we go one step further by situating the question of language use in the context of the information and energy trade off. From this perspective, the instruction set of expressive writing that urges the participants to write about their deepest thoughts and feelings can be expected to promote complexity in information, or in Pennebaker's (1989) term, high level thinking, and thereby enhance the cool system of emotion. This hypothesis is put to test in the following two studies.

Study 1

Study 1 is a reanalysis of an unpublished study (Graybeal, 2004, Study 2), which recruited 86 college undergraduates whose parents were divorced and who were randomly assigned to a control or experimental group (n=43 each). The former was instructed to write--on two occasions, 30 minutes each--about time management; the latter, their deepest thoughts and feeling about their parents' divorce. Participants were also interviewed about the most upsetting aspects of their parents' divorce, both before and after writing, in order to assess their reactivity to provoked stress. The hypothesis was that the Expressive Writing group, relative to the controls, would show decreased reactivity to stress at the final interview, one month post writing. This was not supported empirically. Results showed that both groups improved after the writing exercise--they were less distressed, improved their mean performance on the working memory task, and exhibited fewer psychological symptoms. To shed some light on this conundrum, we used SSWC to re-analyze the data.

Outcome Measures

To measure the participants' reactivity to provoked stress, a comprehensive

battery of tests were used in the original study, including measures of physiological arousal (such as heart rate, skin conductance, and blood oxygen level), self reports of emotional upset (such as questionnaires and mood scales), measures of physical and psychological health (self reports of illness, and symptom checklist), and measure of cognition (working memory tests). From this battery of tests, the following measures were selected because of their robustness (Graybeal, 2004):

max HRd (maximum level of heart rate difference from the baseline),

restact (Degrees to which activities been restricted due to illness in last 2 weeks),
SUDSpk (Subjective Units of Distress, peak score),
sick2m (frequency of being sick for last 2 months),
WM (working memory).

All these measures were taken during or at the end of the interviews, pre- and post-writing.

Besides the above measures used in the original study, we added physician's visits from Health Center data, which are coded as follows:

Dr2m (frequency of health center visits within 2 months post writing).
Dr12m (frequency of health center visits post writing, two months to a year).

RESULTS

Over View

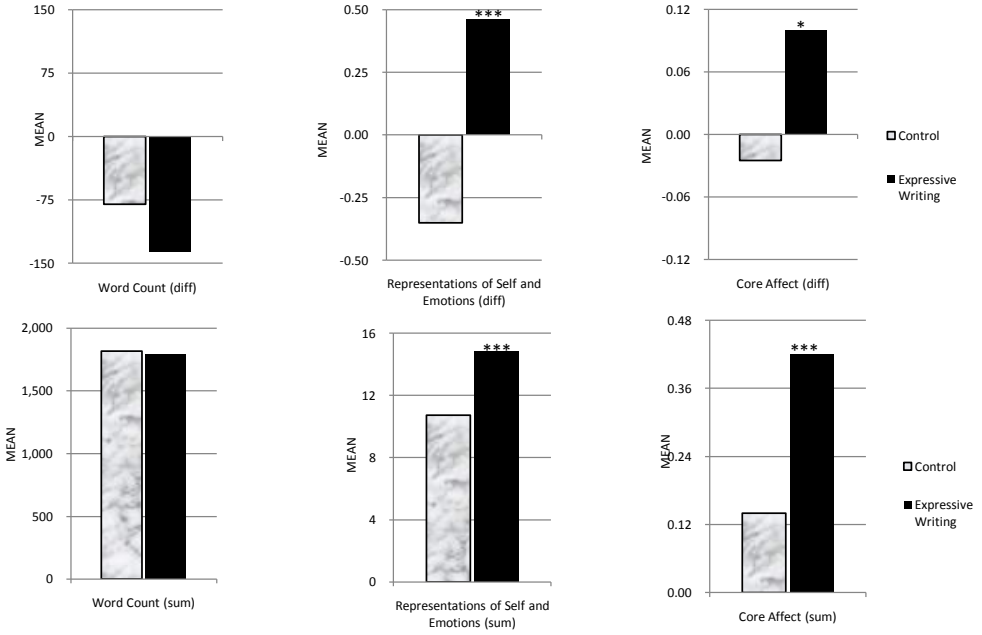
Language use: As shown in Figure 2, the two groups wrote very differently, as measured by the SSWC variables.

Word Count: No significant difference was found between the two groups, neither in terms of the sum total of words produced across the writing days (Figure 3, lower left panel), nor in terms of any significant correlation between length of text and outcome measures (Figure 4a). Furthermore, judging by the difference score of word count between the writing days, both groups wrote less on the second day of writing (Figure 3, upper left panel).

SSWC Variables (with tokens)	*Expressive Writing group Mean (SD)*	*Control group Mean (SD)*	*Significance*
Attention to Affect			
Affect Focal (happy/sad)	1.33 (0.45)	0.33 (0.24)	***
Valence Focus (miserable)	0.30 (0.18)	0.03 (0.05)	***
Facilitative Distance from Experience			
Reflexive Self (ourselves)	0.47 (0.19)	0.19 (0.20)	***
Detached Self (someone)	1.70 (0.80)	0.44 (0.30)	***
External Attribution (sexy)	1.22 (0.43)	0.60 (0.30)	***
Under Distance from Experience			
Affected Self (me)	2.49 (0.82)	1.33 (0.64)	***
Violent Words (swear)	0.07 (0.08)	0.01 (0.04)	***
Somatic (headache)	0.02 (0.05)	0.14 (0.11)	***
Suffering (traumatized)	0.02 (0.03)	0.00 (0.01)	In
Emotion as Action (love/hate, used as verb)	0.46 (0.26)	0.14 (0.16)	***
High Activation (excited)	0.09 (0.09)	0.06 (0.18)	*
Over Distance from Experience			
Focal Self (I, myself, my own)	6.29 (1.03)	7.18 (1.30)	***
Affect Non-Focal (cry, understand)	0.72 (0.33)	0.36 (0.22)	***
Denial ("doesn't bother me")	0.05 (0.06)	0.01 (0.03)	***
Low Activation (bored)	0.03 (0.05)	0.05 (0.06)	Ns

Note. *p<.05, **p<.01, ***p<.001. Ns=Not significant at .05. In=Invalid comparison due to low baseline.

Figure 2. Study 1 (N=86), group comparison, based on weighted mean across writing days, on variables of SSWC (Sundararajan-Schubert Word Count), by writing task.



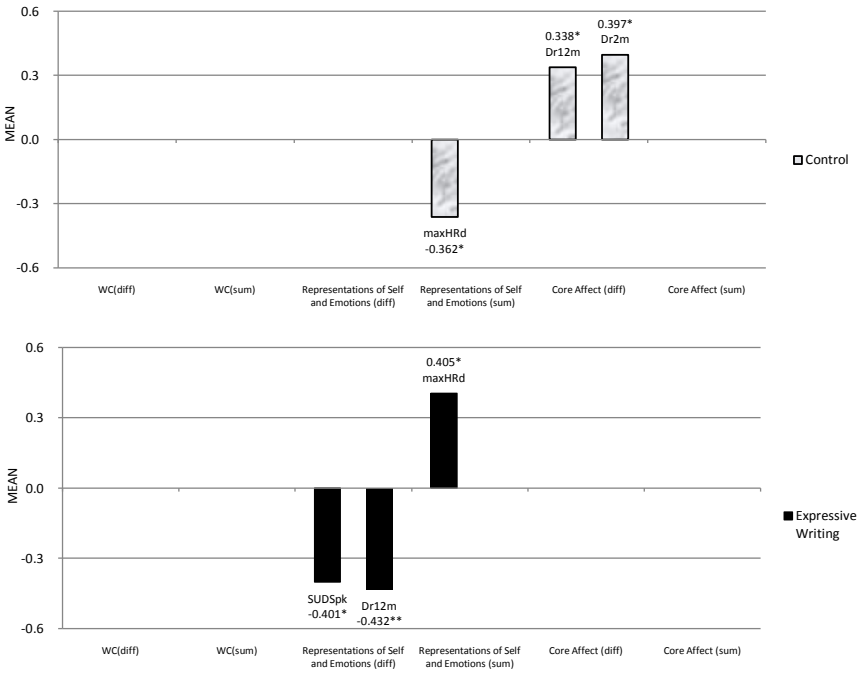
Note. diff=difference score between the writing days (Day2–Day1). sum=weighted mean across the writing days (Day1+Day2). *p<.05, **p<.01, ***p<.001.

Figure 3. Study 1, group differences in global variables of SSWC (Sundararajan-Schubert Word Count), by writing task.

Expressions of Self and Emotions (E): As shown in Figure 3, the Expressive Writing group had significantly (p<.001) more output of E, in terms of weighted mean across writing days, than the Control group. The two groups also differed significantly in terms of difference score between the writing days, with the Expressive Writing group increased, while the control group decreased, their output of E on the second day of writing.

As shown in Figure 4a, both groups benefited from higher percentage of E: The higher percentage of using E, the less likely for the individual in the Control group (r=-.36, p<.05) to show heart rate increase at the final interview, indicating decreased reactivity. Not so for the Expressive Writing group, in which higher percentage of E was associated with increase in heart rate at follow up (r=.41, p<.05). However, the salutary effect of self and emotion expressions (E) was also evident for the Expressive Writing group, when difference score between the writing days is examined. Higher percentage of E on the second day of writing was correlated with a decrease in self reported stress (SUDS, r=-.40, p<.05) at the final interview, and a decrease in the frequency of health center visits (r=-.43, p<.01) from 2 months post writing to a year. This pattern is consistent with the observation (Pennebaker and Beall, 1986) that expressive writing increases stress in the short term, but produces health benefits in long term.

Core Affect: As shown in Figure 3 (far right, lower panel), the Expressive Writing group had significantly (p<.001) more output of Core Affect than the Control group. The two groups also differed significantly (p<.05) in terms of difference score between the writing days, with the Expressive Writing group increasing, while the control group decreasing, their output of Core Affect on the second day of writing.



Note. diff=difference score between the writing days (Day2–Day1). sum=weighted mean across the writing days (Day1+Day2). SUDSpk=subjective units of distress, peak score. maxHRd=difference in maximum level of heart rate from baseline. Dr2m=frequency of doctor's visit within 2 months post writing. Dr12m=frequency of doctor's visit post writing, two months to a year. *p<.05, **p<.01, ***p<.001.

Figure 4a. Study 1, partial correlations, between outcome measures and global variables of SSWC (Sundararajan-Schubert Word Count), for (top) Control and (bottom) Expressive Writing groups.

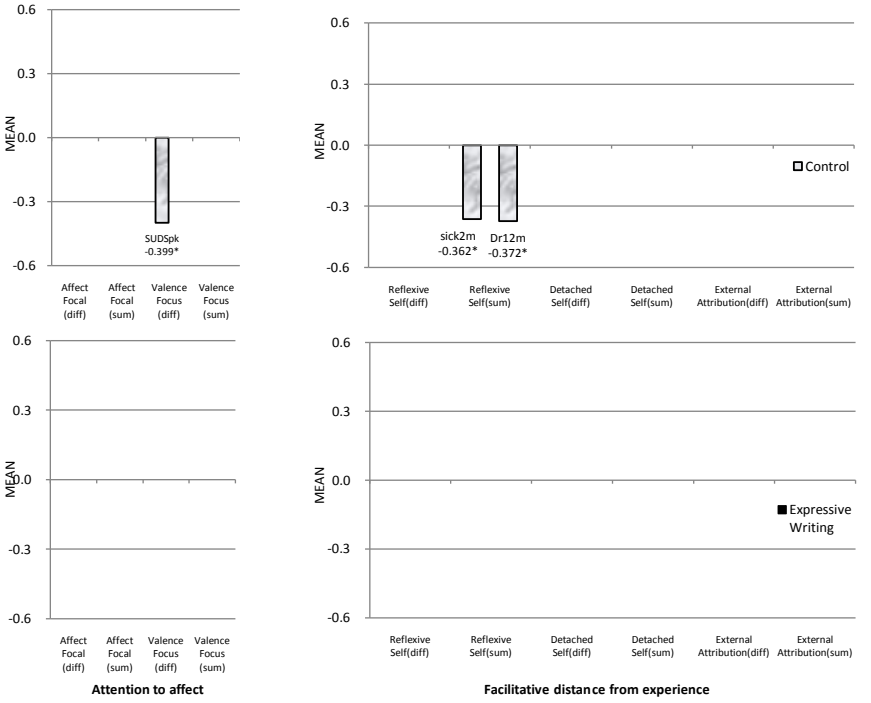
As shown in Figure 4a, weighted mean across writing days had no significant correlations with outcome measures for both groups. However, for the Control group only, change scores between the writing days were positively correlated with the frequency of health center visits in the two months after writing (r=.40, p<.05), as well as two months to a year post writing (r=.34, p<.05).

Results for components of optimal emotion representation—attention to affect and facilitative distance from experience--are shown in Figure 4b.

Attention to Affect

Affect Focal (happy/sad): As Figure 4b shows, no significant correlations of this variable were found with outcome measures for both groups.

Valence focus (miserable/pleasant): As Figure 4b shows, no significant correlations of this variable were found with outcome measures for the Expressive Writing group. For the Control Group, increased use of *Valence focus* from day 1 to day 2 of writing was related to decreased reactivity at the final interview, as measured by self-reported stress (SUDS, r=-.40, p<.05).



Note. diff=difference score between the writing days (Day2–Day1). sum=weighted mean across the writing days (Day1+Day2). SUDSpk=subjective units of distress, peak score. sick2m=frequency of being sick for the last 2 months. Dr12m=frequency of doctor's visit post writing, two months to a year. *p<.05, **p<.01, ***p<.001.

Figure 4b. Study 1, partial correlations, between outcome measures and *Components of Optimal Emotion Representation* in SSWC (Sundararajan-Schubert Word Count), for (top) Control and (bottom) Expressive Writing groups.

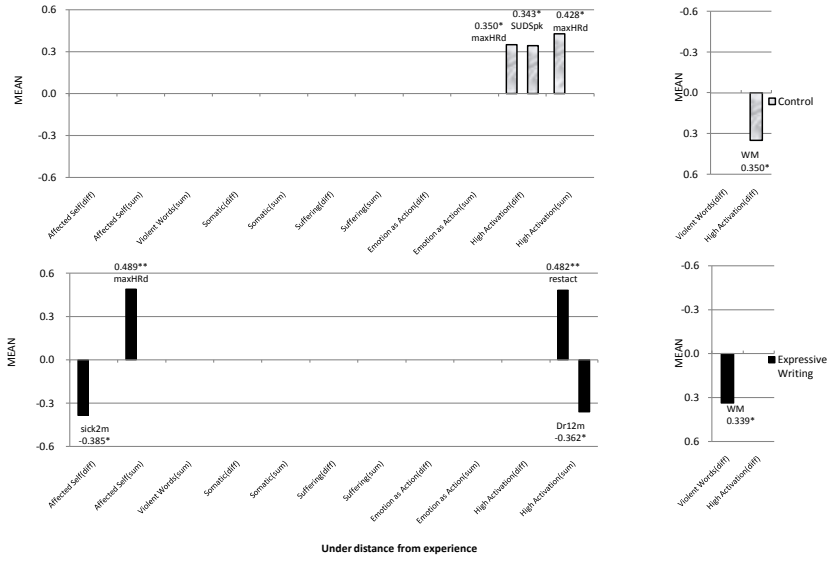
Facilitative Distance from Experience

Reflexive Self (ourselves, itself): No significant correlations of this variable emerged for the Expressive Writing group. For the Control Group, increase in the sum total of this variable across the writing days was associated with both decreased self-reported frequency of being sick for the last 2 months post writing (r=-.36, p<.05), and decreased health center visits (r=-.37, p<.05), two months to a year post writing.

Under Distance from Experience

Affected Self (me, "making me . . ."): For the Expressive Writing group, increase in the sum total of this variable across the writing days was associated with more reactivity at the final interview, as evidenced by a positive correlation with heart rate (r=.49, p<.01). However, progressive increase of this type of expression from day1 to day 2 of writing was negatively correlated (r=-.39, p<.05) with self-reported frequency of being sick for the last 2

months. This category had no significant correlations with outcome measures for the Control group.



Note. diff=difference score between the writing days (Day2–Day1). sum=weighted mean across the writing days (Day1+Day2). maxHRd=difference in maximum level of heart rate from baseline. restact=Degrees to which activities been restricted due to illness in last 2 weeks. SUDSpk= subjective units of distress, peak score. sick2m=frequency of being sick for the last 2 months. Dr12m=frequency of doctor's visit post writing, two months to a year. WM=working memory (reversed scale such that improvement is shown as downward bar; impairment as upward bar). *p<.05, **p<.01, ***p<.001.

Figure 4c. Study 1, partial correlations, between outcome measures and *Under Distance categories* of SSWC (Sundararajan-Schubert Word Count), for (top) Control and (bottom) Expressive Writing groups.

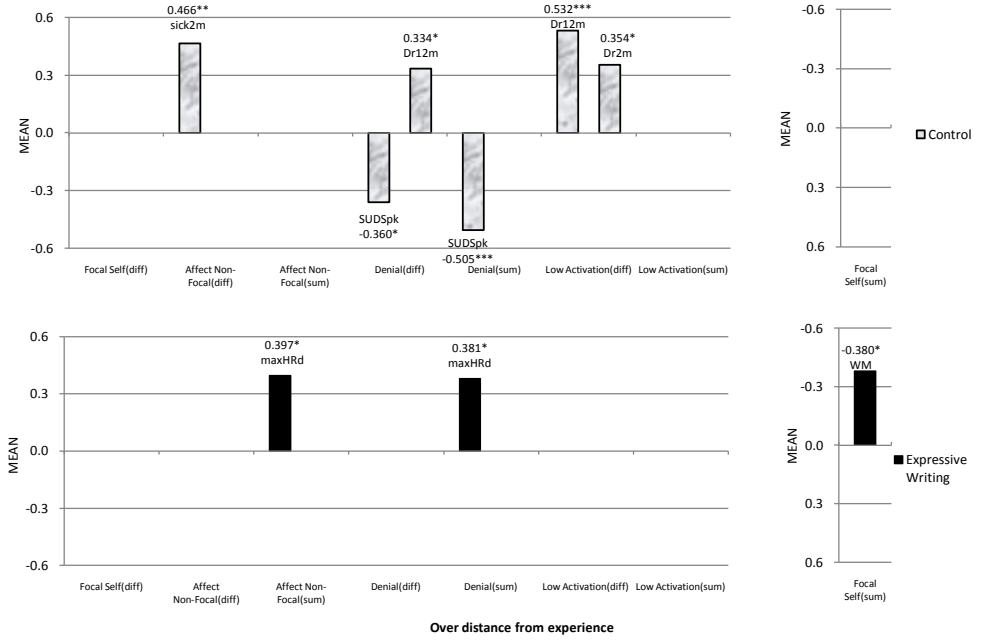
Violent Words (kill, rape, swear words): For the Expressive Writing group, an increase, from day 1 to day 2 of writing, of this variable was positively correlated with improvement in working memory (r=.34, p<.05), post writing. No significant correlation of this variable was found for the Control group.

High Activation (excited, nervous): For the Expressive Writing group, increase in the sum total across writing days of this variable was strongly and positively correlated (r=.48, p<.01) with self-reported extent to which activities had been restricted due to illness in the last 2 weeks. On the other hand, it was not without health benefits, as evidenced by a negative correlation (r=-.36, p<.05) with the frequency of health center visits two months to a year post writing. For the Control group, increase in the sum total across writing days of this variable was positively correlated with increased heart rate (r=.43, p<.05). Progressive increase, from day 1 to day 2 of writing, of expressions of high activation was positively correlated with the health costs of increased heart rate (r=.35, p<.05), and self reported stress (r=.34, p<.05), on the one hand, and with the health benefit of improved working memory post writing (r=.35, p<.05), on the other.

Over Distance from Experience

Focal Self (I, myself, my own): For the Expressive Writing group, the more one made use of this variable, as evidenced by weighted mean across writing days, the less likely was one to perform well on working memory (r=-.38, p<.05) at follow up. This memory impairment could be due to the high self focus characteristic of rumination (Watkins and Teasdale, 2001). No significant correlation of this variable with outcome measures was found for the Control group, a writing condition which probably did not invite ruminative reflections as much as the expressive writing condition that focused on stressful autobiographical memories.

Affect Non-Focal (cry, understanding): For the Expressive Writing group, weighted mean of the use of this variable was positively correlated with increased heart rate (r=.40, p<.05), an indication of reactivity, at the final interview. For the Control group, progressive increase, from day 1 to day 2 of writing, in this type of expressions was strongly and positively correlated with an increase in self reported frequency of being sick for the past two months post writing (r=.47, p<.01).



Note. diff=difference score between the writing days (Day2–Day1). sum=weighted mean across the writing days (Day1+Day2). maxHRd=difference in maximum level of heart rate from baseline. SUDSpk=subjective units of distress, peak score. sick2m=frequency of being sick for the last 2 months. Dr12m=frequency of doctor's visit post writing, two months to a year. Dr2m=frequency of doctor's visit within 2 months post writing. WM=working memory (reversed scale such that improvement is shown as downward bar; impairment as upward bar). *p<.05, **p<.01, ***p<.001.

Figure 4d. Study 1, partial correlations, between outcome measures and *Over Distance categories* of SSWC (Sundararajan-Schubert Word Count), for (top) Control and (bottom) Expressive Writing groups.

Denial ("doesn't bother me"): For the Expressive Writing group, weighted mean of the use of denial was positively correlated with increased heart rate ($r=.38$, $p<.05$), an indication of reactivity, at the final interview. For the Control group, the more one used expressions of denial, as evidenced by weighted mean, the less likely was one to report stress, as evidenced by strong negative correlation with SUDS($r=-.51$, $p<.01$). But the health cost of *Denial* comes through in the change score, which showed that those who progressively used more denial, from day 1 to day 2 of writing, tended to report less stress ($r=-.36$, $p<.05$) at the final interview, but had more health center visits ($r=.33$, $p<.05$), two months to a year post writing. This is consistent with the protocol of repression (Weinberger, 1990), which is characterized by a combination of temporary relief of subjective stress, on the one hand, and long term health cost, on the other.

Low Activation (bored, drowsy): No significant correlations of this variable were found for the Expressive Writing group. For the Control group, those who used progressively more expressions of low activation, from day 1 to day 2 of writing, tended to have more health center visits, both within two months post writing ($r=.35$, $p<.05$) as well as two months to a year post writing ($r=.53$, $p<.001$).

DISCUSSION

Overall, there was no major disacrepancy between the two groups in terms of the shifting balance of cool and hot systems associated with various categories of language use. Both groups showed higher activation with the use of less than optimal representations—in the case of under distance categories (figure 4c), both groups were able to reap a mixture of cost and benefit, with the latter outweighing the former as characteristic of regulated activation; whereas in the case of over distance categories (Figure 4d), both groups evinced dysregulated activation at follow up.

There was however a group difference in nuance attributable to instruction set. In light of the fact that the controls did not have any guidance as to how to express their emotions, whereas the Expressive Writing group was instructed specifically to do so, the differences between the two writing conditions may thus fall along the divide between automatic versus controlled processing (Philippot, Baeyens, and Douilliez, 2006)—the latter, but not the former, can be expected to extend or reinforce the cool system. This is our tentative answer to the question: What good does expressive writing do? Cool system effect may explain some subtle differences in outcome between the two groups.

Consider first the sum total of E (expressions of self and emotions). For controls, higher proportion of E was related to reduced reactivity at follow up (Figure 4a). In contrast, being told to explicitly write about emotions might have increased sensitivity to arousal for the Expressive Writing group, which therefore reaped a mixture of health cost and benefit post writing, with benefit outweighing the cost—temporary increase in heart rate at the final interview, but long term reduction in health center visits post writing (Figure 4a). This is an example of regulated activation, a boon that can be expected from the cool system. But the most common effect of the cool system is neutralization of the hot system. For instance, increased frequency of Core affect from day 1 to day 2 was associated with health cost at

follow up for the Control group, but not for the Expressive Writing group (see Figure 4a), possibly due to the cool system effect of the instruction set, which neutralized the hot system.

Another case in point is optimal emotion representation (Figure 4b), which can be expected to be associated with cool system effect. The cool system effect of this type of language use was manifest, for the Control group, in terms of reduced health center visits and decreased subjective experience of stress, whereas for the Expressive Writing group, it was manifest in the efficiency of sign use, which consists of letting information proliferate maximally- as evidenced by significantly more output on *attention to affect* and *facilitative distance* variables than the controls (see Figure 2)—while keeping energy cost at the minimum, such that no health cost or benefit showed up on the ledger (see Figure 4b).

Study 2

This is a reanalysis of a published study of children's expressive writing (Fivush, et al., 2007), in which 9 to 13-year old children engaged in three consecutive days of writing, for 15 to 20 minutes each day, under emotional and non-emotional instructions (n=56 each)--the former were asked to write about their deepest thoughts and feelings; the latter about how they spend a typical day.

Outcome Measures

The following outcome measures were completed by the children one day before writing, and again two months after writing:

The Birleson Depression Inventory: a self-report on childhood depression (DEP).

The Spence Children's Anxiety Scale: a self-report on childhood anxiety (ANX).

The Children's Somatisation Inventory: a self report on psychophysiological symptoms such as headaches, dizziness, and so on (PHY).

The Strengths and Difficulties Questionnaire: The sum of the items of this questionnaire measure the child's overall difficulties. The questionnaire was filled out by the child and the teacher, resulting in two versions, the child's (CSD) and the teacher's (TSD), respectively.

Similar to study 1, both groups benefited from writing, showing lower anxiety, depression, difficulties and somatic symptoms from baseline to follow-up, in comparison to the non-writing group. With that finding already established in a prior study (Reynolds, Brewin, and Saxton, 2000), the authors proceeded to analyze individual differences in writing.

Surprisingly children who discussed emotions and explanations more in their narratives subsequently showed higher levels of depression and anxiety. The authors attributed this to children's lack of language skills to benefit from expressive writing. To further investigate this phenomenon, we used SSWC to re-analyze the texts. In Study 2, we included children who did not complete all three diary entries, resulting in a slightly larger sample size (n=115; emotional instruction, n=58; non-emotional instruction, n=57) than the original study (n=112).

RESULTS

Over View

Language use: Similar to Study 1, the two groups of children wrote very differently, as measured by the SSWC variables (Figure 5).

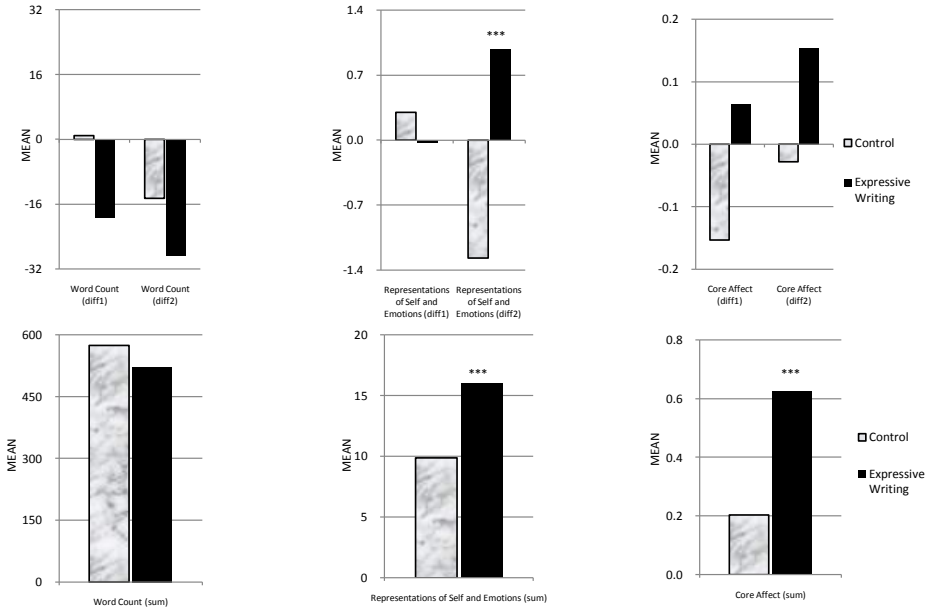
Over all, children wrote in similar ways as adults (Study 1, Figure 2), especially with regard to over-distance type of language use. It is in the under-distance type of language use that some differences emerged: Children, in both writing groups, had higher output than their counterpart in the adult sample (Figure 2) on *High Activation* and *Violent Words.* While children showed no group difference in the frequency of use of *Somatic* category, both groups had higher output on this category than the adult sample (Figure 2), in which controls significantly outperformed the Expressive Writing group. The group differences in children can be summed up in Figure 6.

As shown in Figure 6, the two writing groups of children did not differ in word count, but differed significantly in representations of self and emotions as well as core affect. The over all patterns of group difference in the child sample (Figure 6) are quite similar to the adult counterpart (Figure 3), in both weighted mean as well as difference scores, if we interpret the day 1 to day 2 difference in the adult sample (Figure 3) as equivalent to that between day 2 to day 3 in the child sample (Figure 6)—in both the Control group decreased output while the Expressive Writing group increased output, on the last day, on core affect and the expressions of self and emotions.

SSWC Variables (with tokens)	*Expressive Writing group Mean (SD)*	*Control group Mean (SD)*	*Significance*
Attention to Affect			
Affect Focal (happy/sad)	1.56 (0.86)	0.43 (0.65)	***
Valence Focus (miserable)	0.37 (0.44)	0.04 (0.09)	***
Facilitative Distance from Experience			
Reflexive Self (ourselves)	0.22 (0.27)	0.43 (0.42)	***
Detached Self (someone)	1.63 (1.20)	0.64 (0.50)	***
External Attribution (sexy)	1.11 (0.66)	0.69 (0.64)	***
Under Distance from Experience			
Affected Self (me)	3.17 (1.35)	1.33 (0.92)	***
Violent Words (swear)	0.36 (0.47)	0.10 (0.26)	***
Somatic (headache)	0.17 (0.27)	0.18 (0.29)	Ns
Suffering (traumatized)	0.02 (0.08)	0.01 (0.05)	In
Emotion as Action (love/hate, used as verb)	0.40 (0.44)	0.15 (0.29)	***
High Activation (excited)	0.22 (0.33)	0.10 (0.20)	***
Over Distance from Experience			
Focal Self (I, myself, my own)	6.29 (1.03)	7.18 (1.30)	***
Affect Non-Focal (cry, understand)	0.72 (0.33)	0.36 (0.22)	***
Denial ("doesn't bother me")	0.05 (0.06)	0.01 (0.03)	***
Low Activation (bored)	0.03 (0.05)	0.05 (0.06)	Ns

Note. *p<.05, **p<.01, ***p<.001. Ns=Not significant at .05. In=Invalid comparison due to low baseline.

Figure 5. Study 2 (N=115), group comparison, based on weighted mean across writing days, on variables of SSWC (Sundararajan-Schubert Word Count), by writing task.



Note. diff1=difference score between the writing days (Day2–Day1); diff2=difference score between the writing days (Day3–Day2). sum=weighted mean across the 3 writing days. *p<.05, **p<.01, ***p<.001.

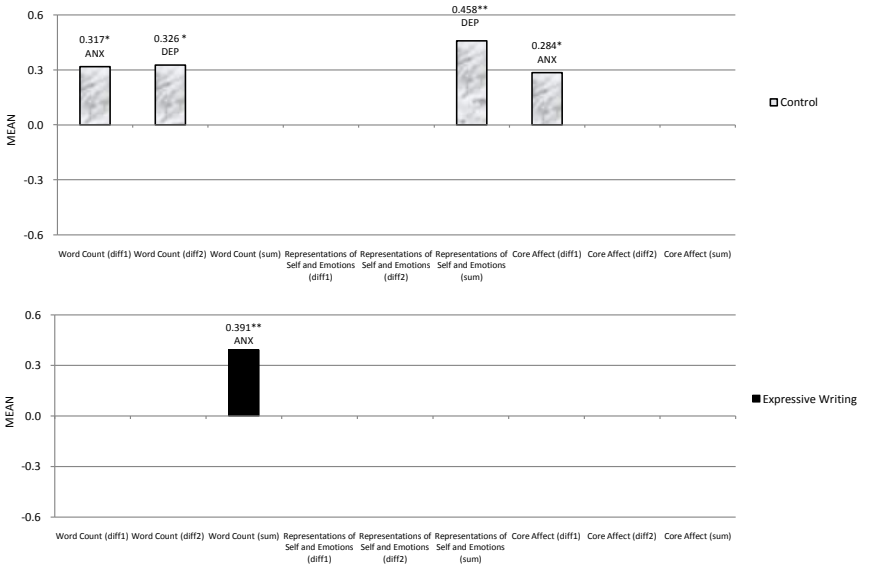
Figure 6. Study 2, group differences in global variables of SSWC (Sundararajan-Schubert Word Count), by writing task.

However, unlike Study 1, children's word count had health consequences, as shown in Figure 7a.

Word Count: For the Expressive Writing group, weighted mean of word count across three writing days was positively correlated (r=.39, p<.01) with the child's anxiety at follow up two months post writing. For the Control group, increase in word count on the second day and the third day of writing were positively correlated with anxiety (r=.32, p<.05) and depression (r=.33, p<.05), respectively, at follow up.

Expressions of Self and Emotions (E): For the Expressive Writing group, no significant correlation was found between outcome measures and the percentage of E. For the Control group, percentage of E was strongly and positively correlated (r=.46, p<.01) with depression at two months follow up.

Core Affect: For the Expressive Writing group, no significant correlation was found with outcome measures. For the Control group, an increase in expression of Core Affect from day 1 to day 2 of writing was positively correlated (r=.28, p<.05) with anxiety post writing.



Note. diff1=difference score between the writing days (Day2–Day1). diff2=difference score between the writing days (Day3–Day2). sum=weighted mean across the 3 writing days. ANX=outcome measure of anxiety. DEP=outcome measure of depression. *p<.05, **p<.01, ***p<.001.

Figure 7a. Study 2, partial correlations, between outcome measures and global variables of SSWC (Sundararajan-Schubert Word Count), for (top) Control and (bottom) Expressive Writing groups.

Results for components of optimal emotion representation—attention to affect and facilitative distance from experience--are shown in Figure 7b.

Attention to Affect

Affect Focal (happy/sad): For the Expressive Writing group, weighted mean of *bona fide* emotion terms was negatively correlated (r=-.31, p<.05) with somatic symptoms post writing.

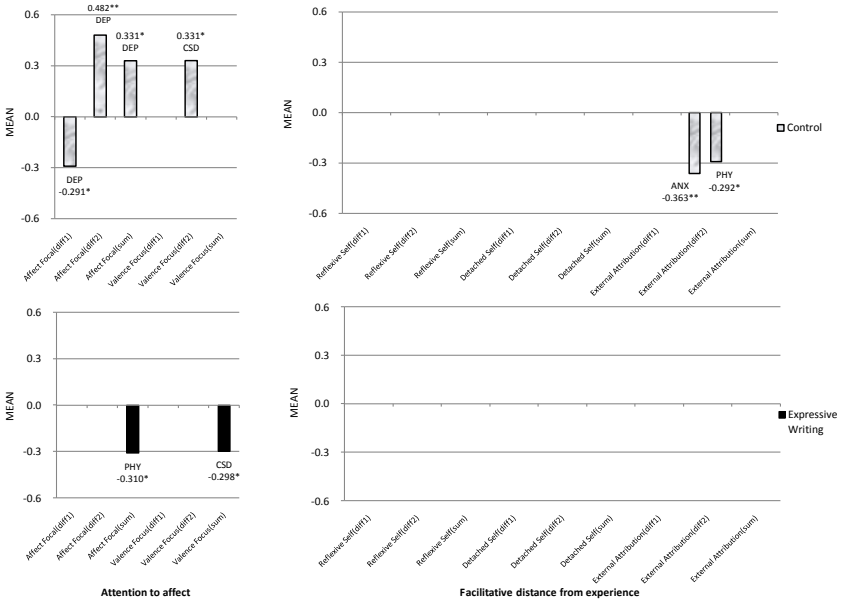
For the Control group, weighted mean of this type of language use was positively correlated (r=.33, p<.05) with depression post writing, but difference scores tell a more nuanced story. An increase in this type of expression from day 1 to day 2 was negatively correlated (r=-.29, p<.05) with depression post writing, whereas an increase of the same from day 2 to day 3 was strongly and positively correlated (r=.48, p<.01) with depression at follow up.

Valence focus (miserable/pleasant): For the Expressive Writing group, weighted mean across writing days of valence focus was negatively correlated (r=-.30, p<.05) with difficulties rated by the child post writing. For the Control group, an increase in use of this category from day 2 to day 3 was positively correlated (r=.33, p<.05) with difficulties rated by the child at follow up post writing.

Facilitative Distance from Experience

External Attribution (sexy, wonderful): For the Expressive Writing group, no significant correlation was found with outcome measures. For the Control group, an increase in

expression of emotion with external attribution from day 2 to day 3 of writing was negatively correlated, strongly with anxiety (r=-.36, p<.01) and moderately with somatic symptoms (r=-.29, p<.05), post writing.



Note. diff1=difference score between the writing days (Day2–Day1). diff2=difference score between the writing days (Day3–Day2). sum=weighted mean across the 3 writing days. ANX=outcome measure of anxiety. DEP=outcome measure of depression. PHY=outcome measure of somatisation. CSD=overall difficulties reported by the child. *p<.05, **p<.01, ***p<.001.

Figure 7b. Study 2, partial correlations, between outcome measures and *Components of Optimal Emotion Representation* of SSWC (Sundararajan-Schubert Word Count), for (top) Control and (bottom) Expressive Writing groups.

Under Distance from Experience

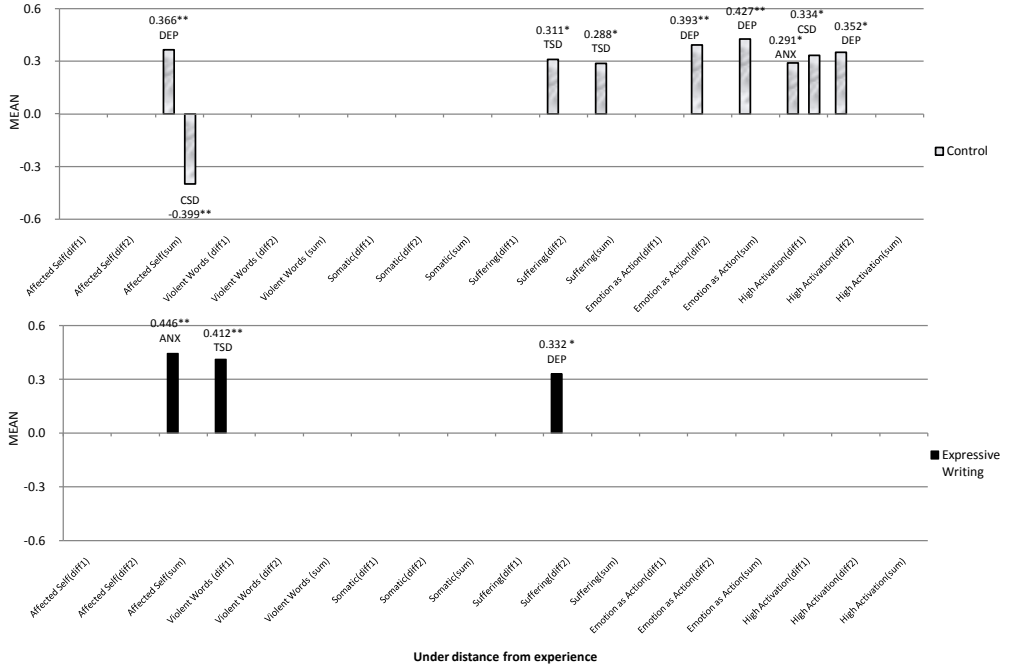
Affected Self (me, "making me . . ."): For the Expressive Writing group, weighted mean of a passive stance across three writing days was strongly and positively correlated (r=.45, p<.01) with anxiety post writing. For the control group, weighted mean of this type of language use was correlated strongly and positively (r=.37, p<.01) with depression post writing, but negatively (r=-.40, p<.01) with difficulties rated by the child.

Emotion as action (love/hate, used as verb): For the Expressive Writing group, no significant correlation was found. For the Control group, weighted mean of this type of un-reflective expression of emotion across three writing days was strongly and positively correlated (r=.43, p<.01) with depression post writing; similarly, an increase in this type of expression from day 2 to day 3 of writing was strongly and positively correlated with depression (r=.39, p<.01) at follow up.

Suffering (devastated, traumatized): For the Expressive Writing group, an increase from day 2 to day 3 of expression of trauma was positively correlated (r=.33, p<.05) with depression post writing. For the Control group, weighted mean of this type of expression

across three writing days was positively correlated (r=.29, p<.05) with the child's difficulties rated by teacher; and the same pattern of correlation (r=.31, p<.05) at follow up was found for an increase in expression of trauma from day 2 to day 3 of writing.

Violent Words (kill, rape, swear words): For the Expressive Writing group, an increase in the use of violent words from day 1 to day 2 of writing was strongly and positively correlated (r=.41, p<.01) with child's difficulties rated by teacher. No significant correlation with outcome measures was found for the Control group.



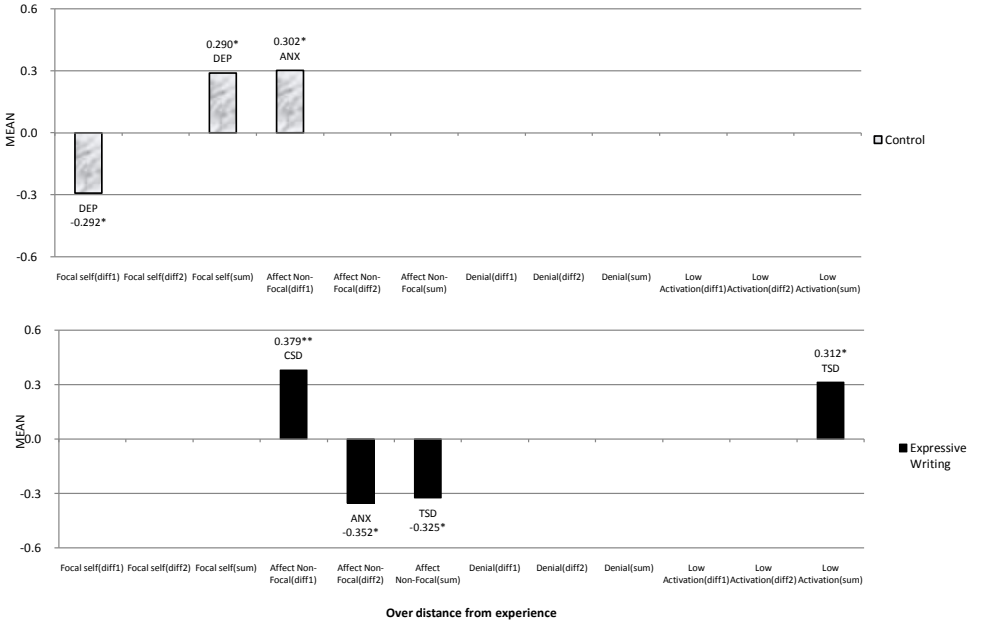
Note. diff1=difference score between the writing days (Day2–Day1). diff2=difference score between the writing days (Day3–Day2). sum=weighted mean across the 3 writing days. ANX=outcome measure of anxiety. DEP=outcome measure of depression. TSD=overall difficulties reported by the teacher. CSD=overall difficulties reported by the child. *p<.05, **p<.01, ***p<.001.

Figure 7c. Study 2, partial correlations, between outcome measures and Under distance categories of SSWC (Sundararajan-Schubert Word Count), for (top) Control and (bottom) Expressive Writing groups.

High Activation (excited, nervous): For the Expressive Writing group, no significant correlation was found. For the Control group, an increase in expressions of high activation from day 1 to day 2 of writing was positively correlated with anxiety (r=.29, p<.05), and with difficulties rated by the child (r=.33, p<.05); similarly, increase in expression of high activation from day 2 to day 3 was positively correlated with depression (r=.35, p<.05) at follow up.

Over Distance from Experience

Focal Self (I, myself, my own): For the Expressive Writing group, no significant correlation with outcome measures was found. For the Control group, weighted mean of self focus across three writing days was positively correlated (r=.29, p<.05) with depression at follow up. This is consistent with findings of the connection between high self focus and depression (Watkins and Teasdale, 2004). However, difference score indicating an increase in self focus from day 1 to day 2 of writing was negatively correlated (r=-.29, p<.05), with depression at follow up.



Note. diff1=difference score between the writing days (Day2–Day1). diff2=difference score between the writing days (Day3–Day2). sum=weighted mean across the 3 writing days. ANX=outcome measure of anxiety. DEP=outcome measure of depression. TSD=overall difficulties reported by the teacher. CSD=overall difficulties reported by the child. *p<.05, **p<.01, ***p<.001.

Figure 7d. Study 2, partial correlations, between outcome measures and *Over distance categories* of SSWC (Sundararajan-Schubert Word Count), for (top) Control and (bottom) Expressive Writing groups.

Affect Non-Focal (cry, understanding): For the Expressive Writing group, weighted mean of expressing emotion in cognitive and behavioral terms across three writing days was negatively correlated (r=-.33, p<.05) with child's difficulties rated by teacher. The difference score tells a more nuanced story: An increase in cognitive and behavioral expressions of emotion from day 1 to day 2 was strongly and positively correlated (r=.38, p<.01) with difficulties rated by the child, whereas an increase of the same from day 2 to day 3 was negatively correlated (r=-.35, p<.05) with anxiety at follow up. For the Control group, increase in cognitive and behavioral expressions of emotion from day 1 to day 2 was positively correlated (r=.30, p<.05) with anxiety at follow up.

Low Activation (bored, drowsy): For the Expressive Writing group, weighted mean of expressions of low activation was positively correlated ($r=.31$, $p<.05$) with child's difficulties rated by teacher at follow up. For the Control group, no significant correlation with outcome measures was found.

DISCUSSION

For both groups, there was a positive correlation between length of the written text and anxiety and depression at follow up. The two writing conditions also did not differ in the health consequences of less than optimal representations of self and emotions (Figures. 7c and 7d)--both groups seemed to be susceptible to activation of the hot system. However, children's susceptibility was different from the adult sample (Study 1). In the adult sample, dysregulated activation was associated with over-distance type of language use (Figure 4d), while regulated activation with under-distance type of language use (Figure 4c); the reverse was the case with children—Under distance expressions were associated with extensive symptoms characteristic of dysregulated activation (Figure 7c), while the use of over-distance type of expressions was associated with a mixture of cost and benefit (Figure 7d), which to some extent approximates regulated activation, although the capacity for children to regulate the hot system was not as evident as the adult sample. This contrasting pattern may stem from the developmental needs of children, who seemed to be in particular need for mental distance such that under-distance type of language use would cause more activation of the hot system than over-distance.

Children's need for mental distance to regulate the hot system may explain why both writing conditions benefitted especially from language use that entails facilitative distance from experience (Figure 7b, right panel). This also explains why language use such as "happy" or "sad"--that has attention to affect as its primary referential focus, and that was associated with the cool system in the adult sample (Figure 4b, left panel)-- activated the hot system in the child sample, as evidenced by associated symptoms at follow up (Figure 7b, left panel). That attention to affect activated the hot system for children is particularly true of the Control group, which showed a positive correlation between increase in depression at follow up and a higher percentage of expressions of self and emotions in child's writing; the same correlation holds for anxiety and core affect (see Figure 7a).

This suggests that while children were equally vulnerable as adults to the health cost of less than optimal representations, they were less able to reap the health benefit from optimal representations of self and emotions—unless they got help. Results of the Expressive Writing group showed that the instruction set could help by reinforcing and extending the cool system. Thus when children wrote with the explicit instruction to pay attention to their thoughts and feelings, their cool system prevailed where the hot system would have been dominant otherwise: With attention to affect type of language use, the Expressive Writing group showed negative correlation with symptomatology at follow up, in sharp contrast to the controls who showed positive correlation with the same (Figure 7b, left panel). Similarly, whereas children in the Control group reported depression and anxiety at follow up if they devoted a large proportion of their writing to expressions of self and emotions and core affect, the Expressive Writing group had more output of these expressions (see Figure 5) without

reaping any health consequences (see Figure 7a). It seems that with the help of the expressive writing instructions, language in emotional writing could be decoupled from the hot system, and became simply information. The cool system effect strengthened by the writing instruction of expressive writing may explain why the protocol produced by the Expressive Writing group of children was more similar to that of the adult sample in Study 1 than the control group of children.

How do the results presented here square with the findings of Fivush, et al. (2007) that the more children wrote about emotions, the more symptoms of depression and anxiety they showed at follow up? The two studies do not necessarily contradict each other, since the original study focused on the content of children's writing, whereas our re-analysis shifted from the what to the how question. Take for instance the hypothetical topic of love, which can be expressed by multiple categories of language use as indicated by italics below:

a. "I *love* you" which would fall under the category of *Emotion as Action*;
b. "My *love* is a red, red, rose" which belongs to the category of *Affect Focal*;
c. "You are *beautiful*" which falls under *External Attribution*;
d. "I am so *excited* to see you" which would fall under *High Activation*.

The results of Study 2 predicts the following protocol: If the writing came from the Expressive Writing group, use of (a), (c), and (d) would not be associated with symptomatology, whereas high frequency of (b) would be associated with a reduction in somatic complaints at follow up. By contrast, results of the Control group confirmed the finding of Fivush, et al. (2007) that the more the child wrote about emotions, the more anxiety and depression the child showed at follow up: With the exception of (c) which was associated with a reduction of anxiety and somatic complaints (Figure 7b, right panel), all the other forms of expressing emotions, (a, b, and d), were associated with an increase in symptomatology (Figure 7b, left panel; Figure 7c) at follow up.

Together, results of Study 1 and the Expressive Writing condition of Study 2 confirmed our prediction--optimal representations of emotion are under the sway of the cool system, while less than optimal representations are under varying degrees of dominance by the hot system. Although the Control group in Study 2 confirmed the contention of Fivush, et al. (2007) that some children might not have the necessary language skills to benefit from emotional writing, the results of Study 2 in general suggested a conclusion that was opposed to that of the original study, namely that explicit instructions of expressive writing may help these children. While we need to be cautious with the interpretation of certain low baseline categories, such as *Suffering*, *Denial*, and *Low Activation*, the overall picture that emerged from these results tells a nuanced story about how the connection between language use and health is robust but varies along developmental parameters.

SUMMARY AND CONCLUSION

The basic idea behind the semiotics of Charles Peirce is integration (Sundararajan, 2008), a notion that is consistent with Pennebaker's cognitive reorganization thesis (1985) as well as his inhibition theory (1993), both converging on the claim that integration of feeling and

thinking, thought and experience is essential to health. The unique contribution of Peircen semiotics lies in its capacity to model the dynamics of integration in terms of complexity. The basic insight is that it is process (known as sign action), not content, that determines the efficiency of the sign as a representation of experience. This shift of focus from *what* to *how*, from the *content* of the information per se, to the *modes* of processing and representation of emotion information is consistent with the claim of Philippot and colleagues (e.g., Neumann, and Philippot, 2007) that regulation of emotion can be achieved by a change in *processing mode* without ostensible modification of the emotional information *content*. Thus instead of the conventional content analysis that focuses on what is said in the text, it is now feasible to approach language as modes of information processing with varying degrees of complexity.

Based on the Peircean model of complexity, we proposed a taxonomy of 15 categories of language use in emotion expressions. These are further grouped into four types of language use, or processing modes, each with its unique balance between the cool and hot systems of emotion.

Based on the insight of Peirce that the mind is in signs, and not the other way around (Colapietro, 1989), our approach entails a figure and ground reversal that puts language on center stage as the main actor, and group differences as the contextual factors--along with other contextual factors such as individual differences and developmental needs--that affect the shifting balance between hot and cool systems associated with different types of language use. An analogy is gene (also a code) expression which is affected by environmental contexts.

Our theory-based predictions were implemented by a Language analysis program, SSWC (Sundararajan-Schubert Word Count), which re-analyzed texts from two studies of expressive writing, one by adults and one by children. Results of both studies showed that the categories of SSWC map out the semantic space of affect in a logically consistent and intelligible manner. The taxonomy of SSWC functions not as a dictionary so much as a prism, which renders visible the various modes of representing emotions. Its proposed classification of language use functions not as a dream book with fixed interpretations, so much as a theory-based system of coding, that tags the various modes of representation so as to see whether and how they vary systematically along various parameters such as instruction sets, individual differences, and developmental needs.

The findings presented here are tentative, but, if confirmed by future replications, may have far reaching implications for both theory and research on the language and health equation. The current research in the field tends to approach expressive writing as a unitary phenomenon, on the presence (the experimental condition) or absence (the control condition) of which hangs the balance for health outcomes. This approach renders expressive writing a black box, thereby making it difficult to investigate the qualitative differences between different types of emotion expression, and their ramifications for health. The semiotic approach to language makes it possible to shift our focus from the whether to the how question. Instead of asking whether expressive writing in general has health benefits (Frattaroli, 2006), we examined how the language and health equation may vary systematically under different contexts and conditions.

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Chapter 4

RE-THINKING THE PLACE OF SEMIOTICS IN PSYCHOLOGY AND ITS IMPLICATIONS FOR PSYCHOLOGICAL RESEARCH

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ABSTRACT

The fields of semiotics and psychology overlap to such an extent that it seems impossible for either to flourish alone. Yet their relationship has been one largely of mutual neglect or hostility. Mainstream psychology's negative attitude towards semiotics can be attributed to four interrelated factors: psychology's subscription to the science/meaning divide; psychology's combination of scientific practicalism and metatheoretical confusion; the view that semiotics is inextricably wedded to ideologies opposed to scientific realism; and the view that semiotics has little concern with the sign *user*. These factors help to explain why recent attempts at semiotics-psychology rapprochement have met with mixed success, and why so little of that work has filtered through to mainstream scientific psychology and its research programs. A solution lies in taking seriously psychology's explicit (but sometimes faltering) commitment to realism. Within a coherent realist framework, integrating semiotics with psychology offers a number of contributions to mainstream psychological research, the most salient of which are: clarifying the irreducible tripartite relational nature of meaning; extricating the legitimate concerns of representation in the information sciences from incoherent epistemological representationism; applying the Peircean distinctions between different types of sign (viz. icon, index, and symbol) to solve problems in information representation research; using iconicity as the bridge between conceptual metaphor and nonconventional symbolic phenomena; and promoting increased methodological sophistication by underscoring the scientific legitimacy of nonquantitative methods.

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INTRODUCTION: THE PSYCHOLOGY-SEMIOTICS INTERFACE

Ask a mainstream psychological researcher whether psychology would benefit from a closer integration with semiotics, and the response is likely to be either "What's semiotics?" or "You must be joking; our science has no place for postmodernist gobbledegook".[1]

Yet, given the nature of the overlapping content in the fields of psychology and semiotics, we might reasonably expect to find not just a close relationship between the two, but a kind of symbiosis, where each contributes to the support of the other and neither can flourish alone.

Although the definition of psychology has varied in accordance with intellectual fashions, psychology today is typically defined as the scientific investigation of human behaviour and mental life. Contemporary psychologists would nevertheless accept two well-known ancient characterisations of the human being, namely, *animal politicum* (a community-living creature) and *animal rationale* (a creature capable of reason). These characterisations are the foundations of social and cognitive psychology respectively. The linguistic turn of the twentieth century, culminating in delayed assimilation to an evolutionary perspective, brought a third characterisation: the human being is also *animal symbolicum* (Cassirer, 1944), the *symbolic species* (Deacon, 1997) - a creature which has evolved to produce, use, and often be dominated by, signs and symbols. It is true that other animals engage in various forms of communication and sign-use. But humans stand apart with respect to the size and complexity of what has been termed their *semiosphere* (Lotman, 1984/2005). This domain includes not only instinctive forms of communication and the signs and signals of the natural environment, but also the humanly-created network of symbols, signifying systems, and symbolic forms of interaction which become part of the fabric of social, cognitive, motivational and emotional life.

Semiotic phenomena are found in almost every area of psychology. To begin with, there is the brain's supposed internal symbolic processing that, within the long-dominant information-processing paradigm, is held to underlie all mental activity (cf. Bechtel & Abrahamsen, 1991; Bickhard, 1996; Billman, 1998). This has led to the claim that semiosis is a *sine qua non* of human cognition and, therefore, the central concern of the cognitive sciences (e.g., Langer, 1942; Smith, 2001). Aside from this, there are all the manifestations of what Piaget (1966) described as the general *semiotic or symbolic function* (e.g., language, logical notation, conventional systems of knowledge representation for electronic devices and human/computer interfaces, non-verbal forms of communication, meaningful associations in perception, learning, attention and memory, the signs and symbols employed in art, music and literature, and the forms of symbolic interaction and ritual in social and group behaviour, including cross-cultural practices). Then there is the concern in personality, clinical and abnormal psychology with individual differences and patterns of breakdown in the ability to process language, symbols, signs, metaphors, and communicative intentions. Finally, there are the more controversial spontaneous productions of dreams, art, fantasies, psychopathology, and so on. Therefore, given that semiotic phenomena comprise a substantial part of the content of psychology's traditional component areas, and given that the aim of

[1] These, in fact, are responses that I *did* receive when I conducted a brief informal survey in my own Department - although, typically, postgraduate students gave the first response and more seasoned academics variations on the second.

psychology is to investigate and explain human behaviour and mental life, we might ask how psychology could so much as get by, let alone expect to make good progress, *without* attending to the human semiosphere.

Semiotics, on the other hand, has been regarded as both a subject area and a method. As a subject area, it is typically defined as the science of signs, or, more broadly, as the field of inquiry devoted to signs, symbols and signifying systems. As a method, it is concerned with the revelation and interpretation of anything that can be regarded as indicative or communicative code or text; to approach something semiotically is to treat it as text to be interpreted. With roots in classical rhetoric, mediaeval scholasticism and British empiricism, modern semiotics has been shaped by the work of such diverse thinkers as Peirce, Saussure, Carnap, Jakobson, Hjelmslev, Morris, Sebeok and Eco. In the semiotic literature there are many different definitions and classifications of signs and symbols (e.g., Alston, 1967; Bertalanffy, 1965; Eco, 1973, 1976; Hawkes, 1977; Langer, 1942; Morris, 1946; Peirce, 1932; Sapir, 1959; Saussure, 1916/1983; Skorupski, 1976). Although Saussure's aim was to mark out a separate domain for linguistics, he nevertheless admitted (albeit somewhat grudgingly) that linguistics was "only one branch" of a general field of semiology (*semiologie*) which "would be part of social psychology" (Saussure, 1916/1983, p. 33), and, thereby, part of general psychology. Consistent with this recognition of psychology, Charles Peirce, the American "founder" of semiotics, defined the genus *sign* (itself divisible into the species *icon*, *index* and *symbol*) as "something that stands *to somebody* for something in some respect or capacity" (1932, 2.228, emphasis added). This definition brings something's relation *to a person* into the definition of a sign and, hence, into the field of semiotics. If a person is a necessary part of signification, it would seem reasonable to expect the psychological (cognitive, motivational, etc.) aspects of that person to be relevant to our understanding of semiotic phenomena.[2] We might then ask whether semiotics, in turn, could flourish without psychology.

Thus, psychology and semiotics appear to need each other. Yet, despite promising beginnings, for most of the last century the two disciplines have remained apart, their relationship characterised by a mixture of mutual neglect, suspicion, or even outright hostility.

In this paper, I am concerned largely with one side of this relation - with the view from the perspective of mainstream psychology.[3] The paper is divided into two sections. In the first section, I begin by considering four reasons why psychology has neglected semiotics. I then discuss how those reasons are still hampering psychology in the face of recent attempts to promote integration with semiotics, how they help to explain why the integration attempts have met with only mixed success, and why so little of that work has filtered through to mainstream psychology and its research programs. In the second section of the paper, I offer a way forward by taking seriously psychology's explicit (but often faltering) commitment to realism. I outline briefly what that would entail, and then show how it clears the way for a

[2] Of course, as will become clear later, semiotic phenomena do not *all* require *equal* attention to the psychology of the person; rather, a sliding scale of relevance is involved (i.e., the fact of convention reduces the relevance of the person, whereas in nonconventional forms of semiosis the psychology of the person is crucial).

[3] Even so, as Milic (2008) has argued recently, it is "safe to say that the neglect of psychology in the field of semiotics is even greater than the neglect of semiotics in the field of psychology" (p. 134). And, as will become clear later in the discussion, exactly why this is so contributes to psychology's reciprocal rejection of semiotics.

convergence with semiotics that meets psychology's scientific requirements, and confers both conceptual and empirical benefits on psychological research in a number of areas.

WHY MAINSTREAM PSYCHOLOGY HAS NEGLECTED SEMIOTICS: FOUR REASONS

According to Jorna & van Heusden (1998), "for some unclear reason there has hardly been any interest in semiotics within the different branches of psychology" (p. 758). On the contrary, I think that the reason - rather, reasons - are not at all unclear. Psychology's neglect of semiotics has developed from a complex interplay of conceptual, social and historical factors. In his discussion of "converging parallels" in semiotics and psychology, Bouissac (1998) examines why the two disciplines, originally much closer, remained apart for most of the twentieth century, and he points to some of the mistakes and confusions that have kept theories of meaning out of psychology (such as the behaviourist exclusion of meaning based on Cartesian assumptions, and the retaliatory hijacking of semiotics by various postmodernist movements). But now, he argues, the two disciplines are gradually converging under the impact of the "epistemological restructuration" brought about by the "return" of Darwin's evolutionary perspective.

My own treatment of this theme casts the net wider and is more critical of mainstream psychology. Furthermore, while I agree with Bouissac's views regarding the need for psychology to reincorporate the evolutionary perspective into its naturalist view of mind and behaviour, I do not think that a psychology-semiotics integration *depends on* the Darwinian perspective; there are more fundamental logical reasons for the integration, and the need for Darwinism *follows from* these.

In my view, the main reasons for the neglect of semiotics within psychology can be summarised in four interrelated points. The first two concern psychology's scientific (or, more accurately, scientistic) self-understanding. The remaining two concern psychology's perception (or misperception) of the subject matter and methods of semiotics. In brief, these reasons are: (1) psychology's subscription to the science/meaning divide; (2) psychology's combination of scientific practicalism and metatheoretical confusion; (3) the view that semiotics is inextricably wedded to ideologies opposed to scientific realism; and (4) the view that semiotics has little concern with the sign *user*. Let me elaborate a little on each of these.

Psychology's Subscription to the Science/Meaning Divide

There is a trend in the Western intellectual tradition which has set the concepts of *symbol* and *meaning* in opposition to that of *science*. This trend found its clearest and most influential expression in the nineteenth century tradition associated mainly with Dilthey and Windelband, following a line of thought from Vico, which proposed a fundamental division of subject matter and/or of method between *Naturwissenschaften* (the natural or physical sciences) and *Geisteswissenschaften* (the social or historical sciences).

Twentieth century psychology struggled in the context of this division. In the effort to extricate psychology from its parent philosophical background and establish the discipline as

a respectable, realist, naturalist science, proponents of the new scientific psychology were keen to shake off Cartesian dualism and restrict psychology's subject matter and methods to what they regarded as legitimate science. Despite the broader conception of science held by some of psychology's pioneers – notably Wundt, James and Freud – psychology aligned itself with *Naturwissenschaften* and against *Geisteswissenschaften*, simultaneously supporting the related methodological split between causal explanation and hermeneutic inquiry. For decades psychology operated according to the principle later spelled out by Eysenck (1985): "an approach which stresses *meaning* is the exact opposite of the natural science approach which stresses the study of *behaviour*" (p. 194). Hence, anything that deals with the understanding of meanings, with hermeneutic inquiry, was not considered a proper subject for scientific psychology. This view was reinforced by the treatment of meaning in the *extra*-psychological and *non-mainstream* psychological literature, where it was widely agreed that meaning is so inherently elusive, variable and multi-faceted that it precludes any kind of coherent scientific treatment (Langer, 1942), quite apart from the fact that certain types of meaning are "at the very limits of the ineffable" (Bertalanffy, 1981, p. 50). The science/meaning divide became especially firmly entrenched as a result of the post second world war methodological consensus in psychology, which, once again in the name of science, privileged quantitative over qualitative methods (cf. Michell, 1997, 1999, 2004).

But *one* type of meaning *was* considered scientifically respectable in mainstream psychology. This was the idea of the internal mental *representations* required for cognitive processing. Developments in computer technology appeared to vindicate the central thesis of the so-called cognitive revolution, that "internalism" vis-à-vis psychological states does not require, as the behaviourists believed, unscientific commitment to the Cartesian "ghost in the machine" (Ryle, 1949/1973). According to psychology's representationist epistemology, cognition is an internal process of symbol manipulation, and cognitive psychology's aim is to identify and elucidate the information-processing components of cognition. Even when cognitive psychology gradually evolved into *the* cognitive sciences, against the background of debates between the old symbolic paradigm and the new connectionism (Bechtel & Abrahamsen, 1991), the computational idea of *meaning as mental representation*, albeit in more sophisticated and disguised form, was never abandoned (cf. Barsalou, 1998, 1999; Bickhard, 1996; Billman, 1998; Fodor, 1981, 2008; Heil, 1981). But of how mental representations *get* and *retain* their meanings no acceptable account could be given. Fodor (1985) conceded that "Unfortunately, of the semantic problem of mental representations we have, as yet, no adequate account" (p. 99). Instead, the strategy was cavalierly to wave aside the issue via further appeal to the computer analogy; since the mind is a syntax-driven machine, "the theory of mental processes can be set out in its entirety without reference to any of the semantic properties of mental states, hence without assuming that mental states have any semantic properties" (Fodor, 1985, n. p. 94). Problem solved. The question of meaning need not concern us.

In sum, psychology's neglect of semiotics is the direct result of the marginalisation and neglect of meaning in general during the development of psychology as a science. Signs and symbols lie on the scientifically intractable "meaning" side of the science/meaning divide, and they require hermeneutic inquiry or qualitative methods rather than the causal explanation and quantitative methods that are held to be the hallmarks of scientific psychology. Furthermore, the existence of computers shows that we can securely proceed with the mind-

as-computer model and its assumption of internal mental representations without having to worry about how those representations get their meanings.

Psychology's Combination of Scientific Practicalism and Metatheoretical Confusion

The second reason for psychology's neglect of semiotics is closely related to the first. Psychology's self-identity as a science was thought to depend on its extricating itself from philosophy. In that process, anything at all to do with philosophy was rejected, including, ironically, that part of philosophy which has always been central to science, namely, conceptual analysis (Machado & Silva, 2007). Mainstream psychology came to be driven by a pervasive *scientific practicalism* - an instrumentalist view of science as directed towards practical ends, extending to the concern with "what works" in terms of bringing social recognition and economic success to the discipline. In particular, the practical fruits of psychological testing and measurement reinforced psychology's anti-theoretical impatience to "get on with the job", and fostered a deep mistrust towards anyone who is "all talk and no action", whose research is purely theoretical. Indeed, many mainstream psychologists today would consider the term *theoretical research* to be an oxymoron; surely, research is, by definition, empirical. Moreover, so-called theoretical research is time-wasting, obstructionist, and prevents enthusiastic scientists and practitioners from moving the discipline forward. Not surprisingly, then, books and journals devoted to theoretical and philosophical psychology are not read by mainstream psychologists, and so the discussion of conceptual and philosophical issues relevant to psychological practices goes unheeded. Even experimental research methods are treated within the mainstream as a set of statistical recipes and mechanical procedures, the blind implementation of which ipso facto guarantees the scientific credentials of the researchers and the scientific value of any results.

A discipline which does not actively engage in examining its own theoretical and metatheoretical foundations is likely to hold a mixed and conflicting set of assumptions. The price of psychology's scientific practicalism has been metatheoretical confusion, which, unfortunately, does not stay conveniently in some metatheoretical realm, cut off from scientific practices. Hence, Wittgenstein attributed the "confusion and barrenness" of psychology to its mixture of "experimental methods and *conceptual confusion*" (1953/1958, p. 232, emphasis in original), and Allport, one of the founders of the popular trait approach to personality, complained that "Galloping empiricism, which is our present occupational disease, dashes forth like a headless horseman" (1966, p. 3), such that "We find ourselves confused by our intemperate empiricism, which often yields unnameable factors, arbitrary codes, unintelligible interaction effects, and sheer flatulence from our computers" (p. 8).

Although most mainstream psychologists would identify themselves as scientific realists, their metatheoretical confusion extends to misconceptions about the nature both of realism and of science (cf. Bickhard, 1992), including what is permissible within, and even *warranted by*, a scientific approach. The result is practical inconsistency regarding both science and realism. On the one hand, despite constant appeals to science and the model of the scientist-practitioner, practicalism means that genuinely scientific concerns and practices are often displaced or subverted by social, political and financial interests, (cf. Petocz, 2004). On the other hand, explicit commitment to realism is accompanied and gainsaid by a positivist

instrumentalism which, despite widespread misunderstanding, is actually *antirealist* (cf. Friedman, 1991, 1999; Hibberd, 2005). As a result, for example, psychology's measurement and data-analytic practices are at odds with the realism of the sciences that it wishes to emulate (Gigerenzer, 1987; Grayson, 1988, 1998; Michell, 1997, 1999, 2000, 2001, 2009a, 2009b; Rosnow & Rosenthal, 1989). Similarly, despite explicit commitment to realism, psychology's establishment position of cognitive/neuroscientific experimentalism adheres to the antirealist "crypto-Cartesian" representationism and mind/brain dualism (Bennett & Hacker, 2003) of the information-processing view of mind, and this is widely accepted by the metatheoretically unreflective majority across other areas in psychology (Mackay & Petocz, in press [a]).

The upshot is that psychology's combination of scientific practicalism and metatheoretical confusion reinforces the science/meaning divide to which psychology has long subscribed, and keeps psychology segregated from the type of theoretical discussion and logical analysis of meaning that would reveal not only the relevance and importance of meaning systems but also the possibility of an objective scientific investigation of semiotic phenomena.

The View that Semiotics is Wedded to Ideologies Opposed to Scientific Realism

The third reason for psychology's negative attitude towards semiotics relates to psychology's perception of semiotics as being inextricably wedded to ideologies and philosophical positions that are opposed to the empirical realism of the scientific approach. For mainstream psychologists, the very term "semiotics" is associated with the postmodernist wave in the social sciences, which they consider to have little to offer, and much to obfuscate, attempts to pursue an objective, rigorous scientific investigation of mind and behaviour.

There is no doubt that this perception of semiotics is largely accurate, and that semiotics itself has contributed to psychology's perception. What is *not* accurate, as I shall soon discuss, is the perception that semiotics *cannot* be extricated. But the greater part of the semiotic literature, whether dealing with semiotics as a subject area or semiotics as a method, is indeed shot through with antirealist and antiscientific philosophical and ideological pronouncements.

As a subject area, semiotics became heavily imbued with French linguistic structuralist and post-structuralist ideas, which were largely a resurrection of earlier idealist, relativist and constructivist strands of philosophy. In terms of antirealism, it is particularly the *signified* that is targeted, while there exists a kind of cult of the *signifier*, which elevates it to a position of primacy, such that it is the signifier that produces the signification. Realism and naturalism (in the sense that whatever the *signifier* is *about* must be grounded in reality) are dismissed as the unjustified "presumption of innocence". Instead, it is proclaimed, the critical semiotic revolution "frees the sign from its subservience to the 'reality' (or *presence*) which it was supposed to serve" (Hawkes, 1977, p. 149), for "the world we inhabit is not one of 'facts' but of signs *about* facts which we encode and decode ceaselessly from system to system" (p. 122). Thus, every signified turns out to be yet another signifier, in an endless process known as the "semiotic circle".

As a critical method, semiotics became popular in the social sciences in the latter half of the twentieth century, in alliance with other modern and postmodern movements (e.g., post-

structuralism, feminism, discourse analysis, ideology critique), with which it was seen to have an affinity "based on their common interest in the revelation of hidden codes that shape perception and behaviour" (Scholes, 1982, p. xiii).

Both as subject matter and as method semiotics spread and fragmented across disciplines, and became a kind of cross-disciplinary surfer and looter (Bouissac, 1998). It was felt that, since a sign can be *anything*, "the object of semiotics is bound to dissolve and 'perfuse' the universe" (Bouissac, 1998, p. 738). Signals transfer information and then "lose their being as signs and dissipate into noise. As relation rather than substance, their fleeting existence is in perpetual transition and transformation" (p. 739). Bouissac remarks that this makes semiotics appear to be "up for grabs", its technical language adjustable to Christian theologian, Marxist, phenomenologist, neo-Darwinian, deconstructionist, neo-positivist, and so on. Who, then, can blame the mainstream experimental psychologist for steering well clear?

> It is understandable that most psychologists trained in the empirical methods to investigate fine-grained processes and to follow bottom-up reasoning procedures find it difficult to relate to the semiotic discourse, whose core notion is so general and ambiguous. From their point of view, semiotics looks more like a brand of folk psychology and its results appear either trivial or purely speculative. (Bouissac, 1998, p. 742)

The View that Semiotics has Little Concern with the Sign User

Related to the third factor is the fourth reason for psychology's negative attitude towards semiotics. In addition to the perception that much of semiotics is hostile to realism and science, even the briefest glance at the semiotic literature reveals that semiotics has little to say about the *person* - the sign *user*. This is not a mere oversight; it has long been part of the official position of semiotics, despite at least one major early warning from within semiotics,[4] and despite other internal movements towards functionalism (Halliday, 1973) and "third force" social semiotics (Hodge & Kress, 1988; van Leeuwen, 2005).[5]

The semiotics of the latter half of the twentieth century was based on one of two divergent strains of structuralism, namely "linguistic/semiotic" (in contrast to "biogenetic"). This type of structuralism is illustrated in the work of Saussure and Lévi-Strauss, and is characterised by a non-biological, formalist, synchronic conception of structure (D'Aquili, Laughlin & McManus, 1979; Piaget, 1971). In the linguistic structuralism of semiotics, the focus is on the systemic aspects of sign-systems, independent of their development or use by people. Not only is the signifier primary, its status is elevated at the expense of the signified and the person, such that the latter two terms tend to become collapsed into the first. That is, the signified becomes merely another signifier (epitomised in the concept of the "semiotic circle"), and the person becomes merely the point of intersection in a network of signifiers. As Bell (2002) observes, the delineation of semiotics as a field separate from psychology

[4] Kristeva (1973) criticised the increasing formalism of semiotics, its abandonment of historical and psychological approaches, and its neglect of a theory of a "speaking subject" in favour of "a transcendental ego, cut off from its body, its unconscious, and also its history" (p. 1249).

[5] As Milic (2008) notes of Halliday's functionalism, "While such an approach represents an advance on more formalist approaches, there is still very little consideration of how psychological aspects of subjects, such as beliefs, values and motivations, might interact with semiotic resources" (p. 12).

resulted in the semiotic separation and appropriation of the *subject position* from the *psychology or nature of that subject*. Although there are three elements in Peirce's definition of a sign (i.e., the *signifier*, the *signified* and the *interpretant*), Peirce does not clearly and unequivocally identify the third term, the *interpretant*, with the person, as we might expect, and his treatment of that third term lends itself to idealist interpretations which contribute to the elision of the subject. In semiotics, then, the Augustinian *dubito*, the Cartesian *cogito*, and the Freudian *desidero* (cf. Lacan, 1973/1977) are replaced by "one, and perhaps only one, common principle, and that is the principle of *scribo, ergo sum*. I produce texts, therefore I am, and to some extent I am the texts that I produce (Scholes, 1982, pp. 3-4). In the jargon of deconstructionism, there is nothing beyond the text.

To summarise, the third and fourth reasons for psychology's neglect of semiotics combine to present a picture of semiotics which, while largely accurate, reinforces scientific psychology's suspicion and hostility. The treatment of the signified as yet another signifier sits comfortably with the antirealist metatheoretical strands within semiotics of relativism, idealism and constructivism. And the eclipse of the sign *user* has contributed to the formalist trend of semiotics and to its apparent irrelevance to the concerns of psychology.

SIGNS OF CHANGE AND ATTEMPTS TO BRING SEMIOTICS INTO PSYCHOLOGY

But the climate has begun to change. For the last couple of decades, psychological approaches have been increasingly characterised by expansion and integration, involving large-scale attempts to unite hitherto fragmented sub-domains, while also looking beyond psychology to embrace related disciplines.

To begin with, mainstream cognitive science is “entering a period of quite dramatic reconstruction” (Wheeler, 2005, p. 6). The recognition that there is “hot” cognition in addition to “cold” cognition, i.e., that cognition is intimately connected to motivation, emotion and bodily experience (cf. Westen, 1998) has led to the *embodied cognition* movement (e.g., Deary, 2006; Gallagher, 2005; Gibbs, 1994, 2003; Kövecses, 2005) calling for psychology to “bring the mind back into the body”, and then to “extend” the mind beyond the body. According to Kövecses (2005), the new development known as *second generation cognitive science* involves not only the empirical integration of cognitive and developmental psychology, neuroscience, linguistics, anthropology, and computer science, but also the replacement of the mind-as-computer metaphor with the concept of mind as at once embodied via sensorimotor experiences and extended into the organism’s environment; hence the rise of *extended mind* theories (Clark, 1997; Rowlands, 1999). Wheeler (2005) summarises this new approach:

> Following others, I shall call this new kid on the intellectual block *embodied-embedded cognitive science*. In its raw form, the embodied-embedded approach revolves around the thought that cognitive science needs to put cognition back in the brain, the brain back in the body, and the body back in the world. (p. 11)

There is also increasing enthusiasm for incorporating an *evolutionary* perspective, as seen in areas such as evolutionary psychology (Buss, 2004), affective neuroscience (Panksepp,

1998), evolutionary social psychology (Tooby & Cosmides, 2005), and developmental neuro-psychoanalysis (Schore, 2003a, 2003b). This move is a corrective to what Damasio (2000), following Cosmides and Tooby (1995), identified as the major oversight of neuroscience and cognitive science throughout most of the twentieth century; it had "proceeded as if Darwin never existed" (Damasio, 2000, p. 39). But now, at last, instead of being exclusively preoccupied with an isolated cortex, some mainstream cognitive neuroscientists are professing a more holistic concern with the bodily, environmental and evolutionary contributions to phenomena such as emotion and consciousness. Introducing the new discipline *affective neuroscience*, Panksepp (1998) predicted that the twenty-first century would bring a new psychology "built jointly on evolutionary, neuroscientific, behavioristic, affective and cognitive foundations" (p. viii).

The combination of these movements has provided a climate favourable for the return of meaning into mainstream psychology. Even behaviourists are signing up for the job of tackling meaning (cf. DeGrandpre, 2000). There is an openness to embracing insights from meaning-related disciplines, including semiotics. Topics such as metaphor, art, music, dance, non-verbal communication, creativity and interpretation are beginning to find a place as legitimate subjects for investigation. According to Andreassen (in Donald & Andreassen, 2007), the second-generation cognitive revolution is all about the *bodily basis of meaning*, which is "an important step toward the inclusion of human meaning in an evolutionary framework" (p. 68).

Just over a decade ago, the leading theoretical journal in psychology, *Theory & Psychology*, devoted a special issue (Smythe & Jorna, 1998) to the relationship between semiotics and psychology. The three central themes selected by the editors for particular attention and discussion were: (1) symbol-processing explanations of human cognition; (2) the application of semiotics to electronic non-linguistic forms of communication; and (3) the relevance of postmodernist conceptions of psychology as human science.

This selection of themes is noteworthy. Themes (1) and (3) are clear legacies of the reasons I discussed above for psychology's neglect of semiotics; theme (1) continues the perception that the dominant role for meaning in psychology is that of internal mental representations, and theme (3) reflects the recognition that semiotics is typically aligned with ideologies more favourable to locating psychology in the *Geisteswissenschaften*, and inimical to the empirical realist scientific stance of mainstream psychology. Theme (2) identifies probably the most rapidly expanding area of concern in cognitive science. It is generally felt that in the management and information sciences there is a growing interest in knowledge management, knowledge creation, screen design in human-machine interface control, etc., but that there is an almost complete neglect of theorising from a psychological point of view in these disciplines. One of the reasons for this is the absence of a common conceptual framework, readily available from semiotics, to deal with information in terms of signs, signals, symbols, and so on:

> The relevance of a psychology that intensively deals with signs and sign-handling is becoming more and more visible. Our future environment will not be only physical, but also virtual, representational and digital. Signs, sign handling and sign understanding are essential constituents of this new environment. (Jorna & van Heusden, 1998, p. 778)

> Jorna and van Heusden argue that the increasing demands of internet, intranet and other kinds of digital and electronic communication, information-gathering and information-presenting devices require an adequate psychology of information handling. They assert that, from a semiotic point of view, signs are all around us. In one way or another, these artifacts will influence our future psychological research agendas and by this they may lead, to a certain degree, to reformulations of current research questions. An information psychology, a psychology of sign handling, is necessary to scientifically cope with the ever-increasing semiotic world around us. (Smythe & Jorna, 1998, p. 726)

The themes of the special issue have continued to occupy those who are attempting to promote the recent psychology-semiotics integration. For example, Garfield (2000) distinguishes two different meanings of "meaning": natural indicative signs on the one hand, and conventional semiotic devices on the other. He argues that cognitive science needs both and must therefore find a way to combine them, for "if among our cognitive states are the propositional attitudes, then we are the subject of meaningful states, states which share the semantic properties of linguistic phenomena" (p. 421).[6] The new discipline *psychosemiotics* (e.g., Smith, 2001, 2005) similarly places semiosis at the heart of cognition, with an emphasis on its biological and evolutionary basis, and identifies its field as the study of how we learn, understand and use the signs of culture. A related new discipline *cognitive semiotics* (Brandt, 2004) is also dedicated to the analysis of meaning within a broader framework for the study of language and thought, gesture and culture, discourse and text, art and symbolisation in general. Promoting this new discipline, a recently created (2007) journal *Cognitive Semiotics* is explicitly devoted to integrating methods and theories developed in cognitive science with those developed in semiotics and the humanities. Advertising the journal as the "first of its kind", the general introduction offers its readers "the opportunity to engage with ideas from the European and American traditions of cognitive science and semiotics, and to follow developments in the study of meaning – both in a cognitive and in a semiotic sense – as they unfold internationally" (Andreassen, Brandt & Vang, 2007, p. 3).

With all this recent activity, it might seem that the movement to integrate semiotics and psychology is flourishing. But appearances, as we know, can be deceiving.

FAILURES IN SEMIOTICS-PSYCHOLOGY INTEGRATION: WHAT SEEMS TO BE THE PROBLEM?

So far, the proponents of the various attempts to integrate psychology and semiotics consider themselves to have had only limited success. Their dissatisfaction crystallises into two major complaints. The first is that it is still not clear which "dialogue" is to be established between semiotics and psychology. Will the relevance of semiotics lie in the "internalist" application to cognitive processing of semiotic categories via a revival of the Lockean "image-like" or "sub-linguistic" approach to mental representations (Holenstein, 2008)? Or

[6] Garfield argues that the indicative sign *grounds* the conventional semiotic device. In applying the combination of the two to the notion of mental representation, his position illustrates the move to centre stage of so-called "naturalism" in psychosemantics, i.e., the attempt to naturalise "indicator semantics" by applying the philosophy of language and its core problem of meaning to the philosophy of mind and its core problem of intentionality.

will it lie in the focus on the more recent "externalist" concept of mind and an extension into cultural and social themes? If the latter, how is that to be accommodated within a science that rejects postmodernist approaches? As Smythe & Jorna (1998) conclude in response to the special issue papers:

> The role that semiotics might play in the continuing evolution of the cognitive sciences and the human sciences remains unclear. In particular, it is not clear how to situate semiotics in relation to postmodernist approaches in discursive, narrative and cultural psychology, or with respect to contemporary developments in connectionism and neuroscience. (pp. 728-9)

Alternatively, will the dialogue between semiotics and psychology provide the long-awaited unification of *both* internalist *and* externalist approaches to mind? If so, then it still seems a long way off, since "the unifying conception of *sign*, *symbol* or *representation* that one looks to the field of semiotics to provide remains elusive" (Smythe & Jorna, 1998, p. 729). This disappointment is echoed more recently by Deacon (2007):

> A scientifically adequate theory of semiotic processes must ultimately be founded on a *theory of information that can unify the physical, biological, cognitive, and computational uses of the concept*. Unfortunately, no such unification exists, and more importantly, the causal status of informational content remains ambiguous as a result. (p. 123, emphasis added)

The second complaint is that, in general, mainstream psychological researchers - those at the coal-face, so to speak, appear to remain unaware not only of developments in semiotics but also of the recent work in psychology-semiotics integration. In particular, cognitive theory, the heartland of mainstream psychological research "remains largely uninformed by developments in the field of semiotics" (Smythe & Jorna, 1998, p. 724).

It is my contention that what lies behind these complaints and is responsible for the hold-up is a set of confusions that reflect the continuing implicit influence of the reasons for psychology's neglect of semiotics that I outlined earlier. Moreover, unless these are addressed, attempts at psychology-semiotics integration will not succeed, and will continue to be hampered by misperceptions concerning the sources of the hold-up.

The complaint that psychologists remain unaware of developments in semiotics is, of course, justified. Psychology's combination of scientific practicalism and metatheoretical confusion *explains why* most of the integrative work, being contained in journals and books devoted to theoretical and philosophical psychology, and rarely appearing in the mainstream experimental journals, will not be read by mainstream psychologists or psychological practitioners. But there are further repercussions. Where and when the integrative work *does* come to the attention of the mainstream, psychology remains ill-equipped to deal with confusions which infiltrate the integration attempts themselves.

Consider psychology's subscription to the science/meaning divide, and the view that semiotics lies on the "meaning" side of that divide and is inextricably wedded to ideologies opposed to scientific empirical realism. *Some* proponents of psychology-semiotics integration place emphasis on *science*, insisting that the aim is to "gain scientific knowledge about these often still unexplored phenomena, found increasingly important by the scientific community" (Andreassen et al., 2007, p. 4). But *many* proponents of psychology-semiotics integration

locate their contributions within an explicitly hermeneutic or *antiscience* or *post*-science framework. For example, when introducing psychosemiotics, Smith (2001) discusses the division between the causal approach of mainstream cognitive science and the meaning-based approach of cultural psychology, and he aligns psychosemiotics with the latter. Recall that the relevance of postmodern conceptions of psychology as a human science was one of the three central themes in the *Theory & Psychology* special issue. Smythe & Jorna (1998) observe that the appropriateness of the natural science approach in psychology is increasingly being questioned. According to Shank (1998), scientific methods are "not so much wrong as 'played out' ... they have grown stale from decades of constant use" (p. 856). Therefore, he asserts, the "Age of Science" is winding down and the "Age of Meaning" is picking up. This is consistent with the widespread antirealism at the core of that "quiet methodological revolution" (Denzin & Lincoln, 1994, p. ix) which has seen the reinvigoration of qualitative research methods. Across the entire field of qualitative approaches it is typically held that meaning is the central focus, that qualitative methods provide "not truth but perspective" (Ruckdeschel, 1985, p. 19), and that anyone who chooses qualitative over quantitative methods does so because they have an a priori ideological or philosophical commitment to antirealism (cf. Bryman, 1988; Lincoln & Guba, 2000; Potter, 1996).

For the mainstream psychological researcher, who certainly does *not* feel that scientific methods have been "played out" and "grown stale", but whose anti-theoretical stance includes the devaluing of skills in conceptual analysis, and whose metatheoretical confusion involves significant lapses from *explicit* commitments to realism and to science, these mixed messages would be difficult to resolve. So, too, would it be difficult for the mainstream researcher to assess critically the flaws and inconsistencies in a movement that wonders "which dialogue" is to be established between psychology and semiotics. On the one hand, attempts to apply semiotics to traditional *internalist* symbol-processing explanations of human cognition (another of the special issue themes) are offered alongside those that recommend we should abandon the traditional cognitivist view of mind in favour of an alternative, *externalist*, semiotic perspective. On the other hand, the integration movement bemoans the lack of a semiotic theory of information that can *unify* externalist and internalist views of mind.

A WAY FORWARD: TAKING REALISM SERIOUSLY

One way forward is to accept mainstream psychology's *explicit* commitments to realism and science, show what problems are created by the *lapses* from those commitments, and then re-think the place of semiotics from the point of view of a *thoroughgoing* realism. This way forward is what I propose to explore in the second section of the present paper.

So, what is meant by a realism that is thoroughgoing? Most philosophers (if not psychologists) would insist that there are varieties of realism. Indeed, the label is so popular that it has been appropriated for just about any position; it seems that we can claim to be "realist" about anything - Platonic universals, ideas and mental representations, higher non-material realms, causal powers, etc. - insofar as we are claiming that these things "really exist" or are part of "the structure of reality". Less controversially, the basic realist thesis regarding the existence of a world independent of human thoughts appears in a number of different recent conceptions of realism, such as are found in J. D. Greenwood's work

(Greenwood, 1992, 1994, 2007), in Bhaskar's "critical realism" (Archer et al., 1998; Bhaskar, 1975, 1986, 1998; Hartwig, 2007), in Harré 's "ethogenic" realism (Harré, 1986, 1989, 1995, 1997a, 1997b; Varela & Harré, 2007), or in Cavell's realist social psychoanalysis (Cavell, 2006). But each of these has a somewhat different account of the nature of that mind-independent reality.

Now, there is one version of realism which is thoroughgoing in the sense that it begins by drawing attention to the basic logical principles which underlie and are necessarily assumed by *all* positions, and then goes on to show that the different alternative "versions" of realism consist in variations on developments which contradict those assumed principles. That is, the varieties of realism are actually different packages of realist and non-realist elements. In contrast, a thoroughgoing realism does not entertain exceptions to its assumed principles, and so does not end up in contradictions. The realism that I have in mind here has sometimes been called *Australian realism*, *Andersonian realism* or *Sydney realism* (cf. Baker, 1986; Mackie, 1962; Passmore, 1962), because its core is found in the work of the Scottish-Australian philosopher John Anderson (1893-1962). It has also been called *situational realism* (e.g., Hibberd, 2009). With roots in the British (particularly Scottish) and American realist traditions, it is a realism which has an established place in philosophy (cf. Monnoyer, 2004), but whose extension to psychology has been relatively piecemeal (but cf. Maze, 1983) and only recently collated and presented systematically (Mackay & Petocz, in press [b][7]; Henry, 2009).

This realist approach is characterised by a number of different interlinked principles about ontology, logic, epistemology, causation, science and so on. Here is not the place to spell these out in any comprehensive or exhaustive way, nor to detail and explore the resulting critique of alternative realisms. Rather, my concern here is with just four of the aspects of this thoroughgoing realism - those, namely, which are the victims of mainstream scientific psychology's lapses from realism. As I shall argue, these four aspects not only challenge the four reasons for psychology's neglect of semiotics, but also provide the required solid foundations for a fruitful scientific convergence of semiotics and psychology.

Four Key Aspects of a Realist Approach

The first key aspect of realism is an *externalist relational view of mind*. As the behaviourists insisted, what is internal to the behaving organism is not mental, but simply the physical brain and its various chemical and neural processes, connected to the perceptual apparatus. The study of these processes is physiology or neurophysiology. *Psychology* deals with the *relation between* the organism and its environment. In arguing thus, the behaviourists were on the right track. But they were trapped by Cartesian assumptions into thinking that there could not be a concept of mind or mentality which is simultaneously externalist and materialist. That is because, as Stove (1991) remarked when discussing idealism, “No one

[7] This book (an edited collection of old and new essays) was a response to the steadily increasing number of calls for a (situational) realist psychology to show what it has to offer, following Stam's (2001) complaint that "the lack of a large, explicitly realist body of work in psychology" means that "once one argues for a psychology that is explicitly realist (as opposed to constructionist, phenomenalist, instrumentalist, etc.), one has very little to go on" (p. 295). The book was also motivated by the need to expose some of the debilitating *pseudo*-realist aspects of the dominant position in mainstream scientific psychology.

thought seriously … of going right back beyond the Cartesian starting points, of dualism in metaphysics, and representationism in epistemology" (p. 102). Anderson (1929/1962) proposed that we do just that:

> History has shown how Cartesianism leads on to absolute idealism. To get rid of idealism we have to go back upon all sophisticated "modern" views and recapture the Greek directness. (p. 60)

This "Greek directness" is the Aristotelian direct realist approach (cf. Esfeld, 2000; Hood, 2004), spelled out in Anderson's (1927/1962) classic essay *The knower and the known*. Direct realism (albeit sometimes mixed with non-realist aspects) can be traced from Aristotle through Medieval scholasticism, Thomas Reid's reply to Locke, Brentano's concept of intentionality, James, and the American New Realists (cf. Holt et al., 1912). According to this view, mind is a relation because every mental act is *directed at* something (Aristotle's *pros ti*). Logically, for knowing (perceiving, believing, etc.) to occur, there must be a knower (the subject, the perceiving organism) and a known (the object, what is known or perceived), and knowing is the relation between the two. The implications of this externalist relational view of mind are radical and far-reaching. Mind is not "in" the body (i.e., cognition is not "*em*bodied"), because mind is not a thing or entity (as the brain is). Rather, it is the brain as subject or knower that is embodied, so it is more correct to say that all cognition/mentality is *grounded in* an embodied brain; only an embodied brain enters into cognitive relations. Cognition, therefore, is not "private" and must be, in principle, observable (Michell, in press). The "contents" of "consciousness" are not "in here" but "out there" (McMullen, in press). Mind can be thought of as "extended" in the sense of being a particular type of relation between embodied brain and situations in its bodily and external environment. The extendedness of mind does *not* lie in recent expansions of internal mental representations to include multi-modal symbols in "grounded cognition" and "situated conceptualizations" (Barsalou, 2008, 2009). Hence, realism's externalist approach to mind involves a non-reductive materialist view of the mental as relation, which is in direct contrast to the two major Cartesian-derived approaches to mind that have dominated mainstream psychology: the behaviourist deference to Cartesianism via reactive dismissal of mind; and the crypto-Cartesianist (cf. Bennett & Hacker, 2003) internalism, mind/brain dualism and representationism of the cognitive information-processing approach.

The second key aspect of realism concerns the logic of relations, and it is that *relations are always external to the things related*. Any relation must involve two or more terms (the *relata*), each of which must be characterisable independently of the relation into which it enters. The relation itself is external to the relata, and cannot be found (either partially or completely) internal to one of its terms (because the relation is *how they are with respect to each other*). Put another way, a term or entity cannot be (either partially or wholly) *constituted by* its relations to any other term or entity. To use a simple example involving the spatial relation *being on* in the situation *the book is on the table*, the "being on" relation is external both to the book and to the table, and cannot be found internal to either. Of course, the relation cannot obtain without the related terms, because it is not a separate existent in the sense of being some third element or stuff, floating between the two; "it" is simply how the two objects stand with respect to each other. Conversely, both the book and the table are entirely characterisable without any reference to their spatial location with respect to each

other. Since the logic of relations applies to all relations, it must apply equally to mind - i.e., to the cognitive relation. The person or cogniser who stands in the cognitive relation of knowing, and the situation that stands in the relation of being known, must exist and be characterisable independently of their standing in that cognitive relation; the cognitive relation is external to both subject/knower and object/known, and cannot be found internal to either.[8] The implication for mainstream psychology is at odds with the received "realist" view; just as no amount of searching *within* the book will yield discovery that it is *on* the table, so no amount of searching within the brain will yield discovery of cognitions, perceptions, memories, etc.; it will yield only information about the state of the subject term when that subject is standing in relations of knowing, perceiving, remembering, and so on. There is no such thing as conscious*ness*, to be found in the brain. Furthermore, the objects of cognition are situations, and some of these situations are themselves relational (as, for example, when we cognise that the book is on the table). When that cognised relational situation concerns some type of relation between a sign and what it signifies (e.g., that the word *table* is being used to refer to that four-legged piece of furniture), then both signifier and signified must be external and perceptible to the knower or perceiver in order for that further relationship between the two external objects to be perceived.

The third key point about realism is what can be called its *ontological egalitarianism*. There is only one kind of existence, the existence of situations - hence the label *situational realism*. Everything that exists is a complex spatio-temporal situation in this single material world. There are no “levels” of reality or “degrees” of truth, no “higher” or “lower” realms, no dualisms involving radically different kinds of existence, no “fundamental” elements that are somehow more “real” than others. There is only a single, complex way of being – the being of situations. This is sometimes conveyed by saying that reality is *propositional in structure*, but by "propositional" here is not meant anything linguistic; it means that a situation always involves a subject-predicate complex - something's being of a certain kind, or something's being related to something else, or something's being located somewhere, etc. Nor must it be mistakenly thought that to say that there is only a single, complex way of being is to deny the historical and contextual variations and situatedness of things, including their coming into being and transformations – as is encapsulated in the Heraclitean notion of flux. The implications of realism’s ontological egalitarianism are, again, at odds with dominant views in mainstream psychology which mistakenly equate realism with reductionism. Relations (i.e., the way objects are situated with respect to each other) are just as real, just as much part of the structure of reality, as are the objects related. Hence, since cognition is a relation between organism and situations in its environment, that relation, when it obtains, is as real as is the organism and its environment considered separately and independently. The relational situations investigated by psychology (or, for that matter, sociology, anthropology or any other discipline) are neither more nor less real than those that

[8] I am well aware of the standard objection to direct realism - namely, that in *mis*perception or *false* belief or some imaginings the objects perceived or believed (e.g., that there are pink elephants and golden mountains) do *not* exist, so they must have some kind of purely internal or phenomenal or mind-dependent existence (i.e., what Brentano called the "intentional inexistence" of the mental object). However, given the intractable logical problems of phenomenalism and representationism, I am convinced that retreating to such a conceptually flawed position is not a viable option. Instead, although it may be difficult to work out the details, it is worth considering the direct realist efforts (e.g., Anderson, 1934/1962; Michell, 1988; Rantzen, 1993) to account for such situations (i.e., the "problem of error") in terms of an asymmetry between true and false beliefs, the latter at least involving *components* which *are* real.

are investigated by physics or chemistry. Therefore, realism is simultaneously non-dualist *and* non-reductionist.

The fourth key point about realism concerns its support for a broader than usual conception of scientific method. Mainstream psychology's views notwithstanding, the *core* method of science is neither measurement, nor experimentation, nor even observation; it is *critical inquiry*. Science involves the investigation of the ways of working of the natural world (including the mental and behavioural ways of working of human beings). As Haack (2003) avers, science and its aim of objectivity are continuous with normal inquiry in any field:

> Respect for evidence, care in weighing it, and persistence in seeking it out, so far from being exclusively scientific desiderata, are the standards by which we judge all inquirers, detectives, historians, investigative journalists, etc., as well as scientists … Scientific inquiry is continuous with the most ordinary of everyday empirical inquiry. There is no mode of inference, no 'scientific method', exclusive to the sciences and guaranteed to produce true, probably true, more nearly true, or more empirically adequate, results. (pp. 23-24)

Instead, being premised on the acknowledgement of our cognitive fallibility, the core of science is inquiry which proceeds carefully, critically, and self-critically, by employing the best available error-detection mechanisms (Haack, 2003; Michell, 2001, 2004). This broad conception, which includes conceptual analysis, was part of science from ancient Greek times, but was lost sight of with the advent of the new tools of experimentation and mathematization highlighted during the scientific revolution (Machado & Silva, 2007). As Michell (2001) notes, nineteenth century scientists also lost sight of Galileo's realist warning that we "must not ask nature to accommodate herself to what might seem to us the best disposition and order, but must adapt our intellect to what she has made" (in Michell, 2001, p. 214). [9] This has two implications which cohere with the previous points. First, with respect to subject matter, if nature contains relations, then we must avoid what Cohen & Nagel (1934) described as the fallacy of reduction in science, i.e., believing that because science often analyses things into their constituent elements, it thereby "denies the reality of the connecting links or relations" (p. 383). Secondly, with respect to specific methods, the choice of quantitative or qualitative method is to be determined empirically by the nature of the subject matter, and not via a priori ideological or philosophical commitments. Hence, if certain relations, such as cognition or meaning, are found to be nonquantitative, then it is scientifically inappropriate to proceed with their investigation using quantitative methods.

Taking together these key aspects of a realist approach, we can now briefly revisit the four reasons for psychology's neglect of semiotics, and how their legacy continues in the perceived hold-ups to semiotics-psychology integration.

[9] Nevertheless, this broader view of science as critical inquiry that is continuous with normal inquiry was supported by some of the founders of psychology. For example, Freud belonged to the tradition that rejected the German dichotomy between the *Natur-* and the *Geisteswissenschaften* (cf. Schilder, 1935/1950), and he always adhered to the broader classical view of science as critical inquiry: "Scientific thinking does not differ in its nature from the normal activity of thought, which all of us … employ in looking after our affairs in ordinary life" (Freud, 1933, p. 170).

Implications of Realism: Revisiting the Current Situation

First, if we take seriously our explicit commitment to realism, then we must recognise that there is no fundamental divide between the physical or natural sciences and the social or human sciences (cf. Petocz, 2001). Each deals with situations in the world that have their own logical and empirical structures, spatio-temporal locations, and conditions of occurrence. Semiotic phenomena involve relational situations of signification or meaning, themselves incorporating the relational situation of cognition/perception. That these relational situations require living organisms with physiological equipment of a particular kind does not put them somehow outside the natural world and its deterministic constraints. Thus, investigation of meaning, hermeneutic inquiry, is embedded within, rather than at odds with, causal situations. Indeed, from a realist scientific point of view, hermeneutic and causal inquiry are not only compatible, but warranted in all those situations that focus on aspects of human behaviour that occur in the context of the human semiosphere. It follows that, as Barclay & Kee (2001) suggest, "psychology cannot progress further towards being accurate, towards being scientific, until it takes semiosis, the process of meaning-making, as an essential component" (p. 684). Furthermore, as I shall elaborate in the following sections, the externalist relational nature both of mind and of meaning precludes any coherent conception of internal mental representations. Hence, the putative resolution of the problem of how mental representations get their meanings by appeal to the syntactic nature of the mind-machine is revealed to be completely misguided and unjustified.

Secondly, taking realism seriously undermines mainstream psychology's scientific practicalism and clears up its metatheoretical confusion.[10] If critical inquiry is taken to be the core method of science, then not only does conceptual analysis regain its rightful place in the mainstream's approach to research, but also the mainstream prejudice against nonquantitative methods, a prejudice that is at odds with the realist self-understanding of scientific psychology (cf. Michell, 2004) is successfully challenged. This opens the door to a systematic, scientific investigation of semiotic phenomena.

Thirdly, although psychology is correct in its perception that semiotics has *typically* been assimilated into antirealist ideologies, it becomes clear that there is no necessary connection between semiotics and relativist, subjectivist or constructionist philosophical approaches. If there is no gulf between *Naturwissenschaften* and *Geisteswissenschaften*, if relational phenomena (such as cognition and meaning) are legitimate subjects for scientific investigation, if practicalism is appropriately subordinated to the scientific aims of discovering and explaining how things are in the world, then mainstream psychology is already well on the way towards developing a *realist semiotics*.

Finally, although semiotics has, again *typically*, elided the person or user, a realist semiotics not only returns the sign user to its rightful place within the semiotic triad, but also, in doing so, acknowledges the central role of *psychology* within semiotics.

In sum, once mainstream psychology takes seriously its own explicit commitments to realism and to science, not only is there no good reason to neglect semiotics, but also there

[10] This, of course, is unlikely to be welcomed while ever scientific practicalism (to which the search for truth is subordinated) is reinforced within the current profit-driven academic instititutions (cf. Nussbaum, 2010), and metatheoretical confusion is disguised as potentially fruitful eclecticism and open-mindedness (cf. Lambie, 1991). In psychology, the "powerful impact of disciplinary socialization practices" (Good, 2007, p. 286) constitutes an almost insurmountable obstacle to scientific progress.

are very good reasons for embracing semiotics, albeit critically and selectively. Furthermore, as I shall show in the discussion that follows, in considering the question how a realist semiotics-psychology integration can contribute to psychological research, new light is cast on existing perceptions about exactly where the problems and challenges lie. Old insoluble problems disappear, giving way to new but more promising challenges.

WHAT CAN A REALIST SEMIOTICS-PSYCHOLOGY INTEGRATION CONTRIBUTE TO MAINSTREAM PSYCHOLOGICAL RESEARCH?

Conceptual analysis is a form of theoretical research which both *precedes* and then *accompanies* observational (including experimental) research. Therefore, it is to be expected that discussion of psychological research will address both conceptual and empirical issues. In general, within a coherent realist framework, integrating semiotics with psychology can serve psychology in a number of ways involving clarification, redirection, unification and expansion. I propose to illustrate these by focusing on the following five contributions: clarifying the irreducible tripartite relational nature of meaning; extricating the legitimate concerns of representation in the information sciences from incoherent epistemological representationism; applying the Peircean distinctions between different types of sign (viz. icon, index and symbol) to solve problems in information representation research; using iconicity as the bridge between conceptual metaphor and nonconventional symbolic phenomena; and promoting increased methodological sophistication by underscoring the scientific legitimacy of nonquantitative methods.

Clarifying the Irreducible Tripartite Relational Nature of Meaning

The first contribution that a realist semiotics-psychology integration can offer is to assist psychology to negotiate its way through the minefield that is the terrain of "meanings". Psychology appears to deal with many different kinds of meaning, and, as Cassirer (1944) observed, “There is perhaps no more bewildering and controversial problem than ‘the meaning of meaning’” (p. 112). Not surprisingly, despite the existence of partial classifications of meaning (in linguistics, semiotics and philosophy), there has not yet appeared any attempt to develop a complete descriptive treatment of the meanings of “meaning”. But that is no reason for scientific psychology to shirk the task.

An initial survey of all the different uses of "meaning" (excluding such colloquial usages as "I mean to do *X*" in place of "I intend to do *X*") yields a comprehensive but uncritical classification[11] into seven (sometimes overlapping) categories: (1) conventional and arbitrary linguistic and symbolic phenomena (e.g., words, code, so-called "abstract" signals such as tones, rings and buzzers); (2) nonconventional and/or non-arbitrary linguistic and symbolic phenomena (e.g., paralinguistic features of speech, onomatopoeia, social rituals, dream symbols); (3) indicative and expressive signs and symptoms (e.g., footsteps in the sand, alarm

[11] Of course, this is merely a *descriptive* and *synchronic* classification. The important issues of the various *origins* and *development* of these semiotic phenomena are not addressed; but psychology in particular cannot afford to ignore those issues (see later discussion of the cognitive and motivational contribution of the user).

cries, blushing); (4) "experiential" or "existential" meaning or significance (e.g., the meaning of life, the value to the person of some object or event); (5) perceptually constituted or constructed meaning of the Kantian or Wittgensteinian "seeing as" kind (e.g., I see this four-legged block of wood *as* a table, or *as* a four-legged block of wood); (6) experiencer-independent meaning, such as Husserlian intrinsic essence (i.e., every object is "meaningful" by virtue of being what it is and not something else); and, finally (7) mixed semiotic/meaning phenomena (e.g., an alarm cry used conventionally in an artificial setting to indicate a warning, an obsessive hand-washing which is simultaneously indicative and symptomatic of a particular state of mind, has perhaps conscious "experiential" significance, and symbolises for that mind some other situation).

Now, within this taxonomy, semiotics traditionally and relatively uncontroversially[12] deals with phenomena belonging to categories (1), (2), (3) and (7). This leaves categories (4), (5) and (6) as types of meaning that appear to muddy the semiotic waters. But critical scrutiny suggests that they need not do so. In the case of category (4) the notion of "existential" or "experiential" meanings imports unnecessary mystification. For, to ask, for example, what is the "meaning" to me of an event such as my mother's death is to ask about my beliefs and feelings regarding that event and its consequences for me, and to ask about its emotional and "motivational salience" (Mackay, 2003). Hence, this apparently obscure and elusive notion of "meaning" can be replaced by a set of statements using the standard psychological categories of beliefs and desires which are everywhere used as data in psychological research. Categories (5) and (6), in contrast, face logical problems. Category (5) may be understood as a simple case of a person knowing that the label "table" applies to a particular object (this piece of wood), in which case it belongs in category (1). Alternatively, it can be understood as a person taking something (a piece of wood) to be usable as something (a table), in which case it belongs in category (2). If, alternatively, it is a case of a person seeing an object for what it is, then that is simply veridical perception. But, in none of these cases can the person's perceiving the object *create* that object; in the case of the table, there must be a pre-existing block of wood, complete with its table-like properties, for me to perceive it in the first place, either as a mere block of wood or as a table. So, there is no sensible way to understand this example as anything other than one which belongs to either category (1) or category (2). Finally, in the case of category (6), there again is unnecessary obfuscation and mystification; if meaningfulness resides in a thing's being what it is, then nothing can be without meaning, and meaning becomes co-extensive with whatever exists. Such a usage becomes, ironically, meaningless. So, category (6) is not a case of meaning at all.

It seems, then, that wherever we have coherent categories of meaning, meaning does involve what is traditionally dealt with within semiotics. Just as is implied on a realist understanding of the Peircean triadic conception of the sign, meaning involves a *three-term relation* (*X* means *Y* to *P* - the signifier means the signified to the person). Furthermore, if any one of these terms is excluded, we do not have meaning. The word "table" does not signify the object without there being *someone* (an English speaker) for whom it does so. And the word "table" cannot be *intrinsically* meaningful to someone; it must mean something other than itself. Footsteps in the sand may well have been *caused by* someone walking on the beach, but they do not *indicate* that without indicating it *to someone*. And so on. We can

[12] As will emerge in the discussion later, there is some controversy concerning unconscious nonconventional symbolism (such as dream symbols) in category (2).

summarise this point by observing that semiotic phenomena involve an irreducible triadic relation. Not only does meaning require each of the three terms, it cannot be an intrinsic property or quality of any of them. Statements of a form which suggest either only two terms (*X* is meaningful to *P*), or only one term (*X* is meaningful), are misleadingly incomplete. Since relations are external to their relata, and since meaning is a relation, it follows that none of the three terms in the meaning relation has inherent semantic properties.

And there is an important twist to the irreducibly triadic nature of signification. While the signifier and the signified in any signifier-signified pair can be interchanged, and while a person can also stand as either signifier or signified, there must always be a cognising organism in the triad, and this organism must have perceptual/cognitive access (albeit not necessarily *conscious* access) to *both* the signifier *and* the signified independently, in order to perceive/cognise the relation between them.

In summary, semiotics-psychology integration allows psychology to negotiate a way through the difficult terrain of meanings, arriving at a fundamental aspect of semiotic phenomena, which forms the basis for unification. Every semiotic situation involves an irreducible triadic relation, one term at least of which must be a cognising organism with perceptual/cognitive access to the remaining two terms.[13] This is the starting point for the next contribution.

Extricating the Legitimate Concerns of Representation in the Information Sciences from Incoherent Epistemological Representationism

The second contribution of a realist semiotics-psychology integration is, ironically, to expose the impossibility of the type of unification of semiotics and psychology that many have been waiting and calling for. This is the unification of internalist (cognition as symbol-processing) and externalist approaches to mind, representation and meaning. Since the former rests on an incoherent conception of representation, whereas the latter does not, any attempt at unification is both misguided and doomed to failure.

It will be recalled that two of the three major themes selected for the special issue of *Theory & Psychology* were (1) symbol-processing explanations of human cognition, and (2) the application of semiotics to electronic non-linguistic forms of communication. In the information sciences dealing with the increasing demands of information-gathering and information-presenting devices, these two themes are typically combined. According to Jorna & van Heusden (1998), one of the contributions of semiotics is that it "places the concept of *representation* at the centre of discussions in management and information science" (p. 758, emphasis in original).

Within the information sciences, the field of "knowledge representation" (KR) emerged from a background in computer science and artificial intelligence (AI). The major question in

[13] It might be suggested (e.g., Smythe & Chow, 1998; T. Pataki, personal communication) that the Peircean triadic relation, while *necessary* for signification, is not *sufficient*. Smythe and Chow (1998) claim that it needs to be expanded into the sextuple of speaker, sign, object, interpretant, audience and context. I think that these extra elements simply *contextualise* the relational situation of signification: sometimes it occurs within an *event of communication*, sometimes it will obtain only under certain social conditions, sometimes it may involve a unique person-symbol-symbolised occasion, etc.). But none of these is necessary. Of course, *some* context *is* necessary. But, since spatio-temporal context is the condition of occurrence of *all* situations, its necessity is not distinctive of signification.

KR is widely agreed to be: What is the nature of knowledge and how do we represent it? This sounds fine. But closer scrutiny reveals that the question applies to how knowledge is represented *in* us (as in computers), and how we *use* internal representations (as do computers) in coming to know anything. Thus KR is typically concerned with representing knowledge in computers (i.e., via computer software programs) to enable such systems to model human reasoning (van Harmelan, Lifschitz and Porter, 2007). In their classic paper "What is a knowledge representation?" Davis, Shrobe and Szolovits (1993) claim that "the fundamental task of representation is describing the natural world" (p. 32), since representations are "the means by which we express things about the world" (p. 27). So far so good. But they also argue that the primary role of a KR is that it "functions as a surrogate inside the reasoner, a stand-in for things that exist in the world" (p. 18). Another role is that it is "a medium for pragmatically efficient communication, that is, the computational environment in which thinking is accomplished" (p. 17), since "reasoning in machines (and somewhat more debatably, in people) is a computational process" (p. 26). Clearly, this is the language-like medium (cf. Fodor's (1975) famous LOT - "mentalese") constituting the internal process of semiosis without which we would be unable to think.

But the irreducible triadic relation of signification precludes this on three counts. First, since signification is essentially a psychological process, the three-term relation (person, signifier, signified) *presupposes* the two-term cognitive relation (knower, known). Since the person must be able to cognise separately both the signifier and the signified, cognitive relations are not only *necessarily part of* the three-term meaning relation, but also *presupposed by* it; they are logically prior. Since there cannot be meaning without *prior* cognition, semiosis cannot be the fundamental basis of cognition. The second point is that the idea of representation as internal cognitive mediator violates the requirement that one of the terms in the meaning relation, the cognising organism, have direct and independent perceptual/cognitive access not only to the signified but also to the signifier or representation. In this, semiotics converges with the traditional arguments against representationism. Since the cogniser has no internal perceptual access to the supposed mental representation, the theory requires the postulation of some other internal perceiver, leading to the famous *homunculus* problem - the problem of a vicious infinite regress in which the explanandum - perception - is begged at every step. But, thirdly, even if there *were* some kind of internal perceptual access, the representation could not be *intrinsically* meaningful, as it is typically held to be for mental representations, for meaning is a relation *extrinsic* to the signifier. It is implicitly recognised even in computer programming that the representational function of any representation must be external to it; hence the focus on the independence of syntax from the semantics that is allocated via the software program. Thus, as has been pointed out, the computer, far from being an existence proof of internal mental representations, is an existence proof that *only extrinsic representation is coherent* (cf. Michell, 1988). And the whole trajectory of the theory of mental representations, now moving away from them as linguistically conceived and coming full circle back to Lockean pictorial "non-propositional" forms (Holenstein, 2008), has been a misconceived detour resting on a mistake (Heil, 1981).

In sum, then, recognition of the irreducible triadic semiotic relation at the heart of meaning reveals the explanatory bankruptcy of the pervasive representationism in psychology and cognitive science, showing that the standard calls for unification in the information sciences are misguided, because the type of unification envisaged is simply impossible. To repeat, any attempt to unify psychology and semiotics via the background assumption that

semiosis is the fundamental basis of cognition is doomed to failure, because it is a conceptually flawed project.

Thus, a realist semiotics-psychology integration allows us, within the context of a large area of cognitive science, to extricate the legitimate concerns of representation in the information sciences from the incoherent epistemological representationism with which they are too often conflated. This move converges with recent "extended mind" approaches by correctly shifting mainstream psychology's attention beyond the brain, to more fruitful questions and genuine problems concerning information representation *for* (rather than *in*) humans and other cognising organisms. One such question is what type of signifier-signified relation is best suited to presenting particular kinds of information within particular kinds of environment. This takes us directly to the third contribution.

Applying the Peircean Distinctions between Different Types of Sign (Viz. Icon, Index and Symbol) to Solve Problems in Information Representation Research

The coherent (externalist) conception of representation is that which deals with forms of information representation that are accessible to the person for whom they are representations. In the recent discussions of semiotics-psychology convergence, much is made of the fact that we are moving increasingly into the age of information representation in digital, electronic and other forms. We are surrounded not only by the signs and symbols of the natural environment but also by the steadily expanding field of signs and symbols in so-called "artificial" environments comprised, typically, of human-machine interfaces in purpose-built operating systems. There are many challenges and problems facing the designers of signals in artificial environments. For example, in the field of auditory warning design (e.g., for computer workspaces, aircraft cockpits, hospital alert systems, automotive safety, and equipment for users with disabilities), according to Edworthy (1994), the acoustic and psychoacoustic problems are largely solved, but the *psychological* issues are proving to be more difficult. For example, there is a common complaint that warning design research success in the *auditory* domain lags frustratingly behind that in the *visual* domain. It is also the case that research results concerning which types of signifier-signified relation are most effective in the auditory domain are confusingly inconsistent. Here, again, a realist semiotics-psychology integration can offer valuable contributions.[14]

To sketch in the background to this area of research, in the field of auditory warning design, auditory signals have been grouped into three basic categories: (a) *speech*, (b) *abstract sounds* (e.g., simple tones or tone combinations), and (c) *auditory icons* (i.e., everyday environmental sounds which rely on already-made associations). In these systems, the association between sound and its referent (the so-called *signal-referent relation*) has been considered to be the pivotal factor in the success or otherwise of the selected warning signal. Accordingly, over the last couple of decades, there is a large body of research in this area, in which the standard method has been to construct various classification systems of *signal-referent relation strength*, and then test predictions regarding ease of learning of different levels of signal-referent relation strength across and within different types of auditory signal

[14] The material that follows is given a more extended and thorough discussion in Petocz, Keller & Stevens (2008).

(e.g., Belz, Robinson & Casali, 1999; Edworthy & Adams, 1996; Edworthy & Hards, 1999; Graham, 1999; Keller & Stevens, 2004; Stephan, Smith, Martin, Parker, & McAnally, 2006).

In his seminal work on classification, Gaver (1986, 1989, 1993) proposed three types of perceptual (visual and auditory) mapping, based on the dimension of *articulatory directness* (Hutchins, Hollan & Norman, 1986), i.e., the *degree* to which the form of the signal or representation is constrained by its relationship to the represented object or event. In *nomic* (later, *iconic*) mappings, which involve the highest degree of articulatory directness, "meaning depends on the physics of the situation" (Gaver, 1986, p. 170). For example,[15] the sound of a metal object being struck can be used to indicate the size of an object, since the pitch of the sound is a direct causal result of the size of the object. Here, it is the *causal* relation, rather than icon-object *similarity*, that is fundamental. *Metaphorical* mappings, in contrast, are less physically constrained and thus have less articulatory directness. They do not depend on physical causation. Instead, they "make use of similarities between the thing to be represented and the representing system" (p. 170). These include structure-mappings (such as that between genealogy and a tree) and metonymic mappings (such as the use of a hiss to stand for a snake). Finally, *symbolic* mappings are "entirely unconstrained in terms of their form" (Gaver, 1989, p. 88), and so involve the least articulatory directness. They are essentially arbitrary and rely on social convention for their meaning. Examples in the auditory domain are telephone bells and ambulance sirens – abstract sounds that acquire meaning through cultural learning.

According to Gaver, the stronger the signal-referent relation in terms of articulatory directness, the more intuitively obvious will it be, and the more easily will it be learned and recalled. Hence, the testable prediction is that nomic mappings should be relatively simple to learn, metaphorical mappings somewhat harder, and symbolic mappings the most difficult. Thus, Gaver recommends developing *auditory icons*, which are "natural sounds with a nomic or metaphorical mapping to the information to be represented" (1986, p. 172).

Now, investigations of the differences in terms of learning and retention between the three broad categories of auditory warning (speech, abstract sounds and auditory icons) have generally shown an advantage for speech and auditory icons over abstract sounds. Furthermore, within the set of auditory icons, certain types of mapping are more successful than others (cf. Keller & Stevens, 2004). Yet, overall, the research results are inconsistent, and the ensuing recommendations for designers are similarly equivocal. On the one hand, it is recommended that "the broad category of sounds classed as 'auditory icons' appears to be worth developing in clinical applications", because "there is considerable evidence that sounds which bear a closer relationship with their referent are easier to learn than ones which do not" (Edworthy & Hellier, 2006a, p. 14). On the other hand, it is concluded that "attempts to incorporate auditory icons as warning signals into complex environments have been largely unsuccessful" (Belz et al., 1999, p. 611).

So, how can a realist semiotics-psychology integration help? The semiotic distinctions between types of sign, and the irreducible triadic relation of signification, both of which are overlooked in this area of psychological research, have important implications. When these are applied, it becomes clear that the problems and inconsistencies are a direct result of (1) confusions in terminology resulting in a failure to recognise what category of semiotic relation is involved, and (2) neglect of the third term in the semiotic relation, the cognising

[15] The examples which follow (some of which are perhaps problematic) are those provided by Gaver.

user or person, resulting in ambiguity in the conception of the pivotal notion of signal-referent relation strength, and leading, in turn, to a research strategy that is fatally flawed.

In the Peircean tripartite division of signs (Peirce, 1932, 2.228-307), the distinction between the three types is based on the dyadic relation between signifier and signified. An *icon* resembles the signified, either in terms of similar intrinsic properties, or in terms of similar functions (Peirce's earlier term for "icon" was "likeness")(e.g., a diagram, a picture, the ideographs found in Egyptian hieroglyphics). An *index* (or *indicator*) is causally related to (either as cause or as effect of) the signified (e.g., clouds may indicate impending rain, a bird's warning cry may indicate the presence of a predator). A *symbol*, as implied by the original meaning of the term (i.e., "something thrown together") has no natural connection with the signified[16] (e.g., the word "table", either graphically or acoustically, has no natural connection with the object).

Here, semiotics allows us to clarify that so-called auditory icons (unlike typical visual icons) are misclassified. Consistent with Peirce's usage, the word *icon* (derived from the Greek *eikon*, meaning "likeness" or "image", such as a picture or a statue) has straightforward application in the *visual* domain. However, when the concept of an icon is applied in the *auditory* domain, the situation becomes much less straightforward (which helps to explain why research developments and successes in the auditory domain have lagged behind those in the visual domain). Strictly speaking, an auditory icon would be a sound used to stand for another sound by virtue of acoustic similarity (e.g., a mouse's squeak used to stand for a baby's cry). But this is not what is meant in the auditory warning literature at large. Instead, the term *icon* is used generally for what Peirce referred to as *index*. Furthermore, in the natural environment, an index can indicate any number of things associated with that sound (its source, the physical properties of that source, its causal antecedent, its effect, its context, etc.). Now, with respect to the *indexical* function of signals, these may be *natural* or *conventional*. Hence, we can clarify that auditory icons are not icons at all. Instead, the term *auditory icon* actually denotes a *natural indicator (index) adopted or adapted for the purpose of conventional indication*. Auditory icons thus belong to the mixed semiotic phenomena category (7) in our earlier classification of meanings. And how easily they are learned or recalled will depend very much on *another* factor, the already-learned associations of the person who is to learn them. That is, the third term of the signifying relation cannot be ignored. This leads directly into the second problem.

In the Peircean classification of signs, any particular sign may be taken to be an icon, index or symbol. The same sound (e.g., a mouse's squeak) may be an icon (for a baby's cry), an index (for the mouse) or a symbol (for an earthquake). But none of the binary relations constitutes a sign without the third term, the person or cognising subject. Consistent with the semiotic triad, indication is always an indication *to* the person or cognising organism - the third term of the semiotic relation. The theory of signification emphasises the need to consider not just the *dyadic* relation between signal and referent, but the full *triadic* relation between signal, referent, and person. But the person is not an empty cogniser; the person is a cognisor with a prior history of learned associations.

[16] In non-Peircean classification, symbols may be conventional or nonconventional. In the latter case, symbols are typically *substitutes for* the symbolised, and, there, the basis of the substitution typically lies in iconicity - in similarity (of form or function). This point is taken up in the next section.

In the auditory warning literature, the standard method is to develop and test classifications, using learning as the dependent variable. The aim is to test which types of signal-referent relation, and which levels of signal-referent relation strength, are more easily learned and recognised than others. However, there is also some awareness that learning can contribute to the *independent variable*, for "articulatory directness does not necessarily affect performance once a mapping has been well learned" (Gaver, 1986, p. 172). The fact that symbolic mappings based on arbitrary connections, once learned, become *no different functionally* from those in natural indication (which themselves must also be learned) highlights a major problem which has significant conceptual and methodological implications. This problem is the ambiguous treatment in the literature of the key notion of *signal-referent relation strength*, a concept which not only lies at the centre of existing classifications, but also forms the basis on which stimulus sets are designed and predictions are tested. In brief, classification and research confounds the *dyadic* relation (articulatory directness between signal and referent) with the *triadic* relation (how well learned by the person is the signal-referent association).

On the one hand, the notion of signal-referent relation strength is understood, as the term implies, to refer to the strength of the *dyadic* relationship between a given sound signal and the critical information to which it refers (Gaver, 1986, 1989). Thus, the strongest relations are the direct, nomic or iconic ones, where signal and referent are causally connected, and the weakest relations are the abstract or symbolic ones, where there is no natural or physical connection between sound signal and its referent. Here, asking the question *how strong* is the signal-referent relation is equivalent to asking how strong is the dyadic relation regardless of whether it is perceived, or how often it has been perceived, by anyone.

In this case, because the term is defined *independently of learning*, it might appear reasonable to offer predictions regarding ease of learning and remembering, based on the assumption that stronger relations are more easily learned and remembered. Much of the research has been based on such predictions and assumptions. However, this approach is flawed for two reasons. First, it would be practically impossible to adhere to the definition based on the dyadic relation, and then test the predictions, without having the results confounded by *prior* learning. If, for example, it is predicted (on grounds of causal directness) that the use of the sound of an elephant trumpeting to refer to the target "elephant" would involve a stronger signal-referent relation than would the use of an owl call to refer to the target "night", success in prediction for learning could only be *because* the causal directness of the former is *already learned*. Second, one of the assumptions underlying any such test, i.e., the assumption that stronger relations (dyadically conceived) are more easily learned and remembered, is obviously false. If we do not know what sound an elephant makes, the directness of the causal relation per se does not help. Thus, of the two ambiguous treatments of signal-referent relation strength, this first is of little use.

On the other hand, the concept of signal-referent relation strength is also used to refer to *how well learned* the connection between signal and referent is. This involves the full *triadic* relation between signal, referent and person. The best-learned connections, however arbitrary (as in speech), are acknowledged to comprise the *strongest* signal-referent relations. Indeed, the associations in speech are typically so well learned that the symbolic system as a whole becomes generally "transparent" and our engagement with it automatic. This explains why research which has compared speech warnings with other types of sound has generally found

that the speech warnings are the most easily learned and recalled (as in the case of the signal "unknown" to indicate the target referent "unknown threat").

Clearly, this second (triadically conceived) definition of signal-referent relation strength entails a *different*, but much less fixed classification of sounds, for it all depends on *how well learned* are the signal-referent connections, and on the context of their occurrence. The price of completing the triadic signifying relation by including the cognitive contribution of the person is inevitable variation and uncertainty in classification. Ironically, however, this does not matter. For it is clear that testable predictions regarding ease of learning are vacuous, because they are already contained in the classification, such that the dependent and independent variables cannot be separated.

In summary, the standard method in this research area, that of constructing and testing classification systems, conflates two different understandings of the notion of signal-referent relation strength, one based on a dyadic relation between signal and referent, the other based on the full triadic relation between signal, referent, and person. However, when these two are disentangled, it becomes clear that the conflation disguises serious problems which mean that *neither* is a useful way for this field to advance. Predictions derived from taxonomies based on the dyadic relation will produce results which are inevitably confounded by learning. Predictions derived from taxonomies based on the triadic relation are vacuous, for they are already answered in the classification itself, rendering pointless their testing. The implications for auditory warning design are that the prior knowledge (the "cognitive contribution") of the user must be taken into account earlier in the design process.

Now, when the third term of the signifying relation, the person or cognising organism, is properly taken into account, it becomes clear that cognition will not be the only relevant aspect. For example, in the auditory warning literature, neglect of the prior learning of the person has prevented critical scrutiny of the very notion of the "abstractness" of a sound (such as a siren to indicate an approaching ambulance or applause to indicate approval). Yet there is a substantial body of literature relevant to this issue. It deals with the way our reactions to characteristics of sounds and symbols have been shaped by the combination of evolution, aspects of our physiology, our bodily experiences, and the natural environment. This takes us to the next contribution of semiotics-psychology integration.

Using Iconicity as the Bridge between Conceptual Metaphor and Nonconventional Symbolic Phenomena

I have referred to the role of the *cognitive* contribution (viz. prior learning) of the user. However, since the cognising term of the cognitive (and, thereby, signifying) relation is an embodied, motivated subject, it would be surprising if bodily, motivational and emotional experiences were not *also* important in shaping our ways of thinking. In psychology this is gradually being acknowledged in the new approaches to "embodied" and "hot" cognition, which draw upon earlier theories of *conceptual metaphor*, although this work remains relatively isolated from experimental research areas in which it could usefully be applied. By contrast, nonconventional symbolic phenomena, which occupy a shaky position even in semiotic classification, have been relegated by mainstream psychology to the "too hard" basket, and receive barely any attention at all. Yet, as I shall argue, the Peircean concept of iconicity can be used as a bridge between the two. In this way, semiotics-psychology

integration can contribute by promoting a potentially fruitful unification of two difficult and hitherto disconnected areas in psychology.

Peirce (1932) commented on the probable iconic and indexical aspects of language, and Sapir (1959) followed him. More recently, theoretical and empirical work on conceptual metaphor and on mappings across sounds and visual images presents evidence for the cross-cultural salience and consistent patterns of metaphorical thinking (Gallagher, 2005; Gibbs, 1994, 2003; Hopkins, 2000; Johnson, 1987; Kövecses, 2005; Lakoff, 1993; Lakoff & Johnson, 1980, 1999; Lakoff & Turner, 1989; Ramachandran & Hubbard, 2001; Wheeler, 2005; Yu, 2003). According to the *conceptual theory of metaphor*, we understand the world in metaphors which are basic, widespread, unconscious, systematic, deep-rooted and conventional. So-called "abstract" things, such as time, life, emotions, relationships, psychological processes, values (belonging to what is called the "target" domain) are typically *understood* (not just spoken of) in terms of "source" domains, which are basic bodily processes (e.g., body temperature, blood pressure, respiration), physical activities (e.g., eating), basic spatial orientations (up/down, right/left, front/back), and movement. For example, we think of the mind as a container, the angry person as a pressurised container, a relationship as a journey, happiness and success as up, sadness and failure as down, time as a moving object or observer, and so on.

Kövecses (2005) has discussed extensions of work in this area which move beyond the single focus on cross-cultural universals and explore also within-cultural, within-social and within-individual variations. To give some examples, whereas English, Chinese and Zulu all think of the angry person as a pressurised container, the English container is filled with hot fluid, the Chinese with gas (or *ch'i*), and the Zulu with emotion substance in the heart. While both Americans and Hungarians think of life as a journey, Americans most frequently think of it as a precious gift, and then as a game, whereas Hungarians most frequently think of it as a war or struggle, and then as a compromise. When we are conscious of ourselves as moving forward spatially (as when we are on a train journey), we map our own experience onto time, and think of time passing as a moving observer. But when we are stationary, we think of time passing as an object that moves towards us (Boroditsky, 2000; Boroditsky & Ramscar, 2002; Casasanto & Boroditsky, 2008).

In the field I discussed in the previous section, that of auditory warning design, it has been claimed recently that *metaphor* is the path of the future. According to Edworthy & Hellier (2006b), "Warnings as metaphors is the main growth area in the brave new world of sound chips, but there are a great many issues to be resolved before clear guidance can be given about which types of metaphors might be best for which types of application" (p. 201). The research in conceptual metaphor offers some promising and intriguing material concerning learning predispositions, associations, and the ability of users to draw upon these associations when using their own cues to attach meanings to so-called abstract sounds. For example, it addresses the question why some sound-concept mappings (e.g., increasing pitch to represent increasing temperature) are consistently judged to be appropriate, whereas other mappings (e.g., decreasing pitch to represent increasing size) elicit more variation in judgments of appropriateness (Walker, 2002, 2007; cf. Gibbs, 1994). Yet, despite important implications from this body of literature for the field of information representation, the material on conceptual metaphor remains a relatively untapped resource.

The second area of interest, whose connection to the first is not generally recognised, is that of nonconventional symbolic phenomena (included in category (2) in my earlier

classification of meanings). Such phenomena occur (whether individually or universally) in dreams, art, literature, music, myths, rituals, fairy tales, folklore, psychopathological symptoms, and so on. Nonconventional symbolism is variously described in the literature as *nondiscursive* (Bertalanffy, 1981; Langer, 1942), *nonlogical* (Turner, 1968), *condensation* (Sapir, 1959), or simply *symbol* (Saussure, 1916/1983). It is generally characterised as motivated, intuitive, involuntary and unconscious. Since this type of symbolism is, by definition, *not* set by convention, both what is a symbol and what the symbol means are therefore controversial. And the explanation of the occurrence of such symbolic phenomena is likewise contentious, and has been discussed and disputed at length, notably within philosophy (e.g., Cassirer, 1923/1953, 1925/1955, 1929/1957, Whitehead, 1927), anthropology (e.g., Lévi-Strauss, 1978; Skorupski, 1976; Turner, 1967, 1968), aesthetics (e.g., Gombrich, 1960, 1963, 1979; Jaffé, 1964; Todorov, 1982), humanistic psychology (e.g., Bertalanffy, 1965, 1981; Maslow, 1943, 1973) and psychoanalysis (e.g., Freud, *passim*; Jones, 1916; Rycroft, 1956; Segal, 1958, 1991). However, neither semiotics nor mainstream psychology has ventured into this area. For Saussure, since symbols are "motivated", they do not properly belong to a field whose core theme is the *arbitary* nature of the signifier-signified relation. For mainstream psychology, the investigation of nonconventional symbolism is readily left to the wild interpretations and subjective flights of fancy of the psychoanalysts.[17]

However, the Peircean concept of icon is relevant here. In a conventional icon, an object is selected to stand for another on the basis of some perceived similarity between the two. Both conceptual metaphor and nonconventional symbolism rest (albeit in a slightly different way) on the same similarity relations that are deliberately used in icon selection or construction. In conceptual metaphor we tend to think of the new, unfamiliar and secondary in terms of the old, familiar and primary. In nonconventional symbolism the primary remains our major focus of concern, but its unavailability causes us to take the next best thing as a substitute. As I have argued (Petocz, 1999), nonconventional symbolism or symbolic activity is a form of substitution; the symbol (whether isolated object, action, event or complex combination) stands in place of the symbolised, such that the person takes the symbol to be the symbolised, and acts in some way towards the symbol as if it were the symbolised. This process can operate consciously, unconsciously, or via a mixture of both, and anywhere along a socially-defined normal/pathological continuum. The common element is the unavailability of the symbolised, either because it is physically absent, or because it is unacceptable to one part of the person's mind (in which case there has been internal motivational conflict, sometimes followed by repression). Thus, nonconventional symbolism may be understood as a case of (usually unconscious) *motivated mistaken identity*; something is mistakenly taken to be something else, by virtue of its similarity or other associations with the symbolised.[18]

Now, since conceptual metaphor draws upon primary bodily and motivational experiences, and since the mistaken identity in nonconventional symbolism is *motivated* by the focus on what is primary, it is clear that a psychology of the signifying subject is particularly relevant in the case of these types of semiotic phenomenon. Far from seeing the

[17] But see Petocz (1999) for a counter to this view, and an attempt to use psychoanalytic theory to develop a systematic investigation of nonconventional symbolism which is consistent with the scientific realism of mainstream psychology.

[18] I have oversimplified here, since only *one part* of the mind is mistaken; the other (conscious) part can see clearly that the symbol is *not* the symbolised. For a fuller account see Petocz, 1999, pp. 159-160 & 233-4.

subject as a mere point of intersection in network of signifiers, we now need to have an adequately developed theory of the psychology of the subject which addresses such things as: the *ontogenesis* of symbols (how and why they occur); the *selection* of the symbolised (what exactly is *primary* and why); what determines symbol ubiquity and cross-cultural consistency, and what determines individual variation; how is the similarity (iconic) relation between symbol and symbolised itself subject to variations (e.g., in degree of obscurity, in changes across time); and what is the relationship between conscious and unconscious (nonconscious or implicit)[19] aspects of symbolism.

I remarked at the beginning of this paper that a semiotics-psychology integration does not *depend on* the return of Darwin into psychology, since (as I noted subsequently) the requirement of a cognising organism or person is imposed by the *logical* features of the triadic semiotic relation. *Now*, however, the need for a Darwinian evolutionary perspective follows from the requirement that our psychological theory of the subject elucidate the crucial distinction between what is primary for the human and what is derivative, for this distinction lies at the heart of conceptual metaphor and of nonconventional symbolism alike. This is obviously a *developmental* issue. The fact that the subject term of the signifying (and, thereby, cognitive relation) is an embodied, motivated subject suggests that what is symbolised is primary in terms both of development and importance. As William James put it:

> *My own body and what ministers to its needs are thus the primitive object, instinctively determined, of my egoistic interests. Other objects may become interesting derivatively* through association with any of these things, either as means or as habitual concomitants; *and so in a thousand ways the primitive sphere of the egoistic emotions may enlarge and change its boundaries*. (James, 1890/1950, p. 324, emphasis in original)

Freud, too, in his Darwinian-based, naturalistic elucidation of the psychodynamic origins and the economic functions of a wide range of symbolic phenomena, described the ego as "first and foremost a bodily ego" (Freud, 1923, p. 26). According to Wollheim (1982), what makes the thesis of the bodily ego interesting is "that it ties not just the mind to the body but the development of the mind to the development of the body" (p. 138). Freud maintained that motivational (instinctual) renunciation is always in exchange for a substitute. We never give anything up – "what appears to be a renunciation is really the formation of a substitute or surrogate" (Freud, 1908, p. 145). Along similar lines, the art historian Ernst Gombrich drew together conceptual metaphor and non-conventional symbolism. He argued that the pleasure derived from metaphors and symbols comes not, as Aristotle claimed, from the way in which they establish new linkages and make us see new resemblances, but from the way in which they indicate linkages not yet broken, reminding us of what are simply "very wide pigeon-

[19] Owing to the Freudian connotations of the term *unconscious*, the terms *nonconscious* or *implicit* are widely preferred in the experimental psychological literature, though they are used to refer *both* to the automatic perceptual and cognitive processes that are temporarily unattended to, *and* to those that are defensively kept out of awareness. Yet Freud's "descriptive" distinction between conscious and unconscious mentality (Freud, 1912, 1915, 1916/17, 1923, 1933), according to which "every mental process exists to begin with in an unconscious stage or phase" (1916/17, p. 295) is consistent with the realist relational view of mind (cf. Petocz, 1999, pp. 161-163). Supporting this relational or "epistemic" view, Freud asserts: "let us call 'conscious' the conception which is present to our consciousness and of which we are aware, and … an unconscious conception is one of which we are not aware" (Freud, 1912, p. 260). Thus, "every psychical act begins as an unconscious one, and it may either remain so or go on developing into consciousness" (Freud, 1912, p. 264).

holes" (Gombrich, 1963, p. 44; cf. Ehrenzweig, 1953/1965). He points out that we are always most comfortable when the new and unfamiliar bears resemblance to the old and familiar; the first railway carriages were made to look like stagecoaches, and the first electric lights like candelabras. In addition, "All art is 'image-making' and all image-making is rooted in the creation of substitutes" (Gombrich, 1963, p. 9). With respect to the nature of the substitution, the stronger the motivation, the less stringent the requirement for formal similarity. Indeed, similarity of function can be more compelling than similarity of form: "substitutes reach deep into biological functions that are common to man and animals - a child ... will reject a perfectly naturalistic doll in favour of a monstrously abstract dummy which is 'cuddly'" (Gombrich, 1963, p. 4).

Of course, in conceptual metaphor, just as in *non*conventional symbolism, there is, by definition, no deliberate selection for communicative or indicative use, as there is in the Peircean concept of icon. Nevertheless, like expressive symptoms (e.g., blushing) and natural indices (e.g., footsteps in the sand), nonconventional symbolism is *naturally indicative* and thus *incidentally* or *inadvertently communicative*; it can be "read" on analogy with communications that are deliberately made. Thus, iconicity in the Peircean sense is the link between conceptual metaphor and nonconventional symbolism, and justifies the inclusion of the latter within a classification of semiotic phenomena. More importantly, the unification of these two fields offers a rich and promising source of material for dealing with the kinds of meaning phenomena (metaphor, art, music, dance, nonverbal communication, creativity, etc.) that are beginning to find a place in mainstream psychology as legitimate subjects for investigation. This raises the question of the appropriate methods for such investigations, and leads into the final contribution of a realist semiotics-psychology integration.

Promoting Increased Methodological Sophistication by Underscoring the Scientific Legitimacy of Nonquantitative Methods

With respect to the question of method, it is the qualifier “realist” in the semiotics-psychology integration that prepares the way. It does this via two steps. First, realism exposes the scientific inappropriateness of mainstream psychology’s exclusive preoccupation with *quantitative* methods. Secondly, by extricating *qualitative* methods from their typical antirealist and antiscientific metatheoretical contexts, realism resolves the problem of the so-called "crisis" or "dilemma" of qualitative methods. Once these two steps have been taken, the "semiotics" part of a realist semiotics-psychology integration takes over. Incorporating semiotics not only underscores the scientific legitimacy of nonquantitative methods, but also directs psychology’s attention to the development of specific methods appropriate for the many different types of nonquantitative, including semiotic, phenomena.

Let me consider the first preparatory step, that of how realism exposes the inappropriateness of psychology's exclusive concern with quantitative methods. I mentioned earlier that mainstream psychology's combination of scientific practicalism and metatheoretical confusion has resulted in measurement and quantitative practices that are at odds with the realism to which psychology is explicitly committed. They are also at odds with the realism of those natural sciences (e.g., physics) that psychology attempts to follow. This theme has been most thoroughly and cogently explored in the work of Joel Michell over the last decade or so (e.g., Michell, 1997, 1999, 2000, 2001, 2003, 2004, 2009, 2010). To

summarise Michell's arguments, psychology's commitment to the "quantitative imperative" (the view that measurement is a necessary condition of science) has led to an approach to measurement and quantitative methods which constitutes a "pathology of science", a form of "methodological thought-disorder" (Michell, 1997). This involves a two-stage breakdown in scientific practice. At the first stage, the underlying empirical hypothesis that the psychological attribute being assessed is quantitative is not subject to empirical test. In other words, psychology merely *assumes* that its variables of interest (abilities, intelligence, attitudes, personality traits, etc.) are indeed quantitative and hence measur*able*. At the second stage, this failure to test the empirical hypothesis is then *disguised*. The disguise is effected by abandoning the classical realist definition of measurement which informs measurement in the physical sciences, namely, that measurement is the "assessment of the magnitude of a level of an attribute via its numerical relation (ratio) to another level of the same attribute (the unit selected)" (Michell, 2001, p. 212). In place of this realist definition, which faithfully reflects the fact that measurement *requires* quantitative structure, psychology has adopted its own special definition of measurement (following S. S. Stevens, 1946), according to which measurement is the "assignment of numerals to objects or events according to rule". This nonrealist, operationist definition of measurement allows psychologists to claim to be measuring any variable of interest, regardless of whether or not it actually has a quantitative structure; psychologists can *make* something quantitative simply by throwing numerals at it. The two-stage breakdown in scientific practice is then reinforced by the social and economic benefits of psychology's marketing itself as an applied science, and is propagated within the various psychometrics and research methods curricula in the teaching institutions. Thus, "the way in which psychometrics is currently typically taught actually subverts the scientific method" (Michell, 2001, p. 211).

The extent to which psychology's "methodological thought disorder" remains unconsciously entrenched within the mainstream is illustrated in Osbourne's (2010) recent paper "Challenges for quantitative psychology and measurement in the 21st century". This is the opening article in a new popular journal called *Frontiers in Psychology* (the kind of journal mainstream psychologists might read). The author lays down the gauntlet, claiming that one of the greatest challenges for quantitative psychology lies in "demonstrating in a convincing way that quantification of behavioral, cognitive, biological, and psychological processes is valid" (p. 1). He calls for scientific psychologists to "redouble their efforts to convince the community of consumers of science that our numbers really represent what we assume or propose that they represent", for "At stake is nothing less than the integrity and future of our field" (p. 1). He warns that "To blindly accept the dogma of the field without scholarly examination is to diminish what we do" (p. 1); instead, "We must be vigilant, as researchers ... to continue questioning and examining our tacit assumptions" (p. 1). For instance:

> At this, the dawn of the 21st century, there are remarkably promising signs. Researchers are beginning to understand that strict null hypothesis statistical testing (NHST) is limiting and provides an incomplete picture of results. More journals now *require* effect sizes, confidence intervals, and other practices one might argue are well overdue. (p. 2, emphasis added)

Osbourne continues: "We have ways of understanding measurement that allow us to create ever more sophisticated quantification of human attributes and behaviors. Truly, this is a wonderful time to be a quantitative researcher" (p. 2). The failure to test assumptions, he says, "troubles me, and I hope it troubles you" (p. 3). Finally:

> The world doesn't need another journal promulgating 20th century thinking, genuflecting at the altar of $p < 0.05$. I challenge us to challenge tradition. Shrug off the shackles of 20th century methodology and thinking, and the next time you sit down to examine your hard-earned data, challenge yourself to implement *one new methodology* that represents best practice. Use Rasch measurement or IRT rather than averaging items to form scale scores. Calculate $p_{(rep)}$ in addition to power and *p*. Use HLM to study change over time, or use propensity scores to create more sound comparison groups. Use meta-analysis to leverage the findings of dozens of studies rather than merely adding one more to the literature. Choose just one best practice, and use it. (p. 3, emphasis in original).

I have quoted substantially from this paper in order to illustrate the overwhelming irony in its message. The failure to test assumptions does indeed "trouble" me, and it ought, as Osbourne urges, to trouble any scientific psychologist. But *which* assumptions? Some of our assumptions about quantitative psychology rest on other, deeper, assumptions. If we fail to recognise and examine those deeper assumptions, and if those assumptions turn out to be indefensible, then "a great deal of psychological research might well rest on philosophical quicksand" (Green, 1992, p. 292). In Osbourne's enthusiastic rallying of the quantitative troops, there is no awareness of the widespread failure to recognise, let alone test, the *basic* assumption underlying psychological measurement in general. Nor is there any apparent awareness that the "promising signs" at the dawn of the 21st century were already presented and discussed nearly a century earlier, sometimes even by those who invented the techniques.[20] There is no awareness of the invalidity at the heart of psychology's concept of psychometric test validity (Michell, 2009). There is no acknowledgment that the altars of effect sizes, confidence intervals, Rasch measurements, etc. are no more deserving of genuflection than that of $p < 0.05$. If this paper is not some quantitative psychologist's attempt to replicate the Sokal hoax, then it is worrying indeed.[21] With respect to semiotics, the danger of the whole quantitative enterprise is that meaning phenomena either remain neglected or become distorted and misrepresented (quanti*fied*) via the ubiquitous mainstream incantations of quantification.

The second preparatory step offered by realism is to allow mainstream psychology to extricate qualitative methods and, hence, semiotic phenomena, from their typical antirealist and antiscientific ideological and metatheoretical contexts, and thereby to solve the major acknowledged problem within the qualitative movement. The flip-side of psychology's obsession with quantification is its prejudice *against qualitative* methods. Yet this is also at odds with psychology's explicit commitments to realism and science. It will be recalled that a thoroughgoing realist approach gives the lie to the science/meaning divide and, along with it,

[20] For example, Neyman & Pearson (1933) state quite clearly that, in terms of the nature of scientific evidence, there is nothing to be gained in a *single* piece of research by performing a statistical analysis and computing a *single p*-value. That is, there is no point at all to how we routinely perform statistical analyses in single experiments (cf. also Halpin & Stam, 2006).

[21] The fact that the author has recently published a book entitled *Best Practices in Quantitative Methods* (Osbourne, 2008) suggests that this paper is *not* a hoax.

to the methodological dichotomisation between causal explanation and hermeneutic inquiry. It follows that there is no need for mainstream psychology to convert to postmodernism, or become Janus-faced with respect to science by virtue of using both quantitative and qualitative methods. For there is no necessary connection between qualitative methods and the postmodernist ideologies in which they are so often packaged. Hence, the link between semiotics and postmodernist antiscience is *not* required by a focus on qualitative methods. Michell (2001) commends the recent reinvogoration of qualitative methods, but he finds it:

> not a healthy sign that its advocates tend to see the quantitative/qualitative distinction as philosophical rather than empirical. Thus, the quantitative approach is demonised as positivistic and the qualitative is praised as post-positivist, or even postmodernist … Seen from this standpoint, advocates of the qualitative approach are as much guilty of a priorism as the psychometricians they oppose. (p. 216)

It is indeed a problem that the advocates of qualitative methods think that the choice of method depends on their prior philosophical or ideological position (e.g., "I am an antirealist, so I do qualitative research", rather than "This is not a quantitative issue, so I shall use qualitative methods to investigate it") (cf. Bryman, 1988). Even in those mainstream psychology departments (usually in the newer institutions) that are willing to teach qualitative methods, these methods are *not* appropriately contextualised within a single, overarching "scientific research methods" course. Instead, they are usually taught by non-experimental psychologists, marginalised by the mainstream, who are ideologically committed to relativist or constructionist approaches. Sometimes they are taught by those who disagree with postmodernist ideology, but who nevertheless feel that they have to present qualitative methods faithfully in their antirealist contexts. Sometimes they are taught reluctantly by "ring-ins" from the mainstream, who take the opportunity to ridicule the methods on the gounds of their lack of objectivity and their failure to meet accepted scientific standards. And sometimes they are eagerly promoted by teachers who are determined to avoid at all costs the dreaded statistics and quantitative data analyses. But the point is that, overall, qualitative methods, whether they are welcomed, merely tolerated, or actively disliked, are just as much misunderstood and mistaught in psychology as are quantitative methods. In contrast, realism shows that:

> Quantitative structure is but one kind of naturally occurring structure amongst indefinitely many… if qualitative methods are to find the place they deserve within the mainstream curriculum, then it will be because mainstream psychologists realize that these methods do not threaten psychology's scientific credentials … *when scientific method is correctly understood*, this alleged threat evaporates … what must be stressed is that *the traditional, realist conception of scientific method entails methodological flexibility*. (Michell, 2004, p. 317, emphasis added)

Thus, "the fixation upon quantitative methods that characterizes modern psychology really has no justification given the realist understanding of science" (Michell, 2004, p. 307), and it is *antiscientific* for psychology to continue to insist that quantitative methods are somehow more scientific than are qualitative methods.

In bringing qualitative methods under the umbrella of scientific research in general, realism helps to solve the major problem in the qualitative movement. This problem has

emerged as the "crisis of representation" (Denzin & Lincoln, 2000) or the "dilemma of qualitative method" (Hammersley, 1989). This crisis is the *assumption* that qualitative researchers can directly capture the "lived experience" of their participants, as it is naturally, while simultaneously being committed to an antirealist philosophy which rejects naturalism. Similarly, what Hammersley (1989) labelled the "dilemma of qualitative method" is described as "its simultaneous commitment, on the one hand to realism and science (by claiming to reflect objectively the participants' accounts and perspectives) and, on the other hand, to constructionism through a recognition of the multiple perspectives and subjectivities" (Pidgeon, 1996, pp. 80-1). Of course, the *real* basis of this crisis lies in tension between *implict methodological realism* and *explicit philosophical antirealism*.

Let me illustrate this tension from the qualitative literature itself. On the one hand, within the qualitative movement, antirealism is the central explicit tenet in the broad *philosophical approaches* (the "paradigms" (Lincoln & Guba, 2000) or "axiomatic positions" (W. Potter, 1996) of social constructionism, phenomenology, symbolic interactionism, hermeneutics, structuralism, post-structuralism, ethogenics, etc.). Realism and objectivism are explicitly rejected in the statements of philosophical or ideological approach. For example, according to J. Potter (1996), the single family resemblance across qualitative approaches is the fact that "they all tend to be oppositional movements of one kind or another to traditional social science positions, and, in particular, *to their realist assumptions*" (p. 127, emphasis added). We are told that meanings cannot exist independently of the interpreter, interpretations provide not truth but perspective, meanings are negotiated mutually in the act of interpretation, rather than discovered, and there is never a finally correct interpretation.

On the other hand, these principles are gainsaid, and realism and objectivism are implicitly *assumed*, as soon as the *specific* qualitative *techniques and methods* are employed in the research (grounded theory, discourse analysis, ethnography, participant observation, protocol analysis, case study, narrative analysis, etc.). Thus, for example, while the "procrustean" quantitative "psychometric trinity" of validity, generalizability and reliability is explicitly criticised and rejected, nevertheless, there are qualitative versions of these same concepts, such as credibility (internal validity), transferability (external validity), dependability (reliability), confirmability (objectivity) (Lincoln & Guba, 2000). The aim of qualitative techniques is to "*uncover* the meanings of events in individuals' lives" (Janesick, 2000, p. 394, emphasis added), and to do so in such a way as to not "overwrite internally structured subjectivities with *a-priori* systems of meaning, as occurs, for example, with standard survey instruments" (Henwood, 1996, p. 27). According to Flick (2002), discussions in qualitative research are "motivated by the aim to do more justice to the objects of research than is possible in quantitative research" (p. 8). In sum, "the whole philosophy of much qualitative research is founded upon an explicit move towards increased validity" (Pidgeon, 1996, p. 84). Not only is the aim increased validity, but also possible biases (which themselves would be inconceivable if there were nothing there to distort) must be carefully monitored, and qualitative versions of validity checks must be applied (cf. Flick, 2002; Stiles, 1993). That is, "a person involved in studying a phenomenon qualitatively must be sure that *the data represent the phenomenon of interest*" (Teddlie & Tashakkori, 2003, p. 39, emphasis added).

The incoherence that results from this tension is illustrated in the statement by Lincoln and Guba (2000):

> There are fairly strong theoretical, philosophical and pragmatic rationales for examining the concept of objectivity and finding it wanting … But validity is a more *irritating* construct, one [not] easily dismissed … [because it is concerned with the question] are these findings sufficiently authentic … that I may trust myself in acting on their implications". (p. 178)

This is clearly what led W. Potter (1996) to be "bothered by the seeming lack of correspondence between what qualitative theoreticians prescribed and what practicing qualitative researchers did" (p. 234). He notes that "researchers must realize that some of the prescriptions cannot be followed" (p. 327).

The proponents of qualitative methods do not consider realism as the way out of the "crisis" or "dilemma". Consequently, their proposed solution, in the form of pragmatism as the dominant paradigm for the "mixed methods" research promoted by the "third methodological movement" (Tashakkori & Teddlie, 2003) simply exacerbates the situation by perpetuating the same confusions. Consider some of the supposed benefits of adopting pragmatism to implement the "fundamental principles" of a mixed methods approach. First, we are told, "Pragmatism avoids the use of metaphysical concepts (e.g., "truth", "reality") that have caused much endless (and often useless) discussion and debate" (Teddlie & Tashakkori, 2003, p. 21). Next, we are told, one of the fundamental principles is that "Data collection procedures are independent of data analysis techniques … Collected data may be *transformed* at any point … and may be analysed both quantitatively and qualitatively" (Tashakkori & Teddlie, 2003, p. 696, emphasis added). In other words, one can *quantitize* qualitative data and *qualitize* quantitative data (Teddlie & Tashakkori, 2003, p. 9) – in accordance with the thesis that "the difference between quality and quantity is not a difference in nature, but a difference in our conceptual schema – in our language" (Carnap, 1966, p. 58). This antirealist *conventionalism* is then contradicted in the very next "fundamental principle" of mixed methods research, which is that: "If the data do not *represent the theoretical phenomena or the attribute* under study, then nothing else in the design of the study matters" (Tashakkori & Teddlie, 2003, p. 696, emphasis added). For, under the Carnapian conventionalism and "principle of tolerance", the data must *always* succeed in representing the phenomena, for they do so by *fiat.*[22] The possibility of their *not* doing so is allowed only by realism; only a realist approach locates quality and quantity as real features in the structure of real situations, such that we *cannot* simply *change* a quality into a quantity (or vice versa) by what we do with numbers or with words by way of *representing* those features.

Of course, the real problem here is that proponents of qualitative research do not realise that a thoroughgoing realism, with its conception of reality as consisting of complex and contextualised situations, and its broader conception of science, is perfectly well suited to acknowledging and dealing with layers of meaning, multiple interpretations, social constructions, subjective perspectives, data uncertainty, cognitive fallibility, etc. As long as the conception of science and realism are appropriately broad and flexible, there is nothing at all to be lost by adopting them for qualitative research, and everything to be gained - for the result is dissolution of the tension between what is practised (method) and what is preached (philosophy). Therefore, the "methodologically aware eclecticism" argued for by

[22] Just as the variables "measured" in quantitative psychology are rendered "quantitative" by the measurement operation.

Hammersley (1996, p. 174) does *not* require the "full range ... of philosophical assumptions" (p. 174); it requires only realism.

To sumarise so far, two preliminary steps have been taken. The first step, keeping faith with mainstream psychology's explicit commitment to realism, uses that realism to expose the scientific inappropriateness of mainstream psychology's exclusive and distorted preoccupation with quantitative methods. The second step uses realism to extricate qualitative methods from their typical antirealist and antiscientific metatheoretical contexts, simultaneously solving the major "crisis" of those methods. Once it is accepted that quantitative and qualitative methods are equally legitimate within a realist science, albeit determined empirically by the nature of the subject matter under investigation, the way is prepared for further increased methodological sophistication within mainstream psychology.

The empirical determination of specific methods - what qualitative researchers, and those supporting the pragmatism of mixed methods call the "dictatorship of the research question"[23] (Tashakkori & Teddlie, 2003, p. 679) - extends beyond the recognition that nonquantitative methods are scientifically appropriate into the determination of *which particular nonquantitative* method is to be used. And clarity and rigour are just as possible here as they are in the case of quantitative methods, for qualitative variables and systems will also have some kind of structure, such that they can be investigated mathematically. As Michell reminds us, the concept of quantity is not coextensive with mathematics:

> If mathematics is thought of as the science of abstract structure, and it is recognised that quantitative structures constitute but one species of abstract structure, then it can be seen that some structures studied in mathematics (e.g., logical structures, network structures, language structures are nonquantitative. (Michell, 2001, p. 212)

> Since it is not a foregone conclusion that psychological attributes will be found to be quantitative, the student of psychometrics must also know something of alternatives to quantitative structure, such as the various set-theoretical, graph-theoretical, algebraic, logical, and grammatical structures. Of course, there are an infinite number of possible alternatives and, so, above all, the student should learn to explore novel, empirical structures. (Michell, 2001, p. 216)

Once *semiotics* is brought into the realist psychology picture, methodological expansion and variety become the order of the day. It is reasonable to expect that, given the triadic signifying relation, and its embedded cognitive relation, semiotic structures in general will include a mixture of more specific causal, logical, semantic, and categorial structures. And which specific structures are involved will also depend on which category of meaning (in terms of my earlier classification) is involved, and what particular question concerning them is at issue.

There is no doubt that qualitative research is centrally concerned with meaning. The reinvigoration of qualitative methods has been associated with a “meaning revolution”. Recall Shank’s claim that the “Age of Science” is winding down and the “Age of Meaning” is picking up. Across the entire range of qualitative approaches, the talk is not of "quality" but of "meaning". To illustrate, Pidgeon (1996) identifies the qualitative focus as "the meaning of

[23] The choice of the word “dictatorship” is significant, for it echoes the widespread postmodernist conflation of the concepts of truth and objectivity with the ideology of political oppression, and, hence, the conflation of realists with authoritarians.

experience and behaviour in context" (p. 77). According to Henwood (1996), "qualitative research lays down its claim to acceptance by arguing for the importance of understanding the meaning of experience, actions and events as these are interpreted through the eyes of particular participants, researchers and (sub)cultures" (p. 27). W. Potter (1996) claims that its aim is to investigate "how humans make meaning of their worlds" (p. 27), that "qualitative research focuses on meaning making by humans and this meaning is seen best through examining the symbols and language" (p. 67). In general, we must "Look for meaning, the perspectives of the participants in the study" (Janesick, 2000, p. 387). Everywhere, the term "qualitative" is taken to mean "having to do with meaning".

Clearly, this type of meaning is the "existential" or "experiential" meaning belonging to category (4) in my earlier classification of meanings. But, as the survey of semiotic phenomena revealed, there are several *other* categories. Of course, experiential meanings are typically investigated via data from the remaining categories - that is, conventional signs and symbols found in spoken and written text, nonconventional linguistic and symbolic phenomena, indicative and expressive behavioural signs and symptoms, and combinations of these. But the semiotic phenomena belonging to these other categories can also be subjects of investigation in their own right. And qualitative inquiry may be concerned with many different questions relating to any of the three terms of the triadic semiotic relation within these semiotic phenomena.

For example, research focus may be directed solely at the structure of the signifier or set of signifiers in conventional signs. While this is similar to the earlier concerns of linguists and structuralist semioticians, it can be extended into areas not typically considered to be part of such programs. Meunier (1998) points out that semiotics was always defined as "the science of signs *in whatever form it took*" (p. 806). Therefore, iconic languages, as complex semiotic systems built out of forms, shapes, graphics, etc., may also be investigated systematically, using the concepts of carriers, generic features, categories, operations and rules. Meunier's work on the non-linear categorial structure of iconic languages, such as the TCS (Traffic Circulation Signs), illustrates how a system of conventional iconic signifiers can be investigated in terms of its grammar and algebraic structures. This type of approach lends itself to extension into the investigation of dance, music, choreography, art, etc. Alternatively, the research focus may be directed at the signifier-signified relation, with appropriate recognition of the psychological role of the third term, the cognising subject. For example, within the field of knowledge representation, the similarity relation that lies at the basis of the iconicity bridge between conceptual metaphor and nonconventional symbolism can be used to inform more successful matching of signifier and signified. According to Don Norman (personal communication), the best pairings are those which adopt a quantitative (additive) signifier for a quantitative signified, and a qualitative (substitutive) signifier for a qualitative signified. This explains why the typical use of hue to represent quantity in medical and other scientific diagrams fails; brightness or saturation would be superior. A quite different research avenue might be taken by those interested in mixed semiotic phenomena, who are willing to venture into the murky waters of unconscious signification and its relation both to conscious signification and to physiological indices. For example, the work of Howard Shevrin and colleagues (Shevrin, 1995; Shevrin et al., 1996) uses mixed methods (recorded interviews, psychoanalytic assessment, linguistic and behavioural analysis, subliminal and supraliminal word presentations, analysis of physiological brain responses, etc.) to investigate the role of unconscious meanings, conflicts and defences in both clinical and nonclinical populations.

Obviously, as Michell (2001) notes, there are an infinite number of possible alternatives to quantitative structure, and so the mainstream psychological researcher, no less than the student of psychology, should be prepared to explore novel empirical structures and appropriate ways of investigating them. Indeed, psychology's methodological expansion and increased sophistication will be limited only by the imagination and skills of its researchers.

SUMMARY AND CONCLUSION

According to Geertz (1973/2003), following Max Weber: "man is an animal suspended in webs of significance he himself has spun" (p. 145). I have argued that what *seems* to be the problem in recent attempts at semiotics-psychology integration is not the genuine problem, and that we must re-think the place of semiotics in psychology. The "dialogue" to be established between semiotics and psychology will not be any of the three possibilities entertained by those who complain of lack of progress; it will not be that of symbol-processing explanations of human cognition, nor that of locating psychology within postmodernist conceptions of the human sciences. Much less will it be the unification of these two, as envisaged by Deacon and others who bemoan the lack of a unifying semiotic theory of information. Instead, successful integration will come by taking seriously mainstream psychology's explicit commitments to realism and to science, and exploring the possibilities from within a thoroughgoing realism. The resulting semiotics-psychology integration offers clarification (in identifying the irreducible triadic relation of meaning), redirection (in extricating the legitimate concerns of the field of information representation), both clarification and redirection (in applying the Peircean distinctions to problems in information representation research), unification (in using iconicity as the bridge between conceptual metaphor and nonconventional symbolism), and expansion (in promoting increased methodological flexibility and sophistication). No doubt this is just a start, and there are many other areas of application to be explored along with attention to novel nonquantitative structures and methods for investigating them. To return to the question I posed at the outset, I hope I have shown that there are compelling reasons for mainstream psychologists to now actively embrace a closer integration with semiotics.

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Chapter 5

HOW ISRAELIS REPRESENT THE PROBLEM OF VIOLENCE IN THEIR SCHOOLS: A CASE STUDY OF A DISCURSIVE CONSTRUCTION[1]

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ABSTRACT

This paper analyzes how 'the problem of school violence' is causally represented in Israeli newspapers. Common propositions are uncovered about the causes for this widespread social problem and, as such, they are understood to constitute a relative and site-specific, but nonetheless empirically legitimate, representation of this particular Israeli discursive construction. This approach is semiotically adopted in opposition to many others that tend to speak of 'discursive constructions' in very general ways. In contrast, regular causal attributions that constituted 'talking about Israeli school violence' are documented based on their emergence from within a long term study of three Israeli newspapers. They are then also explored as they are reflexively interrelated in Israeli cultural terms. That is, they are considered in terms of how they are supported and/or challenged by Israeli ideological beliefs. Reflexive relations of constraint, support and opposition are then investigated by looking at the internal dynamics of the causal propositions that constitute this construction in relation to others in Israel today. In this way, the general link between regular linguistic practices and cultural ideology is explored in this particular case study. It is proposed that this specific case study has implications for the general cross-cultural study of discursive ideological constructs both practically and methodologically. The study then documents a second-order, indexical

[1] I wish to thank Asif Agha and Stanton Wortham for organizing the panel at the 2002 Annual Meeting of American Anthropological Association of which this paper was a part. I am also indebted to Judith Irvine for her thoughtful comments on my paper as well as to my co-presenters for what turned out to be a very intellectually rewarding experience. Their work in conjunction with the many discussions that followed the session, as well as those from my various presentations of this material since that original date, have clearly improved the quality of my analysis and I am grateful to all.
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system that links (and strengthens) causal attributions about the problem of school violence in Israel to a (relative) speaker's/writer's conservative vs. liberal political identity. The study then closes with a discussion of some of the general methodological and theoretical implications drawn from this semiotic case study.

INTRODUCTION

In an area of the world known for and perhaps for some even defined by its explicit violence, it is perhaps not surprising to learn that the secular school system in the State of Israel has the highest rate of youth violence in the world.[2] This problem was recently deemed so troubling in fact that the Israeli government launched a nation-wide media campaign in an attempt to alleviate it. This paper focuses on this 'problem of school violence' as it is discursively constructed in Israel's newspapers on a daily basis.[3]

Verbal practices, like all other cultural practices, display different kinds and degrees of regularity. More specifically, there are relatively shared ways in which verbal practices refer to objects, index into existence contextually-defined social interactional 'realities' and denote ideas in both conceptual and propositional form. It is known that these linguistic functions overlap in a myriad of ways in any particular instance or type of language use (Jakobson 1960, Silverstein 1993). Here however, at least at first, the focus will be on the denotational contribution to a Hebrew language practice found in Israel today: 'talk about the problem of school violence in Israel'.[4] That is, the analytical focus will be on one aspect of what has been called a 'discursive construction' (Foucault 1980, Woolard 1991). What, however, are the component parts of a discursive construction?

A discursive construction is in part composed of the relatively shared set of propositions uttered when engaged in a verbal practice of talking about an abstract concept or idea, such as the 'the problem of school violence in Israel'. In studying a discursive construction from this perspective, the search is thus for the relatively regular component propositions that constitute it. These include not only the regularly repeating propositional statements that enact the practice, but also any regularly repeating models, analogies, theories and/or ideologies that are either explicitly stated or implicitly present within its enactment (cf. the discussion and approaches found in Gal 1992; Schaffner and Kelly-Holmes 1996; Schieffelin and Woolard 1998; Silverstein 1992; Woolard 1991; Woolard and Schiffelin1994). Moreover, as we will see, though all such constituent parts of the practice from this denotational perspective are propositions, some of these regularly repeating components are propositions with more local relevance to the particular topic (i.e. in this case, something like, 'The schools are at fault').

[2] This was reported as a cover story in Israel's most popular daily newspaper, Yedioth Achronot, on December 28, 2001.

[3] It should be pointed out that there are distinct educational systems in Israel for religious Jews as well as for the various religious groupings of so-called 'Israeli Arabs'. Arguments here about the discursive construction of the problem of school violence relate only to the secular educational system for Jewish students.

[4] As mentioned above, denotational function overlaps with all others in linguistic practices. 'I liked your article' is among many other things, however, interpretable as a denotational proposition – that is, as a statement of fact. Its regular (indexical) function as a compliment, however, would in most contexts make its denotational function a highly presupposed part of the interpretive background at best (i.e. one wouldn't respond to it by saying, 'Yes, you did'). What distinguishes the practice being studied here, and in part motivates the opening theoretical approach to it, is that instances of it are often interpreted as factual, denotational propositions given the framing of the practice itself as typically argumentative (cf. Jakobson 1960, Silverstein 1985).

Others are more broadly based ideological propositions. They have a more general causal relevance in that they are more widespread beliefs in society and, as such, appear more frequently in very different kinds of discourse (i.e., in this case, something like, 'Modern Israel is falling apart') (cf. Urciuoli 2003).

This particular analysis of a contemporary discursive construction in Israel has a number of interrelated goals. First, the paper will document a 'single' discursive construct as it relates to a specific, normatively established verbal practice (cf. Blommaert and Verschueren 1998). This approach exists in contrast to other approaches in which the analyzed discourses are themselves quite abstract and often problematically related to specific verbal practices (Bell 1991). Second, though only a case study, the results here are intended to contribute to our general knowledge of how discourse and ideology are reflexively interrelated in human cultural practice. Third, the approach here will be contrasted with more commonly found indexical approaches to discursive constructions that interrelate abstract discourses and locate them at the intersection, typically, of identity and/or power (Dijk 1985; Howarth 2000; Kress 1985; Myhill 2001; Seidel 1985; Wodak 1996, 1997). This will entail documenting a very particular kind of indexical functioning that overlaps at a second order of analysis with the denotational one focused on in the earlier parts of this paper. It will also be reflected in an attempt to demonstrate, and draw lessons from, how denotational and indexical approaches to discursive constructions reflexively complement each other.

The approach here will draw on a semiotic approach to the nature of 'discourse' (i.e. Agha 2003; Parmentier 1985, 1997; Peirce 1955; Sherzer 1987; Silverstein 1976, 1985, 1993, 1996, Urban 1991). While the introduction above makes this theoretical preference clear, the more pressing concerns at present are methodological.

METHOD[5]

Any attempt to study a discursive construction is quickly forced to face a series of related methodological issues. Where do individuals in any society learn the propositions that at least partially unite them within a presupposable discourse practice, such as one about 'school violence'? This is clearly a relevant question when one realizes that quite often individuals have not experienced the object of the discourse directly, but rather only instances of the discourse itself. What then orients them to recognize the practice itself and thus to know what the conventional modes of denotational participation in it are? More specifically here, where is one to look in order to collect propositions about the problem of school violence in Israel? Why are the mass media and particularly the newspaper being identified in this case as an interesting site to collect instances of this practice?

Explicit propositions about 'the problem of school violence' are quite common in the Israeli mass media. Indeed, an argument could be made that the mass media plays a central role in creating the discourses that give birth to 'social problems', such as school violence.

[5] At the core of this study there lies an analysis of particular newspaper texts over a two year period (2000-2001). Over that same period, however, the author lived and worked in Israel. He lived in a northern city, Karmiel, and for part of that period commuted to Jerusalem. These were the sites of the two 'local' newspapers used in this study. He also had a child attending a secular school in Israel and was involved in various ways in the local school system. Here and throughout then, aspects of the argument also rely on ethnographic field notes relating to the general subject matter of this study.

Here however the mass media in Israel need only be assumed to be a societal institution that is influential in contributing to the focal discursive construction. That is, it need only be assumed to be a site at which the focal propositions are at least in part learned. This turns out to be a relatively easy assumption to justify in the Israeli case.

Consider the following relevant facts.[6] General rates of participation in the mass media are quite high in Israel. In addition, news shows are typically the most watched programs. As it is a small nation, in which the same newspapers, magazines and television and radio shows are available to essentially the entire population, the agendas and issues across the various media repeat with great frequency. These facts in conjunction with the high rate of literacy and newspaper readership in Israel justify at least in part the selection of the newspaper as the 'site' of this study. This site is further justified when one reflects on how different kinds of newspapers and the different genres within them reflect a microcosm of the different kinds of cultural framings in which the focal propositions are found. That is, all be them in written form, objective reports, short factual notices, op-ed pieces and letters to the editor constitute genres that reflect and sometimes even directly and indirectly cite or quote a wide variety of socially-located positions on the problem.

In order to get a wide variety of instances of propositions, several additional steps were taken. First, four different newspapers were surveyed over roughly a two-year period. Second, the newspapers themselves were selected to vary by type. They included the most popular national newspaper, an urban religious newspaper, a national literary/intellectual newspaper and a local urban newspaper.[7] Third, within these newspapers, all genres of newspaper articles were read. It is with all of the above reasons in mind then that the newspaper was selected as a justifiably significant and interesting 'site' at which to collect instances of the discursive practice under investigation.

What then was the actual data for this particular study? If by a discursive construction one means ideally, as we do at first here, regularly repeating propositions from within any and all 'talk about school violence', wherever and however it occurs, another problem becomes immediately apparent. This problem is a general one that exists no matter how broadly or narrowly one defines the sites for finding instances for any particular discursive construction. Even within the world of newspapers, propositions about the problem of school violence know a virtually unlimited number of contextual framings for determining 'types of talk'. Types thus multiply very quickly when looking at the data returned by the methods described above. Consider only a few possibilities: A local factual account that merely reports that one student attacked another and gives details about the school, city and students involved; the details of a particular incident reported from a soccer match; an historical perspective on the Israeli case based on histories of school violence in other areas of the world; and an argument that accounts for the problem based on general principles of human behavior and then appends to it a list of proposed solutions. All of these include many propositions about the problem of school violence and, as such, participate in its discursive construction. On the

[6] Though available in numerous places, the relevant facts here were taken from an online site run by the Israeli government (http://www.mfa.gov.il).

[7] The specific newspapers studied were read from cover to cover on Fridays as these issues were longer and tended to review, in any event, the major stories covered during the previous week. The papers included in the study were: Israel's most popular newspaper, Yedioth Achronot, the left-leaning intellectual newspaper, Ha'Aretz; ; a conservative religious newspaper based in Jerusalem, HaModi'a; and a local urban newspaper in the Northern Galilee, Kol Karmi'el.

assumption, however, that there is a normatively established verbal practice here, how then, in the face of this abundance of propositional classes, is one to uncover those propositions that play a regular role in it? What, that is to say, do people know they can say about this issue and still feel that they are talking about it in conventional ways?

The argument about how to narrow down this prohibitively long list of propositions was guided by two facts that characterized the data itself. Both return us to the notion that we are in search of regularly repeating, or common, propositions in the data. First, emanating from at least the world of newspapers, it was very common to find propositions that either explicitly stated or unproblematically presupposed (based on their contextual framing) the idea that school violence was a social problem. This fact not only defines the verbal practice in part, but it in large part accounts for why they were relevant items for newspapers in the first place. Second, being a social problem, causal explanations for school violence were a very commonly found type of proposition in the data. This is an empirically based assumption upon which the rest of this study relies. Though of course such propositions had many overlapping indexical functions in the written contexts that framed them, the propositions defined as focal in this study were isolated out as such because their causal framing was either explicitly stated in the proposition itself or implicitly found in its framing. So given propositions found within a report of a violent school incident, an explanation or account for such troubling stories, or an op-ed piece debating solutions to the problem of school violence – to name but a few of the many types of framings – every causal proposition about the problem of school violence in Israel was located in the data and recorded. Thus, at this first level of analysis, the linguistic data on which this study was based were the written causal accounts for the problem of school violence that were found in all genres of newspaper articles across four different Israeli newspapers over a two year period. At this ground level of the argument, the methods of this study produced a list of nearly 5000 propositions. These written propositions were thus understood to form the ground level data that constituted this particular discursive construction. For the reasons detailed below, however, they were not the primary focus of the analysis carried out.

What was analytically done with the long list of propositions about causes for the problem of school violence in Israel that emerged from the methods of this study? As noted above, causal propositions about school violence were sometimes explicit and sometimes implicit.

Explicit framings, such as ‘School violence is caused by a violent youth culture’, were of course easiest to categorize. Implicitly framed cases, however, were no less clear in context given a focus on the denotational elements in causal propositions. The job of discovering classes of causal propositions only required attention to the semantic elements named in the propositions themselves. Justified by the data itself, their function as causal explanations could be held constant and they could be grouped together into classes as near equivalents from the propositional, or denotational, perspective. In other words, given these methodological assumptions, the common, regularly repeating classes of causal propositions that will be presented below from the list of nearly 5000 propositions show little to no significant variation.

While certain common formulations were borrowed in to represent a whole class in the discussions that follow, the distinct members of the class all included the same named elements and causal directionality. Whatever the context framing the causal propositions,

causal forces, such as peer pressure, a corrupt school system, a violent youth sub-culture, to name but a few, were transparent and easy to identify.

From the analytical perspective taken here then, at this second, more significant, level of analysis, the actual written data recorded were reduced to classes based on their virtual propositional equivalence.[8]

Only one final methodological note remains. Based on the argument above about the ways in which the data was collected, recall the first analytical goal: to present a factual study of the constituent propositions for this particular Israeli discursive construction. In order to arrive at propositional classes, only those cases that were instanced over a hundred times in the data were considered to be 'common' and thus analyzed further in this study. Those above this number were interpreted to be representative of the most widely circulating propositions in this discursive construction because they occurred at this rate across instances taken from different types of newspapers and the different textual framings found within them. Moreover, this number was selected because it ended up marking a somewhat obvious numeric break in the data.[9]

ARGUMENT STRUCTURE

The argument that follows is composed of the following interrelated parts. The first claim to be argued is that the methods of this study have uncovered common causal propositions in a discursive construction of the problem of school violence in Israel. As such, they thus constitute a legitimate analytical representation of this particular discursive construction in Israel today.

The second claim is laid out in a series of related sub-claims. It aims to document ways in which the causal propositions that constitute this linguistic practice are reflexively constrained and supported by the influences of material from other discursive constructions discovered within and around it.

Building on the second series of claims above, the third claim relates to the reflexively framing influence of Israel's dominant political ideology, democracy. It is argued that one can

[8] Presentations of this material have made clear to me the importance of methodological clarity here. The data in this study was transformed from a long list of propositions into a limited number of causal propositional types not only because presenting instances of the former was methodologically and theoretically intractable, but also because the presentation of instances was unwarranted given the denotational focus on propositions about cause. The appropriate analogy here is to a certain kind of sociolinguistic work. In that type of work, individual instances of variable sounds (or phrases) aren't reported because it is their relative frequency as indexically distinct reproductions of denotationally equivalent forms of speech that is at issue. Here, the case is even simpler because denotational concepts and causal directionality are the constants that define the general denotationally equivalent types of propositions being analyzed. Individual instances with respect either to variation in the type itself or based on its surrounding written context are irrelevant to the structure of the argument (at least to this point). Put another way, given the argument to this point, it doesn't matter if the actual written language states, for example, that 'the schools have messed up and caused this problem' or 'One must truly consider how schools have played a role here as I believe they are at fault'. These and many other similar examples have been analyzed here as (virtually) identical propositions for the purposes of this study to this point in the argument (cf. fn. 11 below for further comments on this point).

[9] The vast majority of the causal propositions that did not occur frequently enough to be considered 'common' were individual causes for particular events. As such, they were typically 'one-offs'. A few others however did appear more than just a few times, but not frequently enough to be discussed in the first part of the analysis. A few of these interesting cases will be discussed later in the argument.

see in this case how a second-order indexical system – relating to 'conservative' vs. 'liberal' identity – regularly grounds causal propositions as (political) 'positions' occupied by the speaker (or writer) in the context of the social interaction in which they are uttered (or written).

The fourth claim, again laid out in a series of related sub-claims, returns to the data from a different perspective. Here the goal is to document the methodological and analytical implications of the dialectical relations existing between indexical and denotational (propositional) approaches to the study of discursive constructions.

CAUSAL PROPOSITIONS CONSTITUTING THE 'PROBLEM OF SCHOOL VIOLENCE'

After categorizing how the problem of school violence was represented in Israeli newspapers, as described above, consider the data that emerged from this study in Table 1. At this second level of analysis, only the 'common' causal propositions uncovered in this study appear as numbered entries in the table above.

The table locates these types at the intersection of a 'causal source' in the proposition and its 'causal influence' on some other individual or institution. Consider, for example, the proposition reported in number 13 above (hereafter, n. 13). Here the mass media itself is the causal source because its constant, sometimes sensationalistic, reporting of instances of school violence has created a violent reality, which students, as the 'causal influence' here, then feel that their behavior has to live up to.

Recalling the goal structure of the argument here, the propositions in Table 1 constitute a legitimate analytical take on the discursive construction under study here. They are causal propositional explanations that are commonly used by Israelis when they participate in the verbal practice of 'talking about the problem of school violence in Israel'. They are, that is, propositionally appropriate contributions when participating in a Hebrew language discursive construction about 'school violence'.[10] The data in Table 1 thus serve as a methodologically and empirically defendable example of common propositions in the discursive construction about problematic school violence in Israel. This preliminary conclusion will be relied upon in all that follows below.

[10] The decidedly Israeli, and thus culturally relative nature, of this discursive construction becomes clearer if it is briefly contrasted with a 'similar' one found in the American case. On one hand, consider how some elements appear in the American discourse, but not in the Israeli one. Note the relative absence of common propositions in the Israeli case that point to the role of mental disorders as explanations for the problem. At least in those cases involving middle- to upper-middle class students, such representations are common in the contrasting American discourse. Coming the other way, in the Israeli construction, consider how surprising two of the propositions are if one begins with the typical American constructions of the 'same' issue. First, one finds a general cultural value on violence (n. 34), not just a concern with the issue of gun control. Second, a proposition that proposes that a general state of overall institutional dysfunction is causally responsible for school violence (n. 30) also knows no clear equivalent in the American discourse.

Table 1. Causal Representations of the Problem of Israeli School Violence

	YOUTH as Causal Source	PEERS as Causal Source	FAMILY as Causal Source	SCHOOL as Causal Source	OTHER INSTITUTIONS as Causal Source	SOCIETAL PROBLEMS as Causal Source
of Causal Influences on YOUTH And PEERS	-	1. Violence is a 'cool' norm among youths	2. Set violent, aggressive example 3. Teach to live to survive and expect worst from others 4. Lack of maternal warmth and parental presence 5. Parent-child alienation	6. School too strict 7. School too permissive 8. System tolerates early norm of aggression and violence 9. Allows the good kids to be bullied 10. Children are alienated from school system	11. Children are alienated from larger societal institutions 12. Violence learned via television, internet and videogames 13. Mass media coverage makes violence 'real' and thus a norm to live up to	29. No clear limits or moral boundaries 30. Corruption /loss of faith in society 31. Lack of respect for others 32. Weakening of respect for law and order 33. No respect for individual rights 34. Violence a societal-wide norm/value 35. Outdated 'macho' values rule 36. General agitated psychological state of the Israeli
of Causal Influences on PARENTS	14. Students enlist parents against school authority	-	-	15. Parents alienated from larger school system	16. Economy puts pressures on family structure 17. Mass media robs parents of control	
of Causal Influences on SCHOOLS	-	18. Teachers fear students	19. Teachers fear parents 20. Parents join with their children in opposing school decisions	21. Schools are mismanaged generally	22. Government understaffs school system 23. Government doesn't back school system policy 24. Government is too corrupt to help schools	
of Causal Influences on INSTITU-TIONS	-	-	25. Parents allow television to substitute for parenting	26. Schools politicize process of getting help from government	27. Economy limits government's ability to help 28. Government is corrupt	

THE REFLEXIVE NATURE OF DISCURSIVE CONSTRUCTS

At least in theory, the focus to this point has been on a 'single' verbal practice as it is discursively constructed in isolation. Discursive constructions, however, are not made anew for each practice or 'object' of representational significance to a society. Discursive constructions are in fact highly interdependent. To consider the propositions that constitute one is always to be looking at both the literal members, and the implicit reflections, of others. In an attempt to explore some regular ways in which ideological formulations develop different kinds of reflexive relationships with each other – and thus to attempt to map some of the ways in which linguistic practice and cultural ideology are interrelated – a further look at the data in Table 1 is revealing.

Within the complex web of discursive constructions, found in 'society' at any level of analysis, there are of course both relationships of relative support and opposition. Consider first some of the ways in which propositions within the focal discursive construction are mutually constrained and supported because of their co-occurring operation in other discursive constructions.

In reconsidering Table 1, note the implicit reliance on a widespread folk model of the relationship between the individual and society. This relatively distinct discursive construction about the abstract relations holding within the social universe produces propositional material that is presupposed in and by the focal discursive construction on school violence. Indeed, such a model makes the very organization of the table, and thus the table itself, possible. The conceptual categories of the folk model are explicitly present in the causal propositions as the 'causal sources' and the sites of the 'causal influences'. The folk model as a whole, though never explicitly named, is thus present as the presupposed underlying guide for how individual behavior is generally influenced by 'society' in the particular case of school violence.

What is the specific discursive construction that is modeling the relationship between the individual and society implicitly in the data uncovered in Table 1? The individual, in this case the 'youth' (or student), is surrounded by a series of ever more encompassing social forces or influences. As one moves out away from the focal individual as the 'site' of the violence if you will, there is a corresponding move to groups in which students are members (peers, family) through institutions in which they participate or by which they are at least influenced (school, mass media, government, economy) and ending with general explanations for societal problems which, as such, cannot be localized to any particular individual, group or institutionalized context of social action. These last influences are in a strangely literal sense, neither here, nor there. They float above specific contexts of behavior and thus serve here as explanations for the general causes of many different kinds of social behavior. Given their more general applicability, they are available to Israelis as more conscious 'ideological' accounts for societal problems in Israel.

The conclusion here is that the way in which individuals represent the problem of school violence in Israel is partially constituted by presupposing another discursive construction about the nature of the relationship between the individual and society. That is, the influence of another discursive construction is reflexively intertwined with the one being studied here. The practice of representing the problem of school violence is partially constrained by and thus modeled on one of the regular ways in which the relationship between the individual and

society is talked about in another discursive construction. By framing the talk about the social problem of school violence explicitly on the propositional elements of, and thus implicitly on the model for, how the individual and society are interrelated, one can see how they both mutually constrain and support each other. Violating the conventional terms of talk in either of these two practices would shake, however mildly, the foundations of both. Both then gain strength as conventionally legitimate modes of representation embedded within verbal practices through this mutually supporting relationship.

The relevant conclusion for now is that in documenting the social life of one discursive construction, evidence for the life of another has been found. At times, as here, that relationship is a reflexively supporting one. As noted above, however, they are not the only kind that one should expect to find. Examples of contrasting and even opposing cases of contact within and between different discursive constructions will be discussed further below.

ORGANIZING THEMES IN CONSTRUCTING THE 'PROBLEM OF SCHOOL VIOLENCE'

Recalling the propositions presented in Table 1 above, consider their reorganization as displayed in Table 2. In Table 2 the propositions that constitute the focal discursive construction have been reorganized based on three causal themes that are both implicitly and explicitly present in the data itself.

More specifically this time, consider first how this reorganization of the data reflects on the first 28 propositions in Table 1 above. Note how all of them can be reorganized in Table 2 above by the three interrelated themes of violence, alienation and cross-institutional dysfunction. In fact, the interrelated nature of these themes makes it possible for some of the propositions to appear under more than one theme. So, for example, the mass media robbing control from parents (n. 17) can be implicitly framed or explicitly extended to be either a cause of alienation between parents and their children and/or an instance of institutional dysfunction between the mass media and the family (cf. similarly, n. 15 and n. 25). This further demonstrates the power of these three themes to constrain and thus partially account for the propositions within the focal discursive construction.

Similarly, though regularities in how different causal propositions co-occurred together in particular written texts was not the focus of this study, it is worth noting how these three themes were clearly interrelated in various culturally coherent ways in the kinds of 'explanatory arguments' that were formed by combining the different propositions. So, for example, with (some kind of) alienation itself a typical effect of (some kind of) institutional dysfunction, one or both of these could then be proposed as the cause(s) that explained specific instances of violence, the general problem of violence and/or a general cultural value on violence. While the focus here is not on these kinds of 'arguments', their recursive power as thematically repeating models of explanation is relevant to the larger point here.

Table 2. Organizing Themes in Causal Representations of Israeli School Violence

	YOUTH	PEERS	FAMILY	SCHOOL	OTHER INSTITUTIONS	SOCIETAL PROBLEMS
Explicit Organizing Theme I: Violence	-	1. Violence is a 'cool' norm among youths 18. Teachers fear students	2. Set violent, aggressive example 3. Teach to live to survive and expect worst from others 19. Teachers fear parents	8. System tolerates early norm of aggression and violence 9. Allows good kids to be bullied	12. Violence learned via television, internet and videogames 13. Mass media coverage makes violence 'real' and thus a norm to live up to	29. No clear limits or moral boundaries 30. Corruption /loss of faith in society 31. Lack of respect for others 32. Weakening of respect for law and order 33. No respect for individual rights 34. Violence a societal-wide norm/value 35. Outdated 'macho' values rule 36. General agitated psychological state of the Israeli
Explicit Organizing Theme II: Alienation	-	-	4. Lack of maternal warmth and parental presence 5. Parent-child alienation 25. Parents allow television to substitute for parenting	10. Children are alienated from school system 15. Parents alienated from larger school system	11. Children are alienated from larger societal institutions 17. Mass media robs parents of control	
Explicit Organizing Theme III: Cross-Institutional Dysfunction	14. Students enlist parents against school authority	-	20. Parents join with their children in opposing school decisions 25. Parents allow television to substitute for parenting	6. School too strict 7. School too permissive 11. Children are alienated from school system 15. Parents alienated from larger school system 21. Schools are mismanaged generally 26. Schools politicize process of getting help from government	16. Economy puts pressures on family structure 17. Mass media robs parents of control 21. Schools are mismanaged generally 22. Government understaffs school system 23. Government doesn't back school system policy 24. Government is too corrupt to help schools 27. Economy limits government's ability to help 28. Government is corrupt	

These themes thus further reflexively constrain and support the 'common' causal propositions by aligning them with each other in a number of ways as coherently related cultural logics explaining why school violence takes place at various levels of analysis.

At first glance it might appear that the semantic themes among the causal propositions emerge unmotivated from 'within' the focal discursive construction itself. The overlapping and simultaneous presence of many different reflexively framing discursive constructions, however, should not be forgotten. In addition to the reflexively organizing nature of these themes themselves as they spread across and among the different causal foci, simultaneous processes of semantic generalization have them explicitly framing the propositions 'from above' in the form of more general ideological propositions found within the focal discursive construction itself. At the same time, 'from outside' this particular construction, a different discursive construction is mutually constraining and thus supporting this same propositional content. Each of these reflexively present types is considered below. Doing so requires consideration of propositions n. 29-36 in the extreme right hand column of Table 2.

Propositions n. 29-36 lack a specific causal source and causal influence. They are general in the sense that they are causal propositions that potentially apply at all times to all Israeli contexts of social practice, As discussed above, they are relatively conscious, ideological explanations for social problems in Israel and, as such, they have widespread applicability. Where, though, do they come from? What, if anything, motivates their presence as ideological propositions in this discursive construction?

Note first, how some of the propositions in n. 29-36 generalize some of the other common causal propositions that constitute this particular discursive construction. Specifically, they literally state in general form, the themes that have already been seen to be reflexively constraining the overall set of propositions. That violence is a societal-wide norm in Israeli society (n. 34) clearly generalizes one of the themes discussed above (in n. 1-28). Similarly, general societal corruption (as part of n. 30) also generalizes one of these themes. It is, after all, a generalization of the idea of particular institutional dysfunctions. A loss of faith in society (also part of n. 30) is thus the resulting generalization of the alienation that institutional dysfunction is likely to cause in society at large. In this logical reconstruction, these three ideological propositions, then, seem to be coming in 'from above' to both constitute additional common causal propositions themselves, while at the same time acting as general ideologies that constrain and support other propositions that are thereby more specific within this particular discursive construction.

Second, note how one can account for other ideological propositions (in n. 29-36) and for a further generalization of two of the themes as well by appealing to the framing influence of one of the most dominant ideologies circulating in modern Israel as a whole: the political ideology of democracy. This discursive construction at least in part defines the social entity as a whole and, as such, provides it with an official and thus powerful story about the principles that constitute it. Being such a central ideological formulation, its framing influence in and on a wide array of Israeli cultural practices is to be expected. The particular propositions of the focal discursive construction and the themes that have reflexively organized them to this point in the analysis find further constraint and support in its terms. Its influence on the focal discursive construction – as reconstructed logically here – again appears not only implicitly 'from above' by structuring propositional material, but also explicitly in propositional form in the data itself.

At the most general ideological level then, this particular ideological construction provides further reflexive organization. It frames the problem of school violence as an ideologically explicit 'crisis' in a classic democratic sense. On one hand, one finds common propositions about there being no clear limits or moral boundaries (n. 29) as well as there being a weakening of respect for law and order (n. 32).

On the other, however, there are propositions about a lack of respect for the rights of individuals (n. 31, n. 33). The general result seems to be a loss of faith in the face of a corrupt society (n. 30). At least in Israeli ideological consciousness about 'problems' in society, a clear demarcation of how the individual and the social body are to treat each other, or where the rights of one begins and those of the other ends, seems to be in a very general state of crisis. The government, schools, parents and their children are all caught in the center of an ideologically-reinforced discursive construction that is, as such, believed to be one of the most dominant and widespread in Israel today: there is a society-wide crisis in values that challenges the unity and for some even the existence of the nation.

Given the logic of the argument here, it is not at all surprising to discover the presence of this discourse in other cultural practices. Violence in schools thus finds its most general ideological account in the form of a democratic crisis in modern Israeli society. This specific problem is thus just one of many instances of what is believed to be one of the most general problems plaguing society as a whole. This ideological crisis, for example, thematically characterizes certain genres of academic work in Israel (cf. Katriel 1999 and references there for analyses of a number of institutions and ritual sites in which this fundamental tension between the individual and society is visible) as well as opinion polls of Israeli citizens on related matters (cf. Wolfsfeld 1988 and the tables therein for relevant facts about Israelis media habits and beliefs about their society as a whole).

Once made relevant to the framing of this social issue, the general ideology of democracy plays a reflexive role in constraining and supporting the propositions that constitute the focal discursive construction by reinforcing the previously discussed themes and their recursive cultural logics of explanation (in n. 1-28). It also reinforces both the folk model that relates the individual to society as well as providing explicit ideological framing 'from above' (in 29-34).

Summarizing the argument up to this point, what partial explanations are there for the common propositions that were discovered by this study? The particular propositions were found to be common because they were mutually constrained, supported and framed by at least their own normative status as propositional elements in this verbal practice as well as by an explicit set of folk concepts about the relationship between the individual and society, an implicit causal folk model relating the individual to society, three general organizing semantic themes, general theories about 'societal problems in Israel' and the dominant political ideology of democracy on the ideal relationship between the individual and society. Given the level of analysis here then, one must conclude that all of these reflexively overlapping discursive constructions join together to give relative stability to the others and, as such, all constitute mutually constraining and supporting causes and effects.

APPROACHING A DISCURSIVE CONSTRUCTION FROM AN INDEXICAL PERSPECTIVE

Any connection between the spoken or the written and some aspect of the interactional context in which it occurs belongs to the realm of indexical function. In contemporary work, it is the indexical approach to discursive constructions that has been the more common one; consider, as but a single, if prevalent, example, the search to discover regular connections between language and identity and their implications for relative power relations. The focal discursive construction here has been explored above in terms of the causal propositions that commonly appear within the verbal practice of talking (here, writing) about the problem of school violence in Israel. The argument above, of course, was that a denotational approach that focuses on (causal) propositions as constitutive elements in discursive constructions is a legitimate one.[71] The question posed in this section, however, explores how these (causal) propositions are overlappingly linked to aspects of the social contexts in which they are produced. What then does the social indexical life of this particular discursive construction look like?

Consider another way in which the dominant political ideology of Israel constrains the focal discursive construction. In so doing, we can document an indexical influence and, at the same time, show the unavoidable interdependency between a denotational and indexical approach to discursive constructions. In theory as in practice, to make assumptions about one, as we will see, is to dialectically create the other.

In human language, indexical and denotational functions overlap. All propositions are unavoidably uttered or written in contexts and, as such, they are made meaningful at least in part by being related to aspects of those surrounding contexts. With that in mind, recall the multiple reflexive roles played by democratic ideology. This ideology brings additional support to the focal construction, albeit now from the indexical perspective. Causal propositions about this social problem are often grounded as 'positions' (on an issue), and thus as identity markers, with respect to this ideology. A proposition about cause, from the indexical perspective, is not merely a true or false proposition about explanatory cause. Rather, given typical 'positions', conventionally equated issues and the metaphorical spread of the discourse itself across them, propositions about different issues can be equated as general indexical signs of a particular kind of identity.

The metaphorical equivalence from the causal sources in this issue to the same sources in other issues creates a second-order indexical identity that falls along a continuum from (politically) conservative to liberal. Recalling Table 1 above, 'less control' by any of the causal forces on the youth, his peers or any of the active agents or institutions indexes a certain political liberalness in the speaker, whereas 'more control' along these lines indexes a

[71] Discursive constructions are relatively constituted by both overlapping denotational and indexical aspects. An approach that focuses specifically on 'causal propositions', however, is not likely to be a productive one in all cases. It varies with the nature of the verbal practice under study. The one being studied here, as argued above (see fns. 4 and 8), lends itself to such a starting point. In contrast, consider the verbal practice of 'picking somebody up' (i.e. in a bar). In this case, it seems unlikely that one would find regularly repeating '(causal) propositions' as a recurrent element in the regular life of the verbal practice. Each case thus merits its own methodological consideration.

speaker's 'conservativeness'.[72] For example, a writer/speaker would be labeled 'conservative' if they believed that the school should establish stricter control over students, but also if, by extension, they called for stricter control of the mass media, or the government's control of school boards (in the name of stricter measures). Note then how the dominant ideology again both constrains and supports the common causal propositions that constitute the focal discursive construction by indexing regular identities at a second logical order of analysis (and we speak semiotically here of a logical second order simply because it presupposes the propositional one in order to function). This indexical functioning joins with the causal propositions to form regular component parts of the social life of this discursive practice.

That the political principle for this second-order indexical system relating to speaker identity emerges from an officially dominant political ideology about Israeli society, in ways not unlike a comparable one in the United States, is not surprising. As the problem of school violence (and other 'similar' social problems) are framed at least in part by this highly conscious, dominant ideology, an explicit position taken on the problem, such as a causal explanation of it or even a proposed solution, is tantamount to signaling a complicated but widespread form of in-group/out-group membership with respect to the speaker's (or writer's) status in the national collectivity as a whole.

WITHIN AND ACROSS DISCURSIVE CONSTRUCTIONS

The above example is not in any way intended to exhaust a look at the indexical life of the focal discursive construction. Different oppositions could be set up to motivate a virtually unlimited number of overlapping indexical functions. Even based on only the kinds of causal propositions considered here, newspapers could index 'conservative' vs. 'liberal' or 'objective' vs. 'sensationalistic' identities, to name but two ideologically supported and thus widespread oppositions. Similarly, without any further explanatory details, consider some of the possible analytical perspectives that could emerge by comparatively crossing some typology of the propositions themselves with typologies relating to: genres of newspaper writing; periods of time; types of writer identity; types of reader/audience identity; types of relative writer-audience framings; types of represented interactional framings involving direct and indirect speech; and types of combinations of the propositions themselves as instances of other kinds of linguistically-mediated interactional acts such as arguments, insults and defenses, to name but a few. That this is not intended to be a complete list is the relevant point. Rather it demonstrates two preliminary conclusions emerging from the analysis above. First, many other overlapping indexical meanings could be discovered as constitutive elements of this discursive construction. Second, to make assumptions about where and how to find propositional regularities for any particular discursive construction is to create the very

[72] Though this can be seen in the data often this is so only through a complex inference. One has to have additional evidence about the way in which the writer (or quoted speaker) is being framed. It is rare that this political identity was explicitly stated in the newspapers studied here. Context did often make it obvious however. That said, the dominant form of evidence for this claim was ethnographic. Being one who obviously brought up this issue quite often in contexts of social interaction, I was often made aware (sometimes painfully so) of the identity indexicals that were involved. Moreover as the television media often relies on political oppositions to frame the structure of its content, I witnessed it in action numerous times in that context as well.

terms through which the indexical ones are discovered and vice-a-versa. They are mutually interdependent. We return to both of these points in closing.

To this point in the analysis it would appear that a relatively fixed and stable discursive construction has been located. It is one constituted by a set of common propositions and an overlapping, second-order indexical regularity. In the name of a fuller understanding of the social life of discursive constructions, however, methodological issues, and the related theoretical implications that they entail, now force us to problematize this apparent conclusion. The problem is not that we have failed to exhaust the regular indexical life of this discursive construction because, at least in part, the indexical side of this (or any) discursive construction is dialectically the result of our methods for isolating out propositional regularities. Rather these problems should force us to see how, in general, all analytical representations of a discursive practice, both ours and that of any other interested parties in practice or in theory, are relative to a particular perspective. There can be no 'pure' unmediated representation of a discursive construction. This is not to make the extreme, and ultimately absurd, claim that overlap and thus degrees of shared discursive reality do not exist. They do. Without them social communication would lack the presuppositional grounds on which it is based. It is however to claim that analysts create methods that are in principle no more or less privileged than those used by individuals and organizations with very different perspectives, methods and interests for representing 'how people regularly talk about something'. In closing this argument then, we will return to the data and work through a series of related moves that demonstrate this point. First, we will consider propositions that were vulnerable within the focal discursive construction based on this study's methodological assumptions. Second, we will move outside the results discussed above and consider a few causal propositions that weren't found frequently enough to be considered 'common'.

Returning first to a denotational approach, note how two of the common causal propositions reported (n. 35 and 36 found in the right-hand column in Tables 1 and 2 above) have yet to be mentioned. Like the others, they too were found to be common and thus members of this discursive construction. They were, however, relatively more isolated from reflexive interconnections than the others. That is, their presence was neither modeled on an implicit or explicit theme or theory within the data nor was it patterned from above by a more widespread ideology. As such, references to it were typically stated in or as the causal accounts themselves explicitly. In this sense, while still of course legitimate common members of this discursive construction, their relative isolation makes them somewhat vulnerable participants. This vulnerability, seen in semiotic terms, suggests the influence of a strong indexical component to these propositions. For those individuals sensitive to the sites from which this data was drawn, they stand out as indexically marked propositional elements in the regular discursive construction. For example, some propositions are more likely to be associated with particular kinds of speakers/writers or time periods and as such be interpreted as reflecting narrow 'political' interests (cf. n. 35 on outdated macho values being associated with relatively older Israelis). Alternatively (as evidenced in n. 36 on Israelis' agitated psychological state), component propositions can index other discourses that restrict the reflexive support they find within a focal discursive construction. Mutual constraint and support, as these cases demonstrate, are not the only indexical relations found among the component parts of discursive constructions.

For our purposes here, we'll focus on the second causal proposition: an 'agitated psychological state' offered up as an explanation for negative, but nevertheless

understandable, behaviors (n. 36).[73] Propositions from widely circulating discourses about what it means to be an Israeli include those that both directly and indirectly relate to the political crisis that has tormented the region for many years. Jewish Israelis know that military service is mandatory and see themselves as surrounded by enemies. These views, along with among many other related ones, are parts of a discourse that include the related belief that they are therefore an understandably 'nervous' people. They thus understand a reference to 'the situation' ('hamatsav') to include a complex of difficult social, political and primarily military pressures that hang dangerously over all of them at all times. In this ideological construction of what it is to be an Israeli, it is living with 'the situation' that makes them a generally tense and irritable people, for whom negative behaviors, including violence, are the means by which these pressures, sometimes regrettably, find expression.

This widely known ideological proposition about the psychological state of the Israeli, though common, was relatively infrequent and (thus) isolated from reflexive interrelations with the other propositions in this discursive construction. The reason being suggested for the relative isolation of this proposition, however, is not because it indexically 'belongs' to older Israelis, or even to some other specific sub-population or time or social context (see fn. 13 above), but rather because it overlaps in a very restricted way with another discursive construction. Understanding this requires us to consider briefly the discursive construction of military violence in Israel (Lomksy-Feder 1999, Lavie 1990).

In studying cultural discourses, outsiders are often surprised. Ideological elements from one practice can get metaphorically extended to some discursive practices, but (surprisingly) fail to get extended to others. One such surprising example in this case was how infrequently Israelis cited the military as a relevant institutional site for the problem of school violence in Israel. Indeed it was arguably the one major societal institution missing from Tables 1 and 2 above. To Western readers, this omission, at first glance, might seem almost conspiratorial.

The relatively shared views that military violence is an 'unfortunate necessity' because Israel's hand is forced by 'uncivilized terrorists' ('who kill women and children' and 'threaten Israel's daily existence') partially accounts for the fact that such a causal explanation was almost completely absent in this case study. Military violence is commonly represented as something that Israelis would prefer not to carry out. It is a justified form of 'self defense'. This is particularly the case in situations where military violence comes close to other discursive framings that mark it as potentially unethical or immoral. This demonstrates that 'violence' too is a constructed cultural concept that is relatively constructed at least in part by the kinds of relative discursive constructions being studied here.

Metaphorically speaking, despite the many visually- and conceptually-based iconic similarities, these two discourses can be seen to oppose each other. 'Students fighting each other in school' is not analogically comparable to 'soldiers fighting an enemy in war', or even

[73] The first of the two ideological propositions that has yet to be discussed: 'outdated macho values' (n. 35) is a similar example in the logic of the ongoing argument and so is not being discussed in detail. In short, it was only just frequent enough to be considered a 'common' proposition because it is likely to indexically overlap with an 'older' (vs. 'younger') writer/speaker identity. Ideologies about 'what once was', like any others, have different distributions across different groups of people and if this particular 'historical fact' about Israel is one that is less commonly told today (i.e. less widely distributed in the discourses enacting and commenting on different cultural activities), it is possible that it is because it is one that is less well known by younger Israelis. In this sense, while it shows potential for a 'political' divide in representing this particular discursive construction, there is little ethnographic evidence for that. It appears rather to be an element that is drifting out of relevance with time.

'solders fighting with Palestinian civilians in the territories'. That said, it should not be forgotten that there is a commonality shared by these two discursive constructions: a generally agitated psychological state is found in both. What then is the difference or, put another way, how are these discourses both opposed and yet interrelated at the same time?

A state of psychological agitation commonly appears in causal accounts of school violence as a regrettable, but understandable, cause for the students' behavior. That same state, however, is only applicable to problematic instances of military violence. It serves as a psychological defense for military violence that could be considered at best 'ethically troubling' and at worst 'abusive'. All of this however is framed by the difficult situation that Israelis find themselves in and thus the unfortunate need for military violence that they feel has been forced on them. Thus, the discursive construction of the violence in the military setting is, among other differences, not 'problematic' in the way that school violence is. In school violence, recall, the violence is represented as 'problematic' by ideological definition. It is thus not the type of violence that can motivate the relevance of a state of psychological agitation for students. The political situation and the agitated psychological state which it fosters is more likely to influence them because they are young or because of the specifics of particular cases.

The argument here then is that this particular causal proposition remains relatively isolated and reflexively weak because it is found in a (less significant) discourse about school violence. To increase its reflexive strength would be to analogically map more of its indexical life into the problem of school violence. To do so, however, is to bring together cultural practices that are not mutually supporting. To do so is in essence to metaphorically suggest that Israelis are at least in part responsible for what then also becomes explicitly problematic military 'violence' (vs. self-defense, etc.). A position like that, needless to say, can be taken as a sign of national disloyalty.

In studying the relationships among discursive constructions, the relative isolation of this kind of proposition in the focal discourse seems to be based on the fact that it indexes a different discursive construction in problematic, largely oppositional, ways. It points to its potential for becoming a destabilizing analogical force. While this 'surprising' lack of a connection across these practices for Israelis is truly an ode to the relative ways in which cultural ideologies 'travel' across distinct social practices in light of socio-cultural history, it is also contains a more general semiotic lesson about the analogical bases for the roots of ideologically motivated social change.[74]

Turning to a second set of closing considerations, one can ask what can be learned from propositions that were not found often enough to be considered regular members of the focal discursive construction. Recall that the discursive construction under study here is about the secular school system in Israel. There is in fact, however, a powerful religious education system that exists independently alongside the secular one. If we isolate out the religious paper in this study, consider one new and at least for this particular newspaper, relatively common proposition. Along with the others, the religious newspaper participated in representing school violence (in the secular school system) as the result of general institutional and societal dysfunction. They were relatively unique, however, in frequently adding an interesting extension here. They extended the scope of this sign and saw school violence itself as one instance of many in a different discursive construction, one that was

[74] I owe my realization of the importance of this point to Judith Irvine's thoughtful comments on my paper.

almost completely their own in this study. They framed it as (yet) another sign of the moral deficiencies of secular Israel. Framed often as only one of the many signs of the mistaken ways of secular Israel, there was perhaps less of a need to focus on it. In any event, the larger point here stands. Had this study focused on religious newspapers, this firmly established causal proposition along with others would have changed what was presented above as the analytical view on what was 'common'. That is, this causal proposition would have changed from an indexically located proposition not considered common enough to be a part of the focal construction into a 'common' one that constituted the construction. That is, the reflexive and relative nature of discursive constructions is an unavoidable conclusion.

Consider some final examples of causal propositions that were not cited frequently enough in the data to be considered 'common' signs within this construction. In these cases, we see the introduction not of indexically marked propositions signaling some specific kind of speaker or social context, but rather propositions that largely indexed the relative influences of time on discursive constructions. These two propositions were not common, but they are arguably strengthening. Nevertheless, it is not yet clear what other regular indexical associations they will develop. They both related to the introduction of a large number of Russian immigrants into Israeli society at the time of this study. Their number, estimated at nearly a million in a nation of around six million at the time, suggests the obvious influences that these 'new Russians' were already beginning to have on essentially all aspects of Israeli life. Relevant here however was their role as causal explanations for Israeli problems. Violence in the school system was sometimes represented as the result of the 'negative influences of immigrant children' and 'youth membership in alternative groups'.

Why were these propositions not found to be common enough to be included in this study? One obvious fact is that what they reflected was at the time a relatively new demographic fact. The discourses about Russians, and whatever roles those discourses were going to play in any others beyond those that included them as immigrants being absorbed in the project of nation-building, hadn't yet had time to crystallize. Even at the time of this study, however, supporting discourses were emerging. That is, the appearance of these propositions in the data was not completely culturally incoherent. Stereotypes of Russian violence (and 'mafia' affiliation) and reports on the relatively high rates at which Russian children dropped out of school were two particularly widespread examples of mutually supporting ideologies.

Yet another reason for their under-representation in data drawn from written instances in widely read public newspapers relates to the fact that it was somewhat taboo to express these ideas in written form in a public forum, such as a newspaper. There was a verbal taboo, albeit a weakening one in recent years, on criticizing any specific (Jewish) ethnic group explicitly in any official, public forum. Such explanations run the risk of sounding 'racist' (or, perhaps in more native Israeli terms, at the very least 'anti-Jewish' or 'anti-Israel'). Indeed, given that published newspapers were the source for this study, both of the propositions aimed at the Russians typically used the Hebrew equivalent of politically correct language. In the first case, though clearly only Russian children were being referred to, there was a 'polite' euphemistic overgeneralization of the referent to include all immigrant children. Similarly, though 'alternative groups' is what was written, Russian youth gangs were the known referent.

Here too then one sees the relative nature of any attempt to represent a discursive construction. Indeed, it was in fact quite easy to document causal propositions about this

problem that not only explicitly blamed Russian youth for the problem (as well as the influence of their parents on them), but did so without any concern for politically correct language. Such causal propositions, however, were only found in informal 'neighborhood talk', house visits with neighbors after the Sabbath, barbeques with friends and family, and dinnertime conversations.[75] Whereas in public forums such claims ran a stronger risk of indexing a kind of racism in the writer/speaker, in informal settings the assumption seemed to be that everyone knew each other well enough not to come to that kind of conclusion and/or the racism was explicitly formulated or implicitly present and accepted as such. That such claims about this issue appeared to be normatively present only in informal settings is partly a result of the fact that they were not yet ideologically tolerated, at least officially, by any institutional voice in Israel. As above, in the discussion of the Israeli's agitated psychological state, this is due in large part to the fact that it opposes more dominant ideologies. In this case, the relevant ideologies are the dominant state discourse about the importance of a Jewish nation and thus the need to successfully absorb Jews from all parts of the world at whatever cost.

CONCLUSION

This case study has argued that isolating out any particular discursive construction is thus to be looking into a house of mirrors. It is an analytical nightmare unless one recognizes that there is not an unmediated, objective representation of any particular discourse or of some overall system of societal discourses. Indeed, the general semiotic study of the indexical interrelations among the component parts of discursive constructions described and demonstrated above seems a fruitful way in which to understand the social life of language and society. That is, the conclusion should not be that their relativity pushes them beyond human study and thus renders academic efforts futile. Rather, it should have the effect of forcing analyses to be specific (but not pedantic) about both their methodological design and the analytical goals for any particular kind of representation. In the present study, for example, two particular goals should be stressed in closing.

First, this empirical case study was designed to demonstrate general theoretical traits of 'discursive constructions' as well as methodological principles for their study. That is, it empirically documented the reflexive and relative nature of discursive constructions as well as the utility and interdependence of propositional (or denotational) and indexical approaches to their study. Second, it suggested in the terms of a single case study some of the general semiotic traits of discursive constructions and, as such, detailed some of the general ways in which language and culture work to give shape to human practices. Indeed, building on a case study such as this one, one can envision a kind of comparative semiotics of discursive constructions, wherein the study of different kinds of societies are likely to reveal different and fascinating types of reflexive interrelations of support and opposition as well distinct types of change over time.

[75] The city in which I lived over the two years of this study, Karmiel, was one that was quite well known for having absorbed a very large number of these 'new Russians'. As such, the topic of their place in Israel (and Karmiel more specifically) was a commonly encountered one in everyday life.

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Chapter 6

THE SEMIOETHICS INTERVIEWS III: JOHN DEELY*: HUMAN UNDERSTANDING IN THE AGE OF GLOBAL AWARENESS[1]

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ABSTRACT

The general topic of this contribution is *semioethics*, widely regarded as one of the most significant developments in semiotics after the turn of the 21st century, and along with the *existential semiotics* of Eero Tarasti (2000) a sign of an ethical turn within semiotics. The term semioethics, which signifies not least the emergence of a sense of global responsibility, was introduced by Susan Petrilli and Augusto Ponzio in 2003, and Petrilli in particular is associated with this emerging scholarly field. The semioethics interviews, conducted by Norwegian-born Tartu semiotician Morten Tønnessen, starts out (in four separate interview articles) with Professor John Deely, a prominent American scholar known among other works for *The Four Ages of Understanding: The first Postmodern Survey of Philosophy from Ancient Times to the Turn of the 20th Century* (Deely 2001a). Deely, a semiotician as well as a philosopher, has joined Susan Petrilli and Augusto Ponzio in their endeavour by grounding the notion of semioethics in philosophical terms.

Topics include the responsibility of humankind, individuals and governments, the place of culture as part of and yet distinct from nature, the semiotic side of modern economic and technological development, the future prospects of human understanding and morality in the light of current economic and political developments, and philosophy – the distinction between ontology and epistemology, and the terminology of rights,

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included – reviewed in terms of (Peircean) semiotics. In the course of the interview, Deely relates not only to Peirce but further to Petrilli, to Thomas Sebeok, to the biologist Jakob von Uexküll (1864-1944) and to phenomenologist Edmund Husserl. The human condition is examined time over again, drawing on a rich reference material from philosophy as well as from various sciences and scholarly disciplines.

INTRODUCTION

The current chapter represents the third in a series of four interviews with Professor John Deely in the series "The semioethics interviews", all conducted by Morten Tønnessen (see Tønnessen and Deely 2009 and further Tønnessen 2009a). The author first engaged with semioethics in 2007, cf. Tønnessen 2009b (especially the section "A critique of a critique"). This particular interview session took place May 12th, 2009 in Tartu, Estonia. As for Deely, he has previously written about semioethics among other places in Deely 2005, 2008a and 2008b.

The actors: John Deely (hereafter 'JD') and Morten Tønnessen (hereafter 'MT')

The scene: An apartment by Raekoja Plats (Town Hall Square), Tartu (where Deely was a visiting professor the spring term of 2009)

TO CONSIDER PRODUCTS AS PROCESSES

MT: (begins by mentioning 'climate change' as a key notion) Climate change – which you think is a misleading term. Climate destabilization...

JD: You mean global warming – sure.[2]

MT: How would you relate the era of global warming to the emergence of semioethical awareness?

JD: We are starting to feel the consequences of the two or three centuries of industrialization. We did not realize what we were doing. Just as we polluted the rivers, it turns out, we have polluted the atmosphere in such a way that the whole relationship between the Sun and the Earth is being affected.

MT: The Sun and the Earth.

JD: The Sun and the Earth, the atmosphere – with all this energy that comes from the Sun, which life totally depends upon. But it has to come through the atmosphere.

MT: Here, the atmosphere is a mediator between the Sun and the Earth. This concerns the Earth's relationship to the Sun, but not the other way around.

JD: Well, the Sun does not care.

[2] In Deely's opinion, 'global warming' is a misleading phrase because it does not capture what is characteristic of what is commonly referred to as 'climate change'. While neither climate *change* nor global *warming* is a new phenomenon in geological terms, anthropogenic climate destabilization is indeed a fairly recent phenomenon.

MT: But surely it relates to the Earth's relationship to the Sun. Mediated by the atmosphere – where the biosphere has played a role in maintaining the atmosphere.

JD: In a certain sense, we have no choice but to do something about this. What exactly we should do… (pauses) is not so easy to say. But we need science. We cannot get anywhere without science any more.

MT: You mention industry here, as part of the root of the problem. What kind of thoughts do you have, in broad strokes, about the impact – the consequences – of industrialization? Including its desirability, at a global scale?

JD: Up until this time, we were concerned with making products that we wanted, things that we could use. We really did not give much thought to the consequences of the processes used to get those products. And that is what the enormous extent of pollution has been caused by – not realizing the consequences of the processes we were using to produce things. The semioethic aspect of it is really from semiotics, and amounts to a change in the understanding of human beings highlighting processes of semiosis. Every species has some processes of semiosis that is unique to itself – that are species-specific. And what we have concentrated on – aspects of semiosis that are unique to human beings – we have always looked upon them as making us superior to, and independent of, nature. But what we have come to realize is that they actually tie us in with nature.

MT: All of them?

JD: Yes, all of them. The cultural world is no more opposed to nature than the spider web is opposed to nature. Culture is simply nature for a human being. We are tied in with the whole. And this we are being forced to realize through this whole climate destabilization experience as well. What semiotics provides is an understanding of the human being that fits with this picture. Does that make sense?

MT: You make sense, but the picture you paint is a timeless one. When you say that processes of semiosis ties us to nature, it seems like you are saying this in a very fundamental way. The circumstances of your argument, it appears, would be no different today than a hundred years ago. On what points can you say: These semiosic processes in and of culture have changed as part of an industrial system during the last hundred years?

JD: The main difference, it occurs to me, is that up until this point we have concentrated primarily on things that we wanted to produce. The processes by which we produce them, and their effect on the environment – the ecosystem, the biosphere – we just never gave much thought to it. We are being forced to become aware that we cannot just produce things, we have to become aware of the processes by which we produce them just as much as the products.

MT: There is clearly an emerging awareness about the process of production and how it relates to the environment. But some fundamental assumptions, like the goal of sustainable economic growth – in effect sustained economic growth, meaning that it can go on steadily year after year – remain fundamental premises for our kind of society. These are not really being

questioned. It seems to me to be an unexamined axiom of modern culture that growth is good, and that more growth is better than less. Where do these premises come from? If you look at this in purely semiotic terms, size and volume in themselves do not seem to have significance. They only have significance if they have some kind of effect on society.

TO BE AWARE THAT SOMETHING EXISTS INDEPENDENTLY OF US

JD: I certainly do not think that capitalism is the answer to anything. And what is amazing is that we have not figured out a system that works better – the communist system was a disaster, an absolute disaster. But the real capitalists are people who live from making money; they do not produce anything, they do not do anything.

MT: They move money around to make their money grow.

JD: Yes, they move money around. And there has got to be a better system than that. What would it be? I do not know. Semiotics is not an answer to everything, semiotics simply gives you a perspective on the sign processes that are essential for communication in the modern era.

MT: In this context I think a semiotic perspective could raise some crucial questions, such as: "Where is the meaning?" – of this or that political system. That is a fundamental semiotic question. But then again, the answer is up to each one of us – semiotician or not. Is that perhaps the responsibility of a semioethicist – to raise such questions? At any rate, political practices have to justify somehow that they are meaningful – if nothing else, then on their own terms.

JD: For me, the term semioethics certainly means that there is a need to rethink human responsibility in a larger context than simply behavior between human beings. The terminology of rights – such as the question of so-called animal rights – creates more problems than it solves. Then you have people saying: "You cannot have rights without responsibility" – and animals cannot have responsibility, so in consequence they cannot have rights. Only human beings have responsibilities. Lions and tigers do not have responsibilities.

MT: To me it is a plain point that the only criterion you need to satisfy in order to qualify for responsibility, is that it matters how you relate through your actions to a certain issue. If so, you already qualify for responsibility – to the extent that it is actually a moral issue.

JD: Take a dog that lives with a family. The dog learns that it cannot bite members of the family. But you probably cannot attribute *responsibility* to the dog – saying to the dog: "Listen, you are responsible for not urinating on the rug".

MT: The responsibility we are talking about here is a kind of conscious responsibility which you can probably not say that the dog has. But it could be said to have a kind of social responsibility. It does not make sense to talk

about responsibility unless we can observe the consequences of relating to this responsibility in this or that way, in animal behavior, human or brute.

JD: I think the kind of consequences you have to be able to observe, though, are consequences that are not just in the cycle of animal behavior. They are consequences that concern the way things[3] are independently of any observer. That is the difference between human perception and the perception of the other animals. And it is only through that kind of awareness that you get responsibility – which is precisely the kind of awareness that modern philosophy denies that we can have.

MT: Awareness about how things appear to us and how they are... My point would be that even if we admit that a dog can have a responsibility for another dog – social animal responsibility – that responsibility, I agree, is different in principle from the human responsibility we are talking about here.

JD: Semioethics is just recognition of – a term for recognizing – that since there is no awareness apart from semiosis, there is no awareness without semiosis. The very process that makes us aware of things is also involved in the interaction of things. When they started space travel, there was no debris from human behavior in outer space. In the early days of the space ships, when they had junk, they just threw it outside the spaceship. There was nothing out there. But now they are getting to the point where outer space, in the immediate vicinity of the Earth, is starting to be a menace, because there is so much debris out there. It is the same way that we polluted the rivers. We have to become more aware than we have ever been of the consequences of the means to our ends – not just of the ends. Ethics has never been thought of in those terms. It is a whole new framework for the thinking of ethics.

(The two look into the question of space debris, prognoses for the next 200 years included – cf. Bonnet and Woltjer 2008).

TO REALIZE THAT THIS PLANET IS WHAT WE HAVE

MT: I will soon return to the topic of capitalism and industrial civilization. – This is a really interesting book, by the way, and a good title – Surviving 1.000 Centuries. Some would claim that for modern consciousness, the image of the Earth as viewed from space, and from the Moon, has been instrumental in giving us a new kind of global awareness. They would claim that the simple image of our planet as seen from afar has somehow given us an idea we did not have before – something about being one human race, sharing

[3] 'Things' are here contrasted with 'objects', which unlike things have an irreducible aspect of mind-dependence. According to Deely, animals relate only to 'objects', whereas a human – a semiotic animal (cf. Deely 2008b and 2010) – can relate to both 'things' and 'objects'. See his book *Purely Objective Reality* (Deely 2009a).

one planet. For someone like me, born after man landed on the Moon, it is hard to imagine how history would have been like without this idea.

JD: You get people who object: "Why did we spend all those money on space programs, instead of on social programs?" But we were much better off spending more on space programs and less on arms! And much spent on "social programs" has proven to be so politically misguided as to have "unintended" but seriously detrimental consequences for social order, as in the unmarried birth rate in the USA, for example.

MT: The situation now is that China and India are both involved in space programs, even though they give home to close to half of the world's poor. So it is not just a paradox of the West anymore.

JD: It is a paradox of the human condition. Human beings are made to understand things. And understanding requires that it never stops. Nobody knows a social system that can cure all these problems – poverty and so on. We encountered a bird the other day, underneath one of the bridges – it was really moving. The bird was probably going to die. What can we do about it? You cannot take every bird you run into that needs help and give it a home.

MT: When you are small, you can.

JD: When you are small?

MT: When you are a kid.

JD: You run into people in the streets – sometimes they are a fraud, sometimes they are for real... I do not think that semioethics is the answer to problems. Semioethics is a perspective.

MT: You have read the essay "The last Messiah" by Peter Wessel Zapffe (1993 [1933]). That very same eco-existentialist was interviewed by a magazine for mountain trackers fifty years ago (cf. Zapffe 1993 [1958]). They were talking about the human condition and so on, and the interviewer finally said: "Well, if we end up with too big problems here on Earth, we can always leave the planet – we can leave for Mars. I guess that will be technically feasible in the future", the interviewer said. At that point Zapffe had an answer which displayed his psychological understanding of human beings. Because he replied: "Yes, I am sure it would be exciting the first week. But then of course we would be starting to quarrel about taxes for mining and the inflation on margarine." His point was that we would have exactly the same problems on Mars. The human condition would not change just because we moved on to another planet. Those who have this science fiction idea, that leaving Earth would take care of any problem, are misguided because it does not fundamentally address any aspect of the human condition. And if we moved on without having learnt on this planet, we would not be likely to have a different experience there.

JD: And what planet do they have in mind?

MT: It would have to be Mars.

JD: Mars – that is the only one that would even be a possibility, and we do not know how sustainable it would be.

MT: There are some talking potentially about Venus, but that would be even more of an engineering project. What they say here [in Surviving 1.000

Centuries] is interesting, because the authors are astronomers. Their conclusion, looking ahead to the next few hundred years – and even with a perspective of 100.000 years – is that the most optimistic ones of those who talk about terraforming another planet, like Mars, are underestimating the enormous costs. Yes, it might be technologically possible, but economically it would not make sense, because it would be much easier to preserve what we have here on this planet than to recreate those conditions on another one.

(The two discuss the theoretical possibility of interstellar travels)

MT: The idea would be that we could always move on. Those who claim that humankind can potentially live forever, even after the demise of the Sun, typically claim that we can just jump from one solar system to another – whenever the technology is mature.

JD: Provided that it is mature in time.

MT: I am not saying that that is absolutely not going to happen. I am just saying that it would be crazy to base today's policies on it.

JD: Sure. It certainly would.

TO REALIZE THAT TOMORROW IS NOT A FOREVER THING

MT: Capitalism. It is not a term you use much.

JD: What term?

MT: Capitalism.

JD: No. I hate it.

MT: Why?

JD: The few people I have known that were very wealthy seemed to have a radically distorted view of life. They think that what gives meaning to life is making money.

MT: The tragedy of that view of life is that there can always be more money, and since status comes from money, you have to run even to keep your status – since it is all about relative comparisons.

JD: I do not even know what the term "capitalism" means – do you?

MT: Some would say it is denoting a free-market economy. Others would say that it denotes a certain production system. But I would prefer a definition that mentioned the mechanism of growth, because I think the term capitalism is meaningless without the notion of ongoing growth year after year. Quite often the term is used without any conscious time frame whereafter this mechanism of growth is thought to disappear. I think it is outrageous that in today's society, practically all governments have policies based on sustained growth without having any officially stated idea as to how long it should, or can, go on. But in the long run, it is bound, eventually, to be a historical phenomenon with a beginning and an end. I think this represents a bizarre naivety in today's political system. People live as if they lived in a timeless

system which can be in operation eternally – whereas in fact it does not have the fundamentals of a timeless system.

JD: I just discovered the last month or so that Pakistan has no public school system. The only schools they have are these private schools where they learn nothing but the Quran.

MT: They must have a public school system.

JD: You would think so, but they do not. I was really scandalized. That is exactly the kind of thinking that you are talking about, they think this way: "We only have to worry about now". The Pakistani government has taken no responsibility for the education of the young.

(JD suggests that each generation should be able to expect that overall, they will be better off than the last generation)

MT: In that case we are all failures in our days, because we have put constraints on the conditions for future generations, conditions which we did not have to endure ourselves. I wonder if that is too strict a criterion, though – because it is basically impossible for us to leave the world in a better state in 20 years than it was in 20 years ago. If we talk about the environmental conditions, that is. In human terms, we may be able to offer better opportunities than we had a generation ago. There are two sides to this coin – the conditions we offer to fellow humans, and the conditions we offer to non-humans. I think it is clear that in the course of the last 100 years, the conditions for humans have on many points improved – considerably, if you look at life expectancy – but this has come at the cost of the environment.

TO PINPOINT WHO ARE RESPONSIBLE

MT: You said something about responsibility which I would like to ask you about. In a family setting, the scale gives you a perspective for discussing who is responsible for what in the family. But if we are talking about close to 7 billion people on a globe with international politics and so on, what individuals are responsible for the whole? To some extent we are all responsible, of course – but in effect someone has to do more than others. Who are the ones who have this responsibility on their shoulders?

JD: That is where you get to the structure of governments. I would say the governor of the state of Indiana has more responsibility than Jean Sebeok, who happens to live in the state. And so on.

MT: So power gives responsibility?

JD: Power gives responsibility, for sure.

MT: Many would claim that it can also be a question of being responsible for achieving power for a good cause.

JD: Yes – standing for an office, not necessarily because you want the office, but because you are the only one who can get a particular thing done.

MT: There are people with a mission who would feel that it is their responsibility to have a say.

JD: Right. And they sometimes come out of nowhere. Obama is an interesting case. He is doing great, I think, but there are people who despise him. At any rate, he does seem to have a mission.

MT: So, we have got this universal human responsibility – as human beings we have a certain responsibility, which it would perhaps be inhuman of us not to acknowledge. And then you talked about the responsibility of a government. Finally, somewhere in between, we have got people with a mission. But this still leaves the question of who is responsible unanswered, or left to a power game, to anyone's initiative…

JD: The root of responsibility is what you do with your life. What are you to do with your life? There are things you can do something about, and there are things you cannot do something about. A lot of it depends on your circumstances. It depends upon your training. It depends on the work you have done to prepare yourself for when circumstances do arise. That is the first level. But then we create institutions of government. And this is where the problem starts to get really interesting. Remember the League of Nations, ahead of World War II? It completely failed. And then the United Nations was its successor. The United Nations is not working very well, but still – the situation where we need the United Nations, that type of institution, is a new state of affairs. You did not need the United Nations in the 18th century, or in the 17th century.

MT: Did you not?

TO UNDERSTAND THE DOMINO EFFECT

JD: No.

MT: At the high day of colonialism? You do not think there could be any use of the United Nations in the 1800s?

JD: You did not have the communications that could make it work.

MT: You did not have that many national states. Actually, when the UN was founded the number of national states was around 50, and today it is around 200.

JD: If you go back down through the history of the human race, you have got to get beyond tribalism. The nation states where a move away from tribalism. Most nation states are still very much based on an identity that is not connected by logics but connected by birth.

MT: But not all nation states have only one nation within them.

JD: No – it becomes more and more diversified – that is what I am saying, that we are growing out of these small, clan-like, tribal structures and into ever larger socio-cultural wholes. Though Egypt, for example, or Saudi Arabia, is still much more clan-based a nation than is, say, France. The very events of

the world force the need for these new kinds of institutions. Eventually, I am sure, you are going to have to have a governmental structure for the globe.

MT: A global government. With how much power?

JD: We are being forced, not just by population growth, into the development of new institutions that can balance off the increasing accomplishments. When they got the Russian and American cooperation in the space programs – I do not know how they ever brought that about – they get up there in space, and they can cooperate, and down here on Earth they are in each other's throats!

MT: What about the role of multinational companies? Many would be afraid of the idea of a global government, because it seems potentially oppressive. In the TV series Prison Break, there is a "Company" which secretly conspires to dominate politics. There are several conspiracy theories of a similar kind, where multinational corporations are believed to control puppet governments. Part of these conspiracy theories is based on actual lobby power.

JD: Take George Soros.

MT: He is an investor, and talks publicly.

JD: That guy has got so much money that at one point he almost wrecked the French government.

MT: He could ruin a country's economy, if he decided to.

JD: Some country.

MT: Some, not any – yes.

JD: That is dangerous. But there is no avoiding globalization. The problem is how we are to manage it as we go on. We just cannot afford to continue this route of warfare. It is going to be catastrophic.

MT: Warfare?

JD: Warfare. We are going to have to find a better way than war.

MT: Arne Næss, the deep ecologist, thinks that sooner or later – in a matter of a few hundred years – humanity will mature enough to stop fighting wars. Some would say that he is naïve to say that. Well, he is a long-term optimist and a short-term pessimist… You would perhaps agree with the goal, if not the vision?

JD: As the scientific knowledge grows, the very thing that gives us the power to travel in space also gives us the power to destroy. So it is going to be a question of whether we will use it to build or whether we will use it to destroy. Semioethics is a term that shows the need to rethink human responsibility in this larger context – and on the basis of semiosis, because semiosis is the basis of all our processes of communication.

(JD talks about a video with a duck and an eagle)

JD: The dramas that go on in nature are unbelievable, but we are mostly unaware of them. We are becoming aware of them, we have to become aware of them, and the consequences of our actions – like my idea of getting rid of all the mosquitoes.

MT: Ah! Terrible idea.

JD: It is a great idea.

MT: It would not work.

JD: Because the fish would all starve to death.

MT: You have this domino effect.

JD: Yes, exactly, the domino effect, that is it. And there is no way to become aware of the domino effect except through science. So we need to develop science, we need the education of young people, and we need an awareness of the framework within which to talk about these topics – and that is where semioethics comes in.

TO CONCEPTUALIZE REALITY APPROPRIATELY

MT: I have prepared 40 questions that I will one day ask Susan Petrilli. Here are some of those I would like you to comment on. She states – this was in an article she had in Sign Systems Studies (Petrilli 2003) – that "the approach adopted by global semiotics is predominantly of an ontological order." This concerns ontology and phenomenology, and could be taken to mean, say, that it – global semiotics – points to the true range of semiosis, and to the ontological, rather than phenomenological or ontic status of semiosis. Further, she portrays Charles Sanders Peirce as a phenomenologist within the realm of semiotics, but Thomas A. Sebeok as an ontologist – thus hinting that it is Sebeok that makes the leap from phenomenology to ontology. Here I will bring in Jakob von Uexküll, who claims that all reality is subjective appearance. Uexküll, in other words, claims that phenomenology is ontology in the sense that the appearances are the actual reality – true reality consists of appearances. In that sense, you could claim that Uexküll was introducing a global phenomenology. But that is left out of Susan's tale as she contrasts Peirce's account with that of Sebeok, and portrays the leap from phenomenology to ontology. But Sebeok's reading of Uexküll played a decisive role in his development toward global semiotics. What role would you give to Uexküll in this story of how semiotics relates to ontology, and to phenomenology?

JD: To begin with, it is important to realize that this distinction between ontology and what you call phenomenology – epistemology, is a rather late modern invention. The understanding of semiosis basically undermines it. We necessarily have to start our understanding of semiosis with our own experience with signs. And our own experience with signs turns out in the analysis to be of sign relations that do not fit the divide between ontology and epistemology. They are prior to it.

MT: Phenomenology and epistemology…

JD: Phenomenology as it came out of Husserl is an epistemology, and it is a very modern idealism. You could be a phenomenologist and not necessarily be an idealist, but as a matter of fact Husserl was an idealist. And as a matter of fact, within phenomenology you do not have the means to make a decision

between realism and idealism. So the whole problem of idealism versus realism is a creation of modern philosophy, and it is the problem that semiotics moves beyond (cf. Deely 2009b). I think it is counterproductive to try to recast semiotics in terms of epistemology and ontology. Peirce, under the moniker Phaneroscopy, developed ideas similar to Husserl's phenomenology, but Peirce never was an idealist in the modern sense divorced from what Peirce termed "scholastic realism" and deemed essential to semiotics. Peirce was raised on Kant, and he knew Kant inside-out. So when he turned his back on Kant, it was extremely significant.

JD: The notion of Umwelt is an incredibly seminal notion.[4] But if you were to confine yourself to von Uexküll's understanding of it, you would go nowhere – you are right back to modern philosophy. In the functional circle, the way Jakob's son Thure von Uexküll presented it – and I think this is also in line with Jakob von Uexküll – the plus and the minus are the real objects. The zero objects are the things.[5] But that is not actually the case. The zero object is the thing that Uexküll thought the animal has no awareness of. The animal does have awareness of it – it just is not interested in certain objects or aspects thereof, and "0" in this sense of "safe to ignore" is the actual meaning of zero (0) in the animal classification of plus (+) and minus (-).

MT: Well, these concepts are sometimes context-dependent – in one situation an Umwelt object that would otherwise be neutral would have significance.

JD: But in the animal world, in the animal awareness, there is no distinction between objects and things. So the zero does not represent things as opposed to objects, zero represents the lack of interest of the animal at a given time in a given aspect of its awareness. The whole animal Umwelt is in terms of the interest of the animal.

MT: I would agree that it does not represent things – because that is a separate distinction.

JD: When you get into the human case – that is where you begin to be aware that these objects, regardless of your interest in them, have a being of their own. And it is the investigation of that which makes possible to make better use of the objects, or simply to understand them. Did I tell you the story about the time when I was asking my class: "How many of you think the Sun goes around the Earth?" No one. "How many of you think the Earth goes around the Sun?" About a third. And then I realized the next question: "How many do not care?" – That is the animal side.

MT: We have preserved that side – we still have that side in us.

JD: Yes, absolutely. But it is the human openness to the difference between objects and things that gives the possibility of science, and that is also where the unique human responsibility comes from.

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4 For Deely's treatment of the concept, see Deely 2001, 2002 and 2004. Cf. also Deely 2007.

5 Here, 'plus' and 'minus' refers to the positive or negative functional value respectively of perceptual objects in an animal's Umwelt. Since according to Jakob von Uexküll all animal (and human) lifeworlds are constituted by what has a meaning (i.e., a relevant function) for the living being in question, 'objects with no function' ('zero objects') are, in Deely's interpretation, mistakenly deemed by some to represent an empty category. But "not interested in this or that now", he holds, hardly makes the zero an "empty category".

MT: At least the global awareness that there are things that are not just our objects, but things in their own right.

JD: I may not care for mosquitoes – if it was just left up to me, I would have killed them all. But when you realize that, if you did kill them all – look at the effect upon the fish – look at the repercussion – domino! You cannot get that kind of awareness in any other animal. That is why they do not have responsibility.

MT: I do not think the ethical solution to animal rights issues lies in changes of laws and regulations at all.

JD: Not at all? It has to be some of that.

MT: I mean, the law is reflecting changes in moral responsibility, and expressing part of it – but I do not think it sums it up.

JD: I agree with you.

MT: Sometimes you can phrase an ethical issue in terms of how the law should be changed. If I were to change any subject of law, I would change regulations on property. Because property, I think, is the idea that we can split the land of this planet between us – and that is a really anthropocentric concept. Now, there are various forms of property – private property, public property and these grey zones where even if you have private property there are governmental regulations restricting what the owner can do, and what the public has the right to do. And there are national parks. You have various concepts. But still, this is the most crucial term of the law – 'property' – and I would analyze its ethical implications. This issue concerns how we relate to land, but also the more general idea of 'ownership', which I think is a remnant of the idea that nature is here for our sake. What is not clear to me, however, is whether or not we have no choice but to deal with one concept or another of property, or whether we would be able to reason without a concept of property.

JD: The Husserlian concept of 'phenomenology' is the one that became the most popular. The Peircean counterpart, 'Phaneroscopy', has the advantage that it has a peculiar terminology that is so ugly as to be safe from kidnappers. It does not have the idealist limitations that phenomenology has come to acquire. I think it is less effective to try to cast this in terms of ontology and phenomenology.

MT: Would you accept a term such as 'semiotic phenomenology'? How would that be different from Husserlian phenomenology?

JD: It would not be necessary. Because it would be Phaneroscopy.

MT: But would it necessarily be Peircean?

JD: Yes, I think it would necessarily be Peircean in the sense that after John Poinsot (1589-1644), Peirce was the first one to really get it clear about the being proper to signs (cf. Deely 2006). I think the secret of Peirce is precisely that he was interested in many things, involved in many things, but the arc that ties it all together – the trajectory that unifies his thought – was his interest in semiotics. Most of the essential thoughts are based on his understanding of the being proper to signs, and the being proper to signs is the triadic relation. And to understand the triadic relation, you first have to

understand relation as a mode of being, not simply a comparison that the mind makes – as the moderns conceive of it. All of our knowledge has to start with our experience. And that is where the idea of phenomenology, or Phaneroscopy, comes in.

MT: Who are "we" here? We are not talking just about human subjects, are we? Are we talking about all living creatures?

JD: I am talking about human understanding of semiosis.

MT: So here Peircean phenomenology would be first of all about the human mind?

JD: About human perception and human experience.

MT: Why only human experience?

JD: Because that is the only kind of experience we have.

MT: But Uexküll talks about the experiences of any living creature – why would not he be better suited as the foundation of phenomenology – in this case, Uexküllian phenomenology? If you rid him of some of his Kantian inheritance?

JD: As you know, I agree that the concept of Umwelt is of a seminal and important character. But if you understand the concept the way it is in Uexküll, and if that is where you stop, you are still trapped in modern epistemology.

MT: Uexküll died 65 years ago, so there is really no reason why anyone but historians should resist the temptation to further develop the concept.

JD: That is exactly what Sebeok did about it. The developed concept of Umwelt is quite a different matter ─ it is not a modern epistemological notion, but a properly semiotic notion. But I find it amusing of Susan to talk about Sebeok as an ontologist. I know what she is getting at, but the terminology is questionable: Are you going to rethink the understanding of the sign through and through? Or are you going to take the understanding of the sign and try to make it fit in? That is the fundamental paradox that semiotics faces. That way of talking about signs in terms of phenomenology and ontology – it is not necessarily or wholly wrong, I just do not think it is the most effective for the longer term.

TO FORESEE NEGATIVE CONSEQUENCES OF MIRACULOUS TECHNOLOGIES

MT: To return to these points on Susan's work: She uses the term "globalization" frequently. How do you relate to that concept, as she uses it? And how do you judge the term "globalization" as it is commonly used?

JD: It is usually used in the context of capitalist economics, is it not?

MT: Partly, but not only. When people talk about "the problems of the era of globalization", sometimes it is used in this other sense of us all being, metaphorically, "in the same boat" – that a problem for one is a problem for

all, because we are all connected. So it also concerns the interconnectivity of the modern era – which is in part due to modern communications.

JD: I think that is certainly true. It is unavoidable. And quite incredible.

MT: This development has gone a long way even during my time as an adult. When I was 20, I could not easily call people on the other side of the globe. I met my wife, having to stay in touch with her online daily for 2 and a half month before we could meet again in person. That would hardly have been possible 10 years ago. Technology has an incredible impact on our lives.

JD: It is all science. That is the driving force behind all this.

(JD returns to the topic of the nature of capitalism)

JD: That is the problem of capitalism: At the heart of it you have these individuals that are incredibly wealthy, and all that their intelligence is focused on is preserving and expanding their wealth.

MT: I would say there is also a problem of technology here. Some have introduced the term 'the technological imperative' to describe the modern situation in which technologies are developed and then somehow implemented, or launched, before the technologies have been properly examined in a public discourse, or in democratic terms.

JD: Can you give an example?

MT: Well, part of the dynamics here is due to the fact that we only see the negative consequences of a new technology when it is already in full-scale use. When you develop it, sometimes you cannot even imagine what consequences it can eventually have in use. What is the name of this insecticide? DDT… When it was first launched, people thought it was a marvel. People thought: "Look at the incredible effects it has!" It was only many years later that people bothered with the fact that it functions as undiscriminating poison.

JD (chuckles)

MT: It came as a shock to people. And this happens over and over again, I think – that we belatedly discover the negative consequences of miraculous technologies. There is an irony to the dynamics here, where we over and over again think that we are saved by new technology that ends up just expanding, or changing, our field of problems.

JD: I see exactly what you mean.

MT: But there is no easy solution to it, exactly because of the whole unpredictability of development.

JD: (mentions the use of X-rays, with hazardous radiation as a side-effect) It is exactly the kind of thing you are talking about. But the only answer to it is yet more knowledge.

MT: More caution could be part of the answer here.

JD: More caution? Yes. Yes.

MT: It might be that we should not implement all the technologies we develop until we have done research – maybe even for twenty years.

JD: We do have this to some extent with regard to, for example, drug administration. But the main thing is, we always need to know more. And that is exactly what you are saying too.

CONCLUSION

MT: (pauses) In one sense, yes. I am just not – I am not saying that you are – but I am not an Enlightenment optimist in the sense that I think that knowledge in itself necessarily improves society. Sometimes, when this knowledge is technical knowledge, or knowledge that enables us to carry out new physical activities – economic activities – sometimes it solves problems, sometimes it creates problems, and most times it does both. I see no necessary connection between the intrinsic value of knowledge, on one hand, and the consequences of knowledge, on the other. I think it is interesting that our form of society is based on capitalist exploitation of scientific knowledge. Naturally you could imagine other paradigms of science in which the intrinsic value of knowledge, rather than some second-hand use of scientific results, was the purpose of science. The value of knowledge is somehow disrespected in today's society, exactly in that it is all too often made into commerce.

JD: It is the same thing that is done in the school system of the United States. They think the purpose of education is job training.

MT: Right – so they are small adults, they are not children learning, but small adults being prepared for professional careers.

JD: Right. And that is really a disaster. Of course you are going to have to make your way in the world, at some point. But the education process has an aspect of an end in itself. The person who wants to learn to be fully human has to become aware. You cannot have freedom, you cannot have responsibility – you cannot have any of that stuff without the framework of education.

MT: When we talk about knowledge, I think it is crucial to combine this talk with a concept of understanding, because I would be inclined to state that knowledge without understanding is worthless. Albert Camus once said that faced with ethical problems, there is nothing at all the person with the best intentions could achieve without at the same time having enormous levels of knowledge. So, it is extremely challenging. Then there is Heidegger, who with reference to his own experiences said that one who thinks big, fails big. There is a danger to having a naïve belief in knowledge, isolated from understanding or wisdom. It is possible to portray modern history as the further consequences of a naïve Enlightenment era. These are consequences of the fact that we have believed in knowledge, and in rationality, and ignored exactly the real-life consequences of our way of life that we are now

coming to learn about, especially related to applied science and to our economic system.

JD: Yes, and that is exactly where the idea of semiotics, of semioethics, is a remedy. But some people think the solution is not to interfere with nature. That is not the solution, because we are a part of nature, and nature is dynamic.

MT: I think nature would be fine with an arrangement like that, but humankind needs an ambitious agenda of its own. And that, of course, would involve doing something by means of nature.

JD: It is not true that it implies intervening in nature, if you consider that human beings are part of nature. Of course the universe can get along without human beings. But that does not mean that it is better off without human beings – that human beings are only interfering with these processes.

MT: We are part of nature, and cultural diversity is part of natural diversity.

JD: Yes, we are part of nature, and there is also a sense in which we are an expression of nature without which nature could not have achieved its highest goals.

MT: Nature's highest possibilities – in humans? But that does not justify killing off other species.

JD: It is not avoiding the killing that is the secret, it is about understanding where killing is necessary, and what its consequences are in the whole.

MT: Sure, but in the human realm, it is essential to delimit what limitations there are to our interference…

JD: That is exactly the consequence of understanding.

MT: You agree that there are certain restrictions?

JD: Obviously. It is exactly the acting like all other animals, rather than as human animals, that got us into the problem.

MT: That we were naïve animals?

JD: We were naïve animals. Naïve animals see the prey – "I'm hungry" – "I'll kill it" – end of story.

MT: Maybe that is a good term – the transition from naïve animal to semiotic animal.

JD: Yes! I just graded a student paper, where this young woman was trying to argue that "rational animal"[6] is a superior definition to "semiotic animal" – and of course it is not (cf. Deely 2010). And precisely for the reasons that you are talking about – it belongs to a more naïve understanding that separates humans as "above" nature, whereas semiotic animal shows both what is unique to human awareness while at the same time showing how that awareness is yet tied in with, not simply "transcendent to", the rest of nature.

[6] The notion of Porphyry (man defined as a rational animal). Deely's alternative notion of man as a 'semiotic animal' implies that humans, unlike other animals are capable of distinguishing and treating of relations in their (insensible and suprasubjective) difference from related objects, and hence to distinguish between things and objects, and thus to not only use signs but also to know that there are signs strictly in the sense of triadic relations. This "semiotic consciousness", even when only virtual, enables humans to relate to reality in its less-than-immediate configurations. The semiotic, thus defined, concerns our awareness of the relationships among objects and between objects and things. The semiosic, in contrast – the realm to which animals are confined – concerns our immediate awareness of objects as meaningfully (plus, minus, zero) in our Umwelt (lifeworld).

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Chapter 7

A SEMIOTICS DISCOURSE ANALYSIS FRAMEWORK: UNDERSTANDING MEANING MAKING IN SCIENCE EDUCATION CONTEXTS

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ABSTRACT

A Four–Level Semiotics Discourse Analysis framework is proposed to understand meaning making when scientific theories are used as explanatory models in Science Education contexts such as classrooms. This Discourse Analysis framework is derived from a semiotics perspective of scientific knowledge being interpreted as signed information and from functional linguistics approaches as articulated by M.A. K. Halliday and J. Lemke. Halliday's and Lemke's approaches to Discourse analysis are organized around three generalized semiotic meanings that relate to social action, roles of people, and organization of the text or sign. However, to understand how different signs (referred to as semiotic modalities) are used to construe meanings in Science Discourse, I argue that in addition to Halliday's and Lemke's three-level typology, a fourth aspect of meaning, the epistemological, is necessary. The epistemological aspect of meaning will refer to the nature of science, including the values involved in constructing scientific theories/knowledge. A historical analysis of the creation of scientific knowledge shows that shared values shape the nature of scientific knowledge. Hence, the epistemological aspect is integral to meaning making in Science Discourse. The application of this Four-Level Semiotics Discourse Analysis framework is illustrated within two physics teachers' teaching practices. Analysis of the way these physics teachers signify and communicate scientific knowledge and the nature of science through multiple modalities such as verbal language and visual diagrams is presented. The proposed analytical framework has the potential to guide semiotics research in the Science Education field[1] and illuminate meaning making in Science Discourse. It furthers the field of semiotics by considering how signs communicate epistemological aspects of meaning.

[1] I wish to thank Douglas Karrow for his thoughtful review and insightful suggestions.

INTRODUCTION

A current research trend in Science Education focuses on the role of multimodal representations in constructing meanings in science (Airey and Linder, 2009; Jewitt and Kress, 2003; Kozma, Chin, Russel, Marx, 2000; Kress, Jewitt, Ogborn, and Tsatsarelis, 2001; Lemke, 2002; Prain and Waldrip, 2006; Roth and Lawless, 2002). Multimodal representations/signs are also referred to as multiple semiotic modalities. Research based on multimodal representations is premised upon communication characterized by multiple modes of representation such as oral and written language, images, and actions in contrast to oral and written language (linguistic mode) being the forms of representation. This begs the question: How do multimodal signs or multiple semiotic modalities signify meanings in Science Discourse and how can these signs be interpreted in Science Education contexts?

Before answering these questions, I will clarify how I use the term Science d/Discourse. I use Gee's (2005) notion of discourse (lower-case d) and Discourse (upper-case D) to distinguish between two different d/Discourse modes occurring in Science Education contexts. Gee uses the term discourse (lower-case d) to refer to communicative events where the focus is on a linguistic mode, e.g., written language and the term Discourse (upper-case D) to describe social events that involve a coordinated pattern of words, actions and interactions, values, beliefs, symbols, tools, objects, times, and places. The term Science Discourse (upper-case D) as used in this chapter will include the linguistic mode (discourse), gestures, values, tools, and actions associated with the discipline of science.

The application of a semiotics approach to Science Education contexts illuminates the meaning potential of semiotic signs used in Science Discourse. An understanding of the multiple ways signs can be interpreted in Science Discourse may enhance the process of teaching and research in Science Education. In this chapter, I propose a Four-Level Semiotics Discourse Analysis framework to interpret how multimodal signs or multiple semiotic modalities such as verbal and written language, visual diagrams, gestures, and objects signify meanings in Science Discourse (upper-case D). Thereafter, the proposed Four-Level Semiotics framework will be used to interpret how two science educators use multimodal representations/signs to communicate scientific knowledge.

The chapter is organized in relation to the following semiotic-related questions:

1. How are signs used to signify meaning? This involves looking at the uses and functions of signs from semiotic perspectives.
2. What common signs are used to signify scientific knowledge? This involves a historical inquiry as to how these signs came into existence and how scientific knowledge encodes their meaning(s). The historical analysis supports the development of the proposed Semiotics Discourse Analysis framework.
3. Why do the signs used in Science Discourse mean what they mean? This involves describing the structural features of multimodal signs and analyzing the signs using the proposed analytical framework.

In the sections that follow, I begin by drawing on the works of semioticians such as Pierce and Eco to provide a brief overview of how signs signify meanings. I then discuss scientific knowledge as a system of signed information and illustrate how meanings may be

signified and interpreted in Science Discourse. Thereafter, I propose a Four-Level Semiotics Discourse Analysis framework for interpreting Science Discourse and illustrate its use in the analysis of two physics teachers' teaching of the concept 'inertia'.

INTERPRETING SIGNS

How are signs used to signify meanings? Semiotics is the study of meaning making through signs and is premised on the notion that signs have a triadic quality (Danesi and Santeramo, 1999). There is the physical sign itself (e.g., word, gesture); the entity being referred to (e.g., object, idea), and the sign's meaning or signification. Various philosophers and semioticians (Saussure, 1999; Pierce, 1999; Eco, 1976) refer to the sign, its signified, and its signification/meaning by different terms and have represented this relationship as a triad (Figure 1). In figure 1, the signifier/physical sign/representaman can be words, gestures, physical objects and pictures that call attention to or signify an object, event, idea/concept or being (Pierce, 1999; Saussure, 1999). The signified is also referred to as the referent or object. The process by which the object, event, idea/concept is captured and organized in some way by the sign is a form of representation. Although, not historically accepted as a common view, signs or signifiers are, "seen as suggesting meanings rather than encoding them" (Danesi, 2007, p.73). According to Pierce (1999) a sign's meaning arises in its interpretation. Pierce (1999) explains that a sign "addresses somebody, that is, creates in the mind of that person an equivalent sign, or perhaps a more developed sign" (p. 72). Furthermore, this mental interpretation includes the emotions, ideas and feelings that the sign evokes for a person at that time. Pierce refers to the sign's meaning as the interpretant.

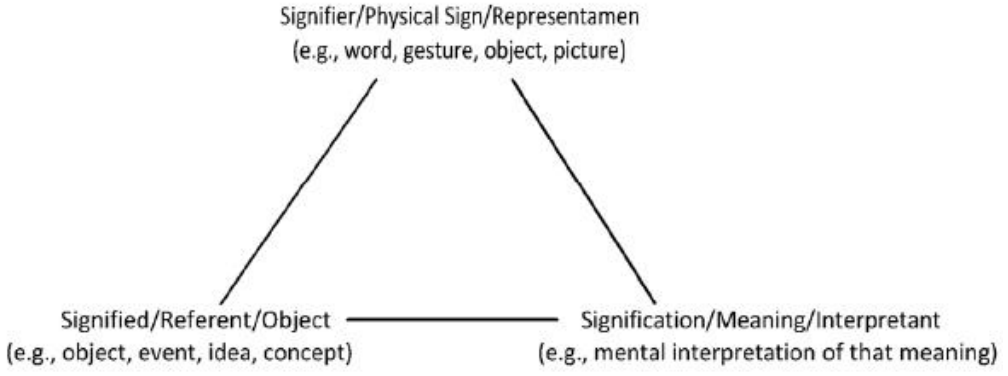


Figure 1. The triadic relationship of sign, referent, and meaning.

Pierce (1999) also describes three ways that signs are created – resemblance, relation, and convention – in turn represented through: icons, indexes, and symbols. Icons are signs resulting from resemblance, constructed to resemble their referents in some way (e.g., photographs, diagrams, models). Indexes are signs that show relations of some kind to something else in time, space, location (e.g., pointing finger, arrow, timeline graph, adverb – here, there, I, you, they). Symbols stand for some conventional practice (e.g., the V sign for

peace, words, sentences, Greek letters representing constants in math) and in science, a knowledge system of society, examples of symbols include: terms, equations, and formulae.

Eco (1979) expands Pierce's (1999) notion of sign and describes a sign as "*everything* that, on the grounds of a previously established social convention, can be taken as *something standing for something else*" (p. 16). Eco illustrates this with the term "dog" – the term "dog" does not refer to a specific, real dog in the room; it refers to all dogs in the world which is a class or set that cannot be perceived as a real object by the senses. Hence, Eco (1979) states, "*Every attempt to establish what the referent of a sign is forces us to define the referent in terms of an abstract entity which moreover is only a cultural convention" (p. 66).* Eco sees the semiotic object as the content – a cultural unit conventionally assigned by society based on a system of rules or codes. The perspective of the referent as content fits well with scientific knowledge where referents are often abstract concepts such as 'force' and 'energy'.

Eco (1979) goes on to suggest that the interpretant can also take on many forms. For example, the word 'property' (sign/signifier) is used to signify a characteristic quality when used in relation to a physical object or it could signify an object such as owned land or real estate. Signs therefore do not represent or communicate one single meaning or interpretation. Additionally, Eco asserts that the meaning or interpretant of a sign can be another sign in another semiotic system (e.g., a drawing corresponding to a word), a definition in terms of the same semiotic system (e.g., 'salt' signifies 'sodium chloride'), an emotive association (e.g., 'dog' signifies 'love'), or a translation into another language. According to Danesi (2007, p.16), "all *signification* (be it denotative or connotative) is a relational and associative process – that is, signs acquire meanings not in isolation, but in relation to other signs and to the contexts in which they occur". Furthermore, he asserts that denotative meaning points out or identifies something (e.g., object, content) whereas connotative meaning includes all other senses including emotional ones that something elicits (Danesi, 2007). For example, the word 'dog' refers to a four-legged animal kept as a pet (denotative meaning) and also conjures the emotion of miserable when used as 'a life like a dog' (connotative meaning).

How is the sign interpreted? For Eco (1984) sign interpretation mostly occurs through abduction or hypothesis. To interpret a sign, a person requires a previously established frame of reference or rule. These rules may be already established or can be hypothesized or created. Codes "provide the rules which *generate* signs as concrete occurrences in communicative intercourse" (Eco, 1979, p.49). "Codes are systems of signs that people can select and combine in specific ways (according to the nature of the code) to construct messages, carry out actions, enact rituals, and so on, in meaningful ways" (Danesi, 2007, p. 75). Danesi distinguishes between social, mythic, knowledge, and narrative codes. Social codes are those that can be used to interpret social communication and interactions (e.g., the zone/distance a person keeps in different social situations indicates the degree of intimacy present); mythic codes (e.g., action heroes representing ideal personality traits); knowledge codes are those sign systems that enable knowledge such as mathematics, science, and philosophy to be represented and communicated (e.g., trigonometry), and narrative code is a story that portrays or represents human events as perceived in a particular timeframe (e.g., novel, newspaper article). Hence, a sign can be interpreted in many ways depending on the codes used. In relation to scientific knowledge, it is the knowledge code that primarily acts as a frame of reference for interpretation of signs.

SCIENCE AS A SEMIOTIC KNOWLEDGE SYSTEM

Science is a knowledge system of signed information (Danesi, 2007). Scientific knowledge encompasses theories, symbolic generalizations/ laws (e.g., f=ma), tools (e.g., constant proportion), models (e.g., force fields), methods (e.g., careful observations), processes (e.g., deductive experiments), and shared norms and values (Kuhn, 1962, McComas, 2008). From a historical point of view, scientific language evolved to classify, decompose, and explain the scientists' world view and became documented in the following major scientific genres – report, explanation, and experiment (Martin, 1993). As well, during this knowledge creation process, many technical terms such as 'motion' were derived from the nominalization (converting to a noun) of everyday words such as 'moved'. Communication of scientific knowledge in journal articles suggests that science is more than a knowledge system instantiated in written text; the way we represent and express scientific meanings is through a variety of signs or semiotic modalities including gestures and images (Jewitt and Kress, 2003; Roth and Lawless, 2002). Analyses of science journal articles (Lemke, 1998; Roth, Bowen, and McGinn, 1999) indicate that it is normal and essential to interpret the verbal text in relation to other semiotic systems. For example, Lemke found that many journal articles displayed results in a set of graphs and a table and referred to the graph and table in the written text. Roth et al. reported that scientific articles with graphical modes provided contextual information and instructions on how to interpret graphs in lengthy captions. Understanding scientific meanings thus depended on the reader being able to interpret the different semiotic modalities by looking at how multiple signs interact with each other and how multiple signs together communicate the meaning of the content. Further, Lemke showed that meaning-making in science also involved the constant translation of information from one modality to another as well as the integration of information from multiple modalities to re-interpret and re-contextualize information in one modality in relation to the other. The most common signs that are used by cultural convention to represent the content of western scientific knowledge are written definitions, mathematical equations, images, and graphs (Lemke, 1998) and in most cases the complete meaning or interpretation requires the use of two or more semiotic modalities, or even all semiotic modalities in relation to each other (Lemke, 2002; Roth and Bowen, 2000). Lemke (2002) also points out that while each semiotic modality expresses a slightly different meaning, all meanings add to the overall meaning of the concept; hence it is necessary to use multiple semiotic modalities simultaneously to represent, communicate, and interpret the meanings of science concepts.

Science as a semiotic system constitutes a body of knowledge generated by a community of scientists using sets of codes. Besides knowledge codes (e.g., symbolic generalizations and models) that guide how scientific knowledge is represented, communicated, and interpreted, value codes play a significant role in constructing and interpreting scientific knowledge. In response to shared values, Kuhn (1996) posits that probably the most deeply held values of the scientific community "concern predictions: they should be accurate; quantitative predictions are preferable to qualitative ones; whatever the margin of permissible error, it should be consistently satisfied in a given field"(p. 185). Another set of value codes held by scientists are those used to judge theories. Kuhn explains that these values "must, first and foremost, permit puzzle-formulation and solution; where possible they should be simple, self-consistent, and plausible, compatible, that is, with other theories currently deployed" (p. 185).

The notion that science is not primarily facts, laws, symbols, theories, and tools, but constitutes a code of values that guides how the scientific community constructs and validates scientific knowledge, suggests that any analysis of meaning making of Science Discourse should include how signs represent and communicate these shared values (epistemological aspect).

The shared values involved in constructing scientific knowledge also shape views about the nature of science. The nature of science includes perceptions about how science works, how scientists interact as a social group, and how society influences scientific knowledge (McComas, Clough, & Almazroa, 1998). How science has been perceived has evolved historically over time. For example, traditional beliefs of science communicated the notion of science as a static body of knowledge derived from facts based on neutral observation; these facts were objective and could be discovered by anyone with the right set of instruments (Kuhn, 2000). It was interpretation of the facts that gave rise to scientific laws and theories, the latter in turn being used to explain natural phenomena. The scientific method (experimentation) was the process used by scientists to discover true generalizations and secondary criteria such as accuracy, consistency with accepted beliefs, and breadth of applicability were also used to evaluate the correspondence of the belief "to the real, the mind-independent external world" (Kuhn, 2000, p. 114). Current portrayals of the nature of science are less objective and more interpersonal. Kuhn (1996, 2000) illustrates how science is a dynamic practice characterized by changes in belief over time. As such, he contends that observations are not independent of all prior beliefs and theories and it is through a process of negotiation involving the factual and the interpretative that scientists reach consensus about laws and theories. Kuhn (2000) states:

> These two aspects of the negotiation – factual and the interpretative – are carried on concurrently, the conclusions shaping the description of facts just as the facts shape the conclusions drawn from them. (p. 109)

Current views about the nature of science emphasize the creative, subjective, theory-laden, tentative, and durable nature of scientific knowledge, the historical, cultural, social, political, and economical influences on the creation of scientific knowledge, the importance of empirical evidence, and the use of inductive reasoning and hypothetico-deductive testing (McComas, 2008). Since learning science is characterized by the learning of a view of science (Roberts and Ostman, 1998), any consideration of meaning-making in Science Discourse should also incorporate an interpretation of what multiple modalities communicate about the nature of science (epistemological aspect).

The previous historical overview of science as a knowledge system provides a foundation for what follows. In figure 2, I illustrate the triadic semiotic relationship of sign, signified/referent, and its meaning/interpretation in relation to more contemporary and fluid interpretations of what constitutes scientific knowledge.

As discussed above, the content of science is constituted by concepts, laws, theories, and tools, scientific processes such as predicting and measuring, and values such as judging the validity of theories. Hence, in figure 2, I use the term content or scientific knowledge to indicate the signified/referent. The content, in this case scientific knowledge consists mainly of culturally assigned abstract entities such as concepts, theories and laws, processes, tools, and values.

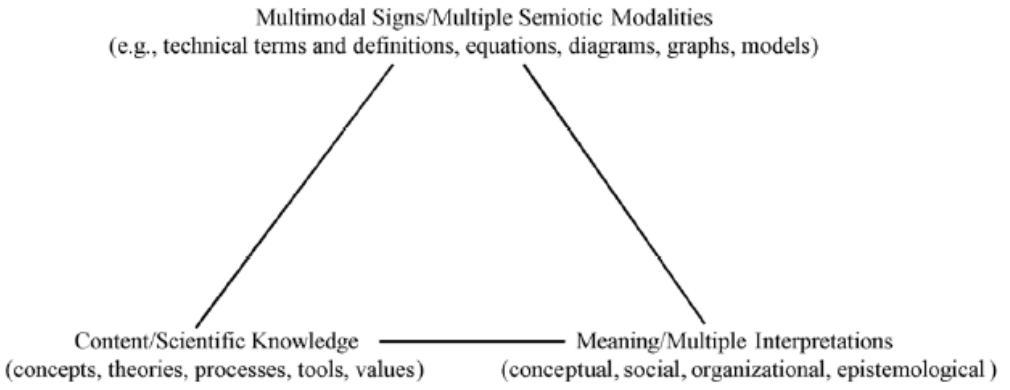


Figure 2. A semiotic relationship of sign, referent, and meaning for Science Discourse.

It should be noted that from a semiotics perspective, when a sign is used to signify the content, the sign first evokes an "image" or a mental picture of the content (Danesi, 2007). It is "the culture-specific interpretation that is assigned to that picture" that is called a concept (p. 17). Two types of concepts have been distinguished: a concrete concept is where the content can be observed in a direct way – be seen, heard, smelled, touched, or tasted; an abstract concept is where the content cannot be perceived in a direct sensory way. Concepts in science are mainly abstract ideas such as 'gravitation' or 'symbiotic' designating phenomena or categories of entities, events, or relations.

In Figure 1, a single sign is used to signify the content. However, in Science Discourse, a combination of signs signifies meanings (Lemke, 2002). Hence, in Figure 2, the physical sign signifying meaning is multimodal signs or multiple semiotic modalities. These multimodal signs in Science Discourse can be a combination of modalities such as technical terms and definitions, equations, diagrams, graphs, and models.

With regard to the third component of the triad, the meaning/interpretation, Halliday (1994) maintains that all meaning making in communicative events (Discourse) involve three aspects of meaning related to the social action, the roles of people and the organizations of the sign or text respectively. Drawing on the work of Halliday, Lemke (1998) proposed the following three aspects of meanings constructed during Discourse: presentational, orientational, and organizational. These three aspects of meaning and their application to Science Education Discourse will be explained in the succeeding section. Of significance to the interpretation component in Figure 2, is the idea (as shown by the brief historical analysis above) that scientific knowledge is construed by theories and symbolic generalizations (conceptual aspects) and shared values and the nature of science (epistemological aspects). Since Lemke argues that the different aspects of meaning are constructed simultaneously during interpretation, I extend Lemke's typology by considering an additional "epistemological" aspect of meaning. I propose that the interpretation of signs in Science Discourse (illustrated in Figure 2) involves multiple interpretations related to four aspects of meaning. All told, these four aspects of meaning – conceptual (presentational), social (orientational), organizational, and epistemological – comprise the Four-Level Semiotics Discourse Analysis framework useful in interpreting how multimodal signs represent and communicate meanings in Scientific Discourse.

A Four-Level Semiotics Discourse Analysis Framework

Halliday's (1994) and Lemke's (1998) three-level typologies to explain how meaning making occurs in Discourse are grounded in Systemic-Functional theory that has its origins in the intellectual tradition of European linguistics that developed following the work of Saussure (1999). Lemke's framework will be elaborated as it extends the use of Halliday's typology for linguistic texts to include the visual-graphical mode, a mode that is commonly used to express scientific meanings.

Lemke (1998) outlines three aspects of meaning that are constructed during Discourse:

- a presentation of events, actions, relations, processes;
- an orientational stance towards and for the presentational content and participants; and,
- the organized and meaningful relations between elements of the discourse.

The presentational meaning in linguistics mode, according to Lemke (1998), reflects the way we use grammar to construct a theme or topic, or make predictions and arguments. The presentational function of meaning therefore describes participants, processes, relationships, and circumstances. It constructs what is actually taking place or what is actually happening in relation to associated participants (agents, instruments) and circumstances (where, why, under what conditions). For visual-graphical semiotic resources such as diagrams and graphs, presentational aspects manifest in elements (e.g., arrows) that are arranged to illustrate meaningful relations between elements about a concept or topic (Lemke). The orientational meaning involves an orientational stance (attitude and viewpoint) towards the presentational content and participants. Orientational aspects of meaning in linguistic mode refer to the statuses and roles of participants in the communicative event (e.g. friendly, hostile, formal) and social relationships between producer of text and reader/listener (e.g. pleased, displeased) (Lemke). Orientation also indicates the stance indicated by the text (e.g. an evaluation of the text as good or bad) and how the text positions the reader and the producer in relation to other viewpoints (Lemke). For visual graphics, typographical tools such as italics and boldface emphasize importance and act as orientational tools. The organizational aspect of meaning refers to the organizational relations between the parts of speech (Lemke, 1998). For example, in oral or written speech, clauses are combined in certain ways to produce meaningful sentences and paragraphs illustrating relationships such as cause-effect or whole-part relations. As well, the organizational aspects of visual diagrams such as typographical tools (e.g. geometric figures, arrows) and compositional tools (e.g. texture, colors) also indicate which elements are to be read in relation to each other (Lemke, 1998).

Drawing on these three aspects of meanings described by Lemke (1998) and the semiotic relationship of sign, referent, and meaning for scientific knowledge proposed within Figure 2, I describe the Four-Level Discourse Analysis framework for Science Discourse in relation to the following four aspects of meaning: conceptual, social, organizational/pedagogical, and epistemological.

Conceptual Aspect of Meaning

This aspect of meaning mainly indicates the denotative meanings (in this case the intended scientific meanings) expressed by multimodal signs during Science Discourse. The interpretation of signs is in response to the question: How do the multimodal signs represent and communicate the conventionally assigned meanings of scientific knowledge? The conceptual meaning is similar to Lemke's (1998) presentational meaning. In relation to Science Education Discourse, the conceptual aspect of meaning is mainly reflected by conceptual aspects such as scientific theories and laws, predictions and arguments, and scientific applications in a variety of contexts.

Social Aspect of Meaning

The social aspect of meaning focuses on the interpretation of signs in response to the question: How do multimodal signs position the participants in relation to each other and scientific knowledge? This meaning aspect is similar to Lemke's (1998) orientational meaning. In Science Education Discourse, the social aspect of meaning will refer specifically to how multimodal signs position the student in relation to the science educator and scientific knowledge. For example, the social aspect of meaning is reflected in how the voice of the teacher and textbook position the learner in relation to science.

Organizational/Pedagogical Aspect of Meaning

The organizational aspect of meaning focuses on the meanings communicated by the choice and sequencing of signs, attempting to answer the question: How are multimodal signs structured and sequenced to communicate conventionally assigned meanings of scientific knowledge? It includes organizational aspects as described by Lemke (1998). Additionally, in Science Education Discourse, meaning-making is also dependent on pedagogical aspects such as the structure and sequencing of multiple modalities (Jaipal, 2010). For example, how does the teacher differentiate modalities to scaffold learning for students with different language abilities? Hence, the organizational aspect of meaning will also include pedagogical aspects related to sequencing modalities for teaching and learning.

Epistemological Aspect of Meaning

The epistemological aspect of meaning involves interpretation of signs in response to the questions: How do the multimodal signs represent and communicate the nature of scientific knowledge? What do the multimodal signs communicate about valued processes and valid scientific knowledge? In the context of Science Education Discourse, Kress et al. (2001) reported that teachers communicated general epistemological meanings through particular configurations of modes. For example, teachers used empirical evidence and measurement, analogy, classification, and presentation of facts through a textbook to implicitly

communicate the nature of knowledge as given fact. In other situations, teachers referred to p phenomena in everyday life, recognizing too, the Ontological nature of scientific knowledge.

Table 1. A Four-level Semiotics Analytical Framework for Interpreting Science Discourse

Aspects of Meaning	How the Sign is Interpreted
Conceptual aspect of meaning	How do the multimodal signs represent and communicate the conventionally assigned meanings of scientific knowledge
Social aspect of meaning	How do the multimodal signs position the participants in relation to each other and scientific knowledge?
Organizational/Pedagogical aspect of meaning	How are multimodal signs structured and sequenced to communicate conventionally assigned meanings of scientific knowledge?
Epistemological aspect of meaning	How do the multimodal signs represent and communicate the nature of scientific knowledge? What do the multimodal signs communicate about valued processes and valid scientific knowledge?

With regard to valued processes and valid knowledge, processes that count as valid ways of reasoning in science include deductive, inductive and abductive reasoning. Very briefly, deductive reasoning moves from the general rule to the specific application; inductive reasoning begins with observations that are specific and limited in scope, and proceeds to a generalized conclusion that is likely, but not certain, in light of accumulated evidence. Much scientific research, involving processes such as gathering evidence, seeking patterns, and forming hypotheses or theories to explain what is seen, is carried out inductively. In contrast, abductive reasoning typically begins with an incomplete set of observations (outcomes) and proceeds to the likeliest possible explanation for the set. Such reasoning yields a problematic theory explaining the causal relation among the facts (Wirth, 1998).

The Four-Level Semiotics Discourse Analysis framework for interpreting how multimodal signs represent and communicate meanings in Science Discourse is summarized in Table 1.

A SEMIOTICS DISCOURSE ANALYSIS OF SCIENCE DISCOURSE

To this point, the semiotic relationship of multimodal signs, content, multiple interpretations was proposed to understand meaning making in Science Discourse. Lemke's (1998) typology of three aspects of meaning was then extended to propose a Four-Level Discourse Analysis framework that included the epistemological aspect of meaning for interpreting Science Discourse. This section addresses the following questions: Why do the signs used in Science Discourse mean what they mean? How do multimodal signs interact with each other to represent and communicate the four aspects of meaning during Science Discourse? The following two examples illustrate how the Four-Level Semiotics Discourse Analysis framework, previously outlined, can be used to interpret how multimodal signs represent and communicate meanings in the teaching of science in a Science Education

setting. In particular, I will analyze how two high school physics teachers used multimodal representations/signs to represent and communicate meanings associated with the concept of inertia. Initially, the analysis contextualizes the use of the multimodal signs in relation to the social context (Science Discourse in classrooms).

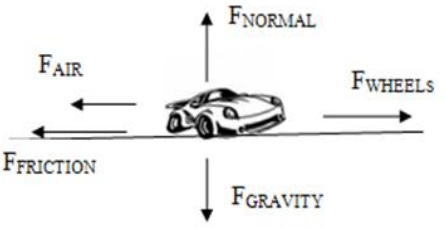
Science Discourse in science classrooms differs from Science Discourse among the scientific community in that new scientific theories are not being construed in science classrooms. In contrast, established scientific theories are used by science educators as explanatory models to explain science phenomena. While the types of signs or semiotic modalities used by scientists to represent knowledge may be similar to what science educators use in classrooms, science educators tend to select from a wide range of modalities to explain and elaborate concepts. Modalities are also selected by educators based on previous experiences implementing them with students in classrooms. Research shows that one factor, among others, affecting how modalities are selected, is teachers' views of the subject, teaching, and learning (Shulman, 1998). The two physics teacher's views were elicited from a series of qualitative interviews and supported by lesson artifacts such as lesson plans and worksheets. An analysis of each physics teacher will consider the ways they view science and learning in science and their corresponding choice of modalities to teach science. The culturally specific/conventionally assigned scientific meaning of inertia is typically reflected within a physics textbook. For the concept inertia, the scientific meaning is described by the following written definitions: Inertia is the natural tendency of an object to remain at rest or in motion at a constant speed along a straight line. Newton's first Law is described as: an object continues in a state of rest and in a state of motion at a constant speed along a straight line, unless compelled to change that state by a net force (Cutnell and Johnson, 2001).

Interpreting Multimodal Signs in Science Education Discourse: Mr. Hurd's Teaching Practice

Mr. Hurd, an experienced physics teacher, chose the following modalities to represent and communicate the concept inertia:

A. Verbal questions related to an everyday experience: "When you are going along in a car, you stop at a street sign, what happens? Why? So you are driving along and you turn a sharp corner, what happens to you? Which side do you lean to? Why?"
B. Verbal statement of Newton's Law: "Newton's first law of motion is commonly called the law of inertia: things keep doing what they always do unless something happens to change it."
C. Verbal Analogies: "People keep doing what they've always done. If you always get up at say, six o'clock in the morning, you'll get up at six o'clock in the morning. If you like to sleep in, you'll always sleep in. That's just the way you are. That's your inertia and it takes something drastic to change because you do what's comfortable for you. "What's an easy way to run?" Fast-slow, fast-slow, fast-slow or just at a moderate pace all the way? You can't run fast and then slow and then fast and then slow; it just wears you right out. But keeping at a constant even speed if you can for a longer time, you can do that because that's inertia. Your body likes to keep doing what it's doing."

D) Diagram



E) Equations $F_N + F_g = 0$ $F_W + F_A + F_f = 0$

All forces balance, velocity is constant. Motion is unchanged ⟶ inertia

Mr. Hurd had explained his view of science as "the process of understanding the physical world around you" and his role as "to develop in the kids an appreciation for the world around them and to develop in them a sense that they can solve problems." Mr. Hurd's intention was "to teach them [students] concepts in a way they can understand" and "to speak in a language that they can understand". His predominant use of the verbal narrative mode related to everyday experiences to signify and communicate the meaning of 'inertia' appeared to be consistent with his expressed beliefs (explained below).

The *conceptual meaning* of 'inertia' as an object at rest is first represented through a series of verbal questions of an everyday situation experienced in a car (mode A). These questions evoke a visual image or mental picture of the abstract scientific concept in relation to the student and his or her motion in a car. The use of the word "you're" positions students as active participants in the science phenomenon and in the meaning making process. Situating the phenomenon in a familiar, everyday experience situates scientific knowledge within student's experiences and minimizes the *social* distance between scientist's ways of knowing and students' everyday ways of knowing and experiencing, portraying an image of science as being an integral aspect of students' lives. *Pedagogical or organizational* aspects such as the use of "Why" and follow-up questions – "Which side do you lean to?" – serve to focus attention on details necessary to establish relations between objects and states of motion.

The first Law of Motion is then initially presented as a relationship between "things" and "something" (mode B). The language used is colloquial/everyday and tends to *position* scientific knowledge as accessible to students in terms of language and experience (*social meaning*). The use of the word "unless", however, signifies and introduces the idea of a cause-effect relationship, *organizing* the stage for the introduction of formal scientific terms such as 'force', and supporting the construction of the *conceptual meaning* of 'inertia'. At this stage of the sign representation, the concept of inertia has only been introduced through an example of an object at rest. The notion of an object in constant motion (a phenomena that is difficult to experience or visualize because of the presence of friction) is explained through two non-scientific analogies (mode C). These analogies of actions in everyday life illustrate the meaning of 'inertia' and thus serve to minimize the *social* distance between students' experiences and the abstract science concept. Everyday words such as "keep doing", "always done" combined with words such as "constant speed" and "takes something drastic to

change" work together to emphasize the *conceptual meaning* of inertia as involving objects at constant speed or motion. *Organization* of elements in sentences such as the use of the words "but" and "because" communicate cause-effect relationships and pedagogical aspects such as repetitive sentence structures "keep doing what it's doing" reinforce the *conceptual meaning* of inertia. The analogy is then followed by a concrete diagram that illustrates the different forces acting on a car in constant motion (mode D). *Orientational* aspects of the diagram such as arrows show the direction of force and reinforce *conceptual aspects* of meaning. They also support the derivation of another sign of the concept - a mathematical equation (mode E). The mathematical equation illustrates how the different forces are related to each other quantitatively for objects in constant motion – showing the net force acting on the body is zero.

Mr. Hurd's use of the verbal explanatory narrative does however implicitly communicate a view of scientific knowledge as being a well-established, expository, cultural system of meanings; the nature of science (*epistemological meaning)* as experiential, involving processes of reasoning such as deduction, induction and abduction, is not communicated explicitly through the verbal, explanatory modalities. As well, all modalities are created by the teacher, which can be interpreted as fostering a social and power hierarchy between student and teacher and student and scientific knowledge. Multiple teacher-generated modalities in this instance place the teacher as the authority and suggest that scientific knowledge is valid and valued when communicated by the teacher and textbook rather than the student.

Interpreting Multimodal Signs in Science Education Discourse: Mrs. Lowe's Teaching Practice

Mrs. Lowe, also an experienced physics teacher, chose the following modalities to represent and communicate the science concept 'inertia'.

A. Visual images with narrative: A video entitled "Inertia" of the historical development of the concept of Inertia from Aristotle to Galileo to Newton
B. Written questions for students to answer about the contents of the video followed by a class discussion. E.g., Describe Galileo's thought experiment that led to the idea of inertia? What type of motion did Galileo think continued unless it was interrupted?
C. Demonstration: Propelling a ball out of a moving cart and the ball continues moving and lands back on the cart
D. Hands-on activity of marble on a dynamics cart with worksheet instructions and questions for students to learn about the "natural" motion of an object and qualitatively derive Newton's First Law
E. Written application questions for students followed by discussion: E.g., "What happens to you if you drive in a car around a sharp corner without reducing your speed?" "What happens to you if you are riding in a car and the driver suddenly slams on the brakes and you are not wearing a seat belt?"
F. Student generated force diagrams based on a scenario: "Draw a picture of a car at constant speed and show the forces acting on it?"

Mrs. Lowe wanted to "open up students' minds in science to new ideas and concepts and [show students] how to approach them in a scientific way – to look for evidence, to question" and to see science in the context of society. She engaged students in thinking about scientific ideas through visual, verbal, written, and action representations. Her personal beliefs about the nature of science (*epistemological aspect)* were supported by her *sequencing* of multiple modalities. A historical video (visual mode - A) about the changes in ideas about motion from Aristotle to Newton communicates the evidence-based nature of science, the changing nature of scientific beliefs over time, and the religious, social and political influences on the construction of scientific knowledge. These *epistemological aspects,* particularly the nature of scientific knowledge as changing over time and involving reasoning processes such as abduction, are reinforced by explicit written questions such as "Describe Galileo's thought experiment that led to the idea of inertia?" and "How did Newton change Galileo's Law of Inertia?" (mode B). Besides communicating the nature of science through historical examples, the video also provides representations of cases of inertia and introduces the *conceptual meaning* of inertia. Further analysis of the organization of the questions suggests that the *sequencing* of questions supports the development of the conceptual meaning of inertia. The order of questions shows the progressive historical development of inertia. Additionally, in the question "What type of motion did Galileo think continued unless it was interrupted?" the use of the word "unless" introduces the notion of a cause-effect relationship and signals the idea of a force. Another feature of the questions is the language used - academic and formal terms (e.g., proposed, motion) signal science as a formal body of knowledge that is different from everyday explanations.

Consistent with Mrs. Lowe's belief of looking for evidence, the use of a demonstration and a hands-on experiment (action modalities C and D) signal the nature of science as experiential and evidence-based and reinforce the *epistemological* aspect of meaning. However, these action representations, involving the movement of a ball on a dynamics cart, simultaneously communicate the *conceptual* meaning of inertia as an object at rest and in uniform motion. In this case, concrete and visual representations of the abstract concept 'inertia' reinforce and extend observations from the video. A worksheet, accompanying the hands-on activity, serves to organize the development of the concept of 'inertia' and the derivation of Newton's First Law. Step-by step procedures on the worksheet - *organizational* aspect of meaning - contribute to the conceptual aspect of meaning.

Once the First Law has been generalized from observation and experiment, the use of everyday applications such as the seat belt scenarios (mode E) position scientific knowledge within everyday phenomena and minimizes the gap between scientific knowledge and everyday explanations (*social aspect*). The use of the personal pronoun "you" in the scenario questions supports the *social aspect* of meaning by situating the student within the phenomena, thereby personalizing scientific knowledge. Force diagrams, the final mode (F), signal another feature contributing to the *conceptual meaning* of 'inertia' – the specific forces, their direction, and how they interact with each other. The word "draw" and "show" indicate the type of *organizational aspects* (pictures and lines of force) required to communicate the conceptual meaning of inertia on a diagram. Drawing on students' personal, everyday experience to draw a force diagram once again suggests that scientific knowledge is represented as accessible (*social meaning*) and portrayed as an integral part of everyday phenomena (*epistemological meaning).*

In Mrs. Lowe's case, modalities generated by students (diagram, written law) and a hands-on activity situate students as active participants in representing and communicating scientific meanings. Active participation in the representation of scientific knowledge tends to minimize the social and power hierarchy between students and teacher and students and scientific knowledge.

CONCLUSION

In this chapter, I applied a semiotics approach to interpret how multimodal signs signify meanings in Science Discourse. I provided research-based evidence to argue that multimodal signs or multiple semiotic modalities signify scientific knowledge. I also argued and demonstrated that in addition to the three-level typology outlined by Halliday and Lemke, a fourth aspect of meaning, the epistemological meaning, is necessary to interpret how multimodal signs signify or suggest meanings in Science Discourse. Consequently, I argued that multiple semiotic modalities in Science Discourse require interpretation in relation to four meaning aspects: conceptual, social, organizational/pedagogical, and epistemological. A Multimodal Semiotics Discourse Analysis framework incorporating the four aspects of meaning was developed and proposed as a way to provide insights into how multiple semiotic modalities represent and communicate meanings in Science Discourse. The potential usefulness of the framework was then demonstrated by analyzing the teaching strategies used by two high school physics teachers.

An analysis of the two different approaches to teaching the concept inertia in secondary school illustrates the utility of this Semiotics Discourse Analysis framework for interpreting Science Education Discourse. The use of the semiotics framework made it possible to interpret how teachers' choices and sequencing of different multimodal signs signified the four aspects of meanings in relation to scientific knowledge. For example, in the two teaching approaches, the verbal, expository modality represented science as well-established theories while concrete, visual and action modalities represented science as experiential and evidence-based.

The utility of the Framework has also been demonstrated through the detailed analysis of a biology teacher's classroom Discourse (Jaipal, 2010). These analyses suggest that a semiotics discourse analysis has the potential to reveal a teacher's tacit knowledge of pedagogy, content, and epistemology and that this knowledge can be used to help science educators reflect on their choices and sequencing of modalities, particularly in relation to the kinds of epistemological meanings communicated about the nature of science. This is particularly relevant in light of the emphasis in Science Education to educate students to make informed decisions about scientifically based societal and personal issues (Lederman, 2007).

It is important to note that this Four-Level Semiotics Discourse Analysis framework has been applied in two contexts: one, these two physics teachers' classroom practices, and two, in another study examining a biology classroom (Jaipal, 2010). The framework may be informative in several ways.

First, in these contexts there is the suggestion it has the potential to be used by researchers to understand how multimodal signs signify and represent meanings in relation to concepts and topics in different science disciplines.

Second, it may also have pedagogical implications for science educators striving to diversify instruction, solicit multiple modalities as expressions of learning, directed toward clarifying students' understandings of scientific knowledge while broadening their understandings of the nature of science.

Third, another fruitful area of investigation is the application of the Semiotics Discourse Analysis framework to other Science Discourse settings such as a research laboratory. Such an analysis may yield insights that might enhance the process of research, the communication of research findings, and the manner research can be appropriated.

Fourth, the proposed analytical framework has the potential to guide semiotics research in the Science Education field and illuminate meaning making in Science Education Discourse. Lastly and conversely, it may, as well, because of its unique application to Science Education, further the field of semiotics as suggested by considering how epistemology also conveys meaning.

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Chapter 8

SEMIOTIC CONSTRAINTS OF THE BIOLOGICAL ORGANIZATION

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ABSTRACT

Living systems are self-maintained semiotic structures open for material and energy flows but "closed for efficient causation" (Robert Rosen). The factor which introduces the organizational invariance and generates such a closure has a fundamentally semiotic nature.

The system having the semiotic parameter of organizational invariance physically exhibits stable non-equilibrium and is able to transform and evolve according to basic symmetric and combinatorial rules. The living process is self-referential: the biological system in its development and reaction to external stimuli makes an internal choice by reducing indeterminacy of the potential field in interaction with the environment. In other words, the system measures itself as embedded into the recognized part of the environment, the *Umwelt*.

This reflective action is based on the semiotic structure of living system, which includes the inherited description with rigid grammar and the flexible combinatorial rearrangements generating possibilities of internal choice. The inherited description itself can evolve towards incorporation of the environmental inputs as recognized (i.e. signified) by the system. The social evolution starts when the parameters designating the world as a whole and representing the actual infinity are encoded within the semiotic system. This allows the semiotic expansion of the *Umwelt* by using the external elements as labor tools, by directing human-driven evolution, and by discovering new energy sources.

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INTRODUCTION: SEMIOSIS AND LIFE

Biological systems possess contextually determined semiotic relations within and between them (Sebeok, 2001). This is manifested in the existence of different systems of signification, the most fundamental of which is the genetic code. It possesses the properties established by Saussure (1983) to all languages such as the arbitrariness of the sign and the linear character of the signifier (*signifiant)*. Even for the genetic code, there were attempts to explain it in purely physical terms of steric correspondences however such explanation is not substantiated by any evidence. Language can arise in a structure that has certain holistic mode of behavior making possible a selective choice. From this point of view, the semiotic approach to description of biological systems (Sharov, 1992) claims that the biosystem is not simply fractionable into two functional parts, corresponding to a hardware and software. It contains a significative system (genome) which encodes its structure, but in turn, the system of significations is internally reproduced within the system and is repaired through the sets of internal constraints coming from the elements that it encodes (Igamberdiev, 1992). Such a system represents a single entity, with a locally stable point attractor (steady-state). Moreover, it possesses other types of control besides error-based cybernetic controls. One of them is based on an anticipation, in which some present action is taken, not to correct an error which has already occurred, but to pre-empt an error which will occur in the absence of that action (Rosen, 1985). The control here is based not on the past, but on the future through the agency of a predictive model, which converts present information into predicted future consequences. These consequences provide the basis for present actions. Such a control system works on the basis of predictive models rather of cybernetic feedbacks.

To describe biological systems, the founder of biosemiotics Jacob von Uexküll introduced the concepts of *Umwelt* and *Funktionkreis* (Uexküll, 1982). The Umwelt (German word meaning "surrounding world" or "environment") designates the world in which biological systems live, meaning that they not only inhabit but actively form and support it. This world is not equal to the physical world but it has certain characteristics common to all living systems which constitute a subset of this Umwelt – the common Umwelt, corresponding to basic parameters of the physical world. The Umwelt is usually considered as a "subjective universe" (Uexküll, 1973; Sebeok, 1977) and the organisms can have different Umwelts, even though they share the same environment (Kull, 1998). The physical spacetime is really the most robust part of the system of interconnected Umwelts.

The Funktionkreis (functional cycle) describes all phenomena of the subject-specific interpretation. The Funktionkreis operates through perception, interpretation and feedback (Uexküll, 1982). From the modern point of view, Uexküll understands the interaction of an organism and environment in nonlinear, dynamic-cyclical terms, involving feedback loops. However this interaction should include internal holistic organization of a biosystem based on its semantic closure. For Uexküll, the Funktionkreis is the theory of meaning (*Bedeutunglehre*). In Uexküll's Funktionkreise, the signal caught by receptor is transformed internally (in subject's inner world) to the effective action. This transformation has a semiotic nature being internally determined. The reductionist study of system's structure will not help in establishing this response. The Funktionkreise always includes recognition which does not work in an algorithmic way (i.e. bit-to-bit checking) but possesses a mutual coherence of forms. The fundamental feature of this structure is that each of its members signifies other

members through attaining different functions. Each component signifies another component and is signified by this another component, in other words it is both the signifier (*signifiant)* and the signified (*signifié)*. This is the idea of code duality suggested by Lotman (1990) according to whom a symbol serves as a condensed program for the creative process.

Semiosis could be defined as the appearance of a connection between things, which do not have a priori anything in common, in the sense that they do not interact or convert each other through direct physical or chemical processes (Kull, 1998). However, as far as the relation between them, once established (by a subject), is nevertheless intermediated by physical or chemical processes, this infers that the relation is semiotic as long as it is established through learning. This also means that there exist entities in the world (like 'meaning' of signs) which can influence only living systems and not non-living ones. Semiotic phenomena do not belong to the physical reality. The existence of two different recognition processes (local and global, in relation to a particular translation act) in every semiosis can be seen as another way of describing the existence of two codes in every sign process. The idea of code duality (using the terminology of analog *vs.* digital encoding) is important for understanding the mechanism of semantic information transfer.

The concept of Funktionkreis was further transformed in the dynamical theory of information processing developed by Barham (1996) who realized that every act of knowing involves a low-energy interaction between a component of a non-linear system and an environmental input signal that causes the component to undergo a state transition. Barham regards living cells as ‘epistemic engines’, in which a low energy or regulation (epistemic) stroke and a high energy or work (pragmatic) stroke constitute the work cycle. Both phases of the cycle are connected in such a way that the low-energy (informational) constraints act as signs with respect to high energy (pragmatic) constraints, leading to semiotic correlations that have predictive value. Biological oscillators possess the ability to measure certain low-energy environmental signals which are transformed into actual work. It is essential that correlation between such a signal and the response is a semiotic (epistemic) correlation. In accordance to this, every biofunction contains a subsystem ('epistemon'), a sort of sense organ which acts as a trigger for the functional action of the whole system. Receptor molecules or active sites of enzymes are considered as such epistemons (Barham, 1996).

The recognition of a certain compound by the receptor site is based on the spatial and structural correspondence which can be described by the well-known model of 'key and lock'. This correspondence is realized as being inducible, i.e., the recognizing system induces correspondence of its structure to the structure of an external object and therefore constructs its image (or imprint, or '*Gestalt*'). Therefore an external object is imprinted via the fixation of characteristic features of its structure. The reaction of a system caused by an external object cannot simply be deduced from its structure, and these two components are joined by a relation possessing semiotic character. The consistent reproduction of this relation is possible via operation of the second semiotic subsystem - the encoding (digital) system. Biological system therefore includes two semiotic subsystems, one based on the structure of imprint and on the recognition of three-dimensional shapes (images), and the other based on the digital linear structure of code. The appearance of consciousness is connected with the formation of a digital system of human language. The semiotic system of human culture is subdivided into the two subsystems: of the scientific and of the humanitarian knowledge. This 'dialogic' structure provides the possibility of self-growing of semiotic system (Lotman, 1990).

SEMIOTIC CONSTRAINTS OF THE "CLOSURE TO EFFICIENT CAUSATION"

According to Rosen (1991), biological systems are closed to the efficient causation. The closure to efficient causation corresponds to the entailment of efficient cause within the system and thus to the generation of an internal stimulus for movement that we define as living process. The system perceives the signals from outside to react on them according to its internal efficient cause in the course of the *Funktionkreis* dynamics. To perceive external signals as signs, the system needs to transform the signals through the internal sequence of signal transduction cascades in which the elements serve both as carriers of information and are embedded into internal energy flows. In such behavior, some elements of the system must be doing a "double duty", as an ordinary material constituent, and as a predictor for something apparently quite unrelated in material terms (Letelier et al., 2006). It means that the element of the system represents an anticipatory relation, i.e. it belongs both to the sets of elements and the sets of relations (Rosen, 1985). This kind of a "double duty" is difficult to accommodate in the dynamical terms but it can be analyzed in the semiotic terms. It is related to the phenotype-genotype dualism, which is characteristic of biological systems in general, but which is essentially absent in the inorganic world. However, it is not completely reducible to the phenotype-genotype dualism representing a quality of certain elements of the system that can fulfill the duties of provision of the organizational invariance. They can belong simultaneously both to the "hardware" and the "software" parts (Igamberdiev, 2009).

Rosen (1991, 2000) suggested and developed explicitly the alternative to the classical dualistic genetic model of the biological system. He called it (*M*,*R*) system where he considered *M* as metabolism and *R* as repair. The elements of metabolic system are continuously repaired or, more correctly, replaced (Letelier et al., 2006), the elements that replace them are also replaced, and this can go to infinite regression. However, Rosen stated that the system can be "closed to efficient causation" and contain the internal principle of the organizational invariance (Rosen, 1991) which results in avoidance of the infinite regression and closure of the system in a stable non-equilibrium state in which the system, remaining open to the material flows, becomes selective to them and affords being closed to efficient causes that are locked inside it. By formulating these basic principles, Rosen introduced the general basic structure for life, which has a capacity for internal development via internal rearrangements with simultaneous redefinition of the organizational invariance. In fact, the structure imposed by Rosen is triadic and it includes the central principle of "organizational invariance" (can be defined as *O*) holding *M* and *R* in the state of avoidance of the infinite regression for the internal system's time *T*.

Rosen's theory contains the formulation of a relevant formal apparatus for describing biological systems. Although this apparatus needs further development, it represents a unique attempt to structure the formal basis for description of living systems. Other approaches that should be mentioned here are Eigen's theory of hypercycles (Eigen and Schuster, 1979) having some features common to Rosen's ideas in the notion of hypercycle closure but reducing evolution to random mutations within hypercycles and to their natural selection, the phenomenological biosemiotic model of Pattee (1972), and the autopoietic theory of Maturana and Varela (1980). Below we outline the basic principles of Rosen's concept and describe its possible connection to semiotics. Rosen extensively used the category theory for

description of (*M,R*) systems, and the semiotic aspect of this theory is also evident (Kull, 1998).

In Rosen's concept, the (*M,R*) system is viewed as a conjunction of three mappings *F*, *Φ*, *β* uniting two sets *A* and *B* that have correspondingly elements *a* and *b*:

$$A \xrightarrow{F} B \xrightarrow{\Phi} Map(A,B) \xrightarrow{\beta} Map(B(Map(A,B)))$$

In this system of mappings, the following assumptions are set:

F(a) = b,

Φ(b) = F,

β(F) = Φ with *β* equivalent to *b*.

We can write $\Phi \vdash F \vdash b \vdash \Phi$, where the symbol ⊢ means "entails" (Kercel, 2007). The map does not merely entail the result but contains it, which becomes a consequence of the semiotic relation when we have a closed significative structure of a bootstrapping type.

A formal entity *β* has the property that *β(F)=Φ*. Thus, *β* is a mapping between *Map (A,B)* (the set of possible metabolisms) and *Map (B(Map(A,B)))* (the set of possible selectors). The procedure defined by *β* consists in the operation that, given a metabolism *F*, produces the corresponding selector *Φ* that selects metabolism. For *β* to exist it is required that the equation *Φ(b)=F* , for *Φ* must have one and only one solution. The most fundamental question here is if it is possible to produce a definitive mathematical description (preferably algorithm) to calculate *β*. Rosen recognized that the existence of such mathematical description is mathematically difficult (Rosen, 2000, pp. 261–265). The tricky thing here is that *β* is a function, but it is simultaneously ''equivalent'' to an element $b \in B$, in the sense that *β* sends any *f* to the unique *Φ* such that *Φ(b)=F* . As a result, this construction solves the problem of infinite regress. The infinity generates its limit within the system by allotting certain element *b* with the property reflecting the whole system. Thus the element *b* gets a dual function becoming a sign (argument) designating the system as a whole. It has a semiotic nature imposing the semantic closure to the system in which it is present.

The main problem that we face in formalization of (*M,R*) system is that in general we do not know for certain which quantifiers to put on the elements *b* and *a*. The original definitions of the (*M,R*) systems give no information about the element *a* in *A* and *b* in *B*. In other words, the question is if we have for some *b* in *B* and some *a* in *A* such that *b=F*(*a*), there is a unique *Φ* in *Map(B(Map*(*A,B*)*))* such that *Φ*(*b*)=*F*. The assumption is affirmative, but it is not well defined and proven in the theory and still remains unclear. The solution can need some fuzzy and soft mathematical approach that would introduce the functional elements of (*M,R*) systems as results of a kind of a selection procedure taking place in the potential field. This selection procedure will provide a minimum price of action (Liberman, 1989) for the maintenance of a given organizational invariance. Here we face the intervention of mathematically undefined parameters linking elements, maps, and functions in the same way as the physical fundamental constants entail physical universe so that it becomes structurally stable and, in principle, observable. Like in Feynman's quantum mechanics, the real path becomes a result of integration of all possible paths, the selectors *Φ* and *β* in Rosen's (*M,R*) systems emerge through a kind of a selective evaluation procedure taking place on metabolisms and replacements. These selections are semiotically arbitrary and can be derived only through the evaluation of optimality of a possible selector solution.

The operation defined by β, designates the system as a whole within itself. It acts as a generator of the complete enclosed structure of an (*M,R*) systems (Letelier et al., 2006). In other words, β has a semiotic value signifying the system as a whole. In the true (*M,R*) system, the β parameter is unique according to Rosen (1991) and is beyond the genotype and the phenotype. From the point of view of optimality, the uniqueness can be restricted by the organizational invariance of the system in the biological realm or by the observability in the physical realm. There is no rigid algorithm to take β, this operation has its own ambiguity, but when the β is taken (an arbitrary choice which determines the Saussurean arbitrariness of a sign), this ambiguity becomes frozen and the internal computation becomes possible. The original Rosen's approach deals with a transformation which is in fact an inversion in time: the inverse of the evaluation map resulting in the organizational invariance is a formation of a finite spatiotemporal structure of the body of a given biological organism. Later, Gunji et al. (2008) came to the idea of describing the organizational invariance of the biological system from the point of view of "heterarchy" that naturally involves self-reference through inherited logical inconsistencies between levels. A description of heterarchy is presented as a pair of the property of self-reference and the property of a frame problem interacting with each other. The semiotic coupling of them embodies an inheritance of logical inconsistency.

THE BIOLOGICAL EXPANSION OF THE UMWELT

The idea of Rosen about the organizational invariance of biological systems has a certain similarity with the concept of nomothetic organization of living systems developed by Sergei Meyen. The organizational invariance assumes that the system possessing it develops according to certain rules, i.e. nomothetically. The term "nomothetic" is based on what Kant described as a tendency to generalize or to derive laws that explain objective phenomena. The term is suggested by the Kantian philosopher Wilhelm Windelband and extensively used by Meyen (1977,1978). Nomothetics in biology describes the laws appearing in diversity sets generated by biological variability.

The biosystem develops and transforms in a way that it maintains its 'organizational invariance". The organizational invariance is a spatiotemporal characteristic which is expressed in a certain ideal pattern called *archetype*. The archetype determines the attribution of a biosystem to a certain taxonomic group. The idea of a taxonomic class can be expressed through the same organizational invariance. Archetype has a certain structure, being consisted of *merons*, the generalized structural components of the homology parts of a certain archetype. Merons are not rigidly fixed and can be divided into a set of alternative states that can appear sequentially in time. The complete set of alternative states of a meron and of transitions between them within the archetype is called *refrain*. Meyen associated an application of the same transformation to different initial forms with theme development in a musical composition; that is why he named this phenomenon "refrain", an archetype-like character usually more complex than an ordinary morphological trait. The law of polymorphism associated with meron is really the law of the organizational invariance of a given biological system formulated in Rosen's concept. Meron, according to Meyen, also possesses its own individual time. This time appears as a variability pattern referred to an individual biological system and includes a component which is uniform in all objects being

associated with the physical time. It serves as a logical saver from paradoxes: the self-reference softens the notion of equality. Time is precisely that degree of freedom which allows a thing to change and yet to still be itself. This biological time is an observer's time which brings a relational understanding of the spatiotemporal structure (Molchanov, 1998).

The refrain is not simply a set of states of archetypal merons. It consists also of arrows defining transitions between merons. These arrows introduce a pattern of temporal organization for the organizational invariance. We cannot predict the existence of these particular arrows because they are determined by history and by the internal logic. Refrain is the complete sequence of alternative states of a meron and of transitions between them at certain degree of specification. This also assumes that refrains cannot unfold infinitely because their time is finite. Self-similarity of a system at a particular time during this unfolding is supported through the maintenance of its organizational invariance.

Ervin Bauer in his monograph "Theoretical Biology" suggested that the main principle governing the biological evolution is an increase of the external work imposed by an organism (Bauer, 1982). This can be related to the expansion of the Umwelt. The increase of external work can explain selective preference of a new structure. It corresponds to the increase and intensification of the basic properties of living matter, which Bauer called "stable non-equilibrium". The stable non-equilibrium is a physical representation of the principle of organizational invariance. In Bauer's terms, to make a correct comparison of a living system to waterfall, it is necessary to state that the difference in the levels of water, which is an indispensable condition for the fall, should be made and maintained by the waterfall itself. The increase of adaptability is related to appearance of forms with wider limits of adaptation, but these organisms provide less material and fall behind in evolution as compared to organisms having narrow limit of adaptation but higher energetic of non-equilibrium process (Bauer, 1982). Thus the progressive evolution is related to the increase in complexity of organism's structure related to a formation of a new relation (niche) in the expanding semiotic Umwelt.

The physical approaches to describe evolution of a system towards observability are based on understanding of the quantum measurement (as opposed to the classical measurement of external objects) as a measurement of the environment together with the embedded measuring system, which cannot be separated from it (Igamberdiev, 2002). The Umwelt is the assimilated part of environment as recognized by the system. Recognition of new observables during this measurement will generate a simultaneous increase in complexity of the measuring system itself and its Umwelt and lead to the possibility of measurement of a newly formed system plus environment (Igamberdiev, 1999, 2001). Although the measurement itself is not recursive, it will generate enfolded embedding structures viewed as appeared in the continuous recursive embedding process after it takes place. This is the difference of the quantum measurement from the classical measurement, which views the environment as external: the system views itself as embedded into the Umwelt, the recognized part of environment. The appearance of a new description means that the system memorizes its optimal state in the concrete environment, i.e. it measures not the external environment, but itself plus the environment (itself embedded into the environment). In Bauer's terms, it adds its external work to the environment.

The newly generated structure attains the value in changed Umwelt. This means that it is embedded in a whole system interacting with the environment as a part of new established harmony. This is possible if a new configuration fits to a certain harmony relation (*canon*).

The problem of form is generally not only pragmatic but it needs aesthetic criteria, primary and absolute to any concrete adaptive harmony. According to Lyubishchev (1973, 1982), evolution passes through the change of canons which includes the period of initial primitivism (simplicity of form, brightness and contrast of colors), the classical period with the highest harmony and finely balanced forms and colors, and finally the mannerism period with some unusual and unbalanced structures. The style unity is the highest level of wholeness, non-reducible neither to the adaptive harmony nor to the correlation between parts.

The classical description of evolutionary process views the latter as occurring in the external Newtonian time. The real evolutionary process forms time by itself — time appears as a tool for the separation of contradictory statements in the infinite embedding process. This means that time is a semiotic phenomenon. Evolution in the semiotic time represents a contradictory process of growing complexity, which includes both the fundamental principles of perfection of canons regarded as its nomogenetic laws and the free creativity for their construction based on the internal choice.

THE ANTHROPOGENIC EXPANSION OF THE UMWELT

The expansion of the biosphere via inclusion of new objects of external world in the Umwelt takes place during the biological evolution (Witzany, 2007). But the growth of this Umwelt is limited because there is no semiotic structure symbolizing the parameter of the wholeness of the world which is represented as the class of all classes (*actual infinity*). The social evolution takes place only when such a structure appears (Igamberdiev, 1999). In the human reflection, objective patterns generated in conscious events are associated with certain types of semiotic loops originally described by Freud who discovered the basic structure of the organizational invariance for human social behavior (the Oedipus complex). This loop, being interpreted as a reflection of a subject, is a non-trivial semiotic structure, which determines the way of internalization of the external world. It can be considered as a logical pattern describing interrelations between the consciousness and the external world, which determines the fixation of somebody's image into the other as a possibility to substitute the other (Igamberdiev, 1999). The Oedipus complex represents the generalized archetype for all social semiotic systems and it is expressed in religious and cultural styles of sociosemiotic systems. The temporal sequence of a historical transformation of these styles forms a pattern of transformation of the sociosemiotic system. Sociosemiotic systems have both cultural and civilization constituents. The development of the civilization constituent is based on gaining the control of the material/energy flow. The two major steps in it were the agricultural and the industrial revolutions. The development of the cultural constituent is based on its own internal principles forming the development of a style and the sequential change of this style.

The transformation and complication of semiotic structures during the evolution of biological systems ultimately leads to the appearance of possibilities of their own descriptions. This property arises as a non-determinable transfinite leap of formation of the social organization. The biosemiotic reality in the appeared higher organization represents a lower level of a new more complicated structure and corresponds to the Freudian *unconscious*. The initial biosemiotic level of the unconscious attains certain restrictions

through imposing social constraints on it. The realization of an external world for a social being appears when the image of the other, who initially is identified with the Mother (upon birth – in the biological imprinting), becomes related to another object in whom the earlier identification is reflected, i.e., the symbol of the Father. The Oedipus complex arises as a result of this identification. Thus the inclusion of the external world comes into the semiotic structure with the *symbol of father*. While in the structure of the Oedipus complex, the symbol of father prevents the total possession of mother, this is equivalent to the selection of meanings from the unconscious. The allotment of unconscious events by the values is an action of a semiotic nature. Initially associated with Father, the 'Symbolic' (Lacan, 2006) or 'Super-Ego' (Freud, 1976) represents an external reality, which is always present as a sign (determinant) being absent in a given moment as a material object. It selects meanings from the unconscious which can be named herewith in this respect as a 'Speech of the Other' (Lacan, 2006).

Thus, in the structure of the social subject, the Symbolic is equivalent to the Name of Father in the Oedipus Complex, representing an external determinant of the social behavior, which means that the structure of the subject includes a symbol which designates some external reality. Initially it is identified with the father who selects meanings from the unconscious and who allots Ego by a certain name (defines Ego semiotically). The External as it is, being the Symbolic in the advanced cultures, corresponds to the inclusion of the actual infinity in its symbolic form into semiotic structures. The existence of the unconscious (or Real, according to Lacan, i.e. of the substrate on which the psychological semiotic structure is unfolded) and of the Symbolic implies the urgency of the third component of the structure of subject which is named by Lacan as the Imaginary. The external world in the structure of the subject is therefore subdivided into the symbolic reality and the non-structured, or 'material', reality. The Freudian trinitary structure of psyche resembles the trinitary structure of a biosystem suggested by Rosen. In Rosen's terms, the unconscious (*Id*) refers to the *M*-set, the symbolic (*Super-Ego*) refers to the *R*-set, and the imaginary (*Ego*) refers to the Organizational invariance. The Freudian structure, therefore, manifests a realm which is based on the ground provided by the biological reality.

Initially (as in the ethological imprinting), the biological subject associates itself with its mother, and the ethological biosemiotic structure does not include the 'Super-Ego', therefore the biological subject is essentially non-separable from the external world. Strictly speaking, the subject in the biosemiotic system is still not the Ego. The Ego appears as a projection of the Super Ego onto the unconscious, which forms a gap between the lust and the object of external world. The structure of subject, being initially the structure of the Oedipus Complex, means the potential inclusion of the entire external world into the semiotic system, i.e. the Umwelt (the internalized external space) acquires the ability of infinite expansion. Just that means the origin of consciousness, as this structure really permits the inclusion of other subjects into its semiotic relations.

The Oedipus Complex contains a replaced object. The Father is absent and at the same time is present (as a symbol). The existence and the non-existence are present simultaneously in one sign. The essential reflections of a human person, particularly the feeling (reflection) of his own finiteness, are based on this structure; nevertheless this structure contains also the possibility of reconciling the contradiction. The absence (non-existence) and the presence (existence), coincided in the same symbol, provide the combination of different levels in one object. The structure of the social sign therefore contains non-existence, which divides the

signifié and the *signifiant*. This gap corresponds to the appearance of the past and the future time in the semiotic system and to its development in the form of refrain. One part of a system is semiotized as a symbol of the past (this corresponds in the cultural systems to the appearance of burial places), and another part – as a symbol of the future (the ideas of possible worlds, forecasts and predictions of the future, etc.).

The Oedipus Complex, being interpreted as a reflection of a subject, is a non-trivial semiotic structure of a higher (than the biosemiotical) level, which determines the internalization of the external world. It can be considered as a semiotic structure describing interrelations between the consciousness and the external world, which determines the fixation of somebody's image into the other, i.e., the possibility to substitute the other. The psychosemiotical reality is realized via the structure of reflection of the-Ego-in-the-Other which arises to the universal triad of the Complex of Oedipus. The Ego is reflected in the Other (and the Other is reflected in the Ego), which results in the appearance of a semiotic relation. Therefore the Ego is present in the Other as a Symbol, being absent as a material object, and the structure of subject non-trivially combines the existence and the non-existence. Such a structure (represented in the Oedipus Complex initially as an imprint of itself in the absent father) makes it possible a non-limited expansion of the psychosemiotic Umwelt resulting in the inclusion of the world as a whole entity in it. Any external object can be included into the structure of the subject as a Symbol being transformed via some other object. External objects are the materials for the fixation of reflective arrows of the psychosemiotic structures. Therefore the human language originates simultaneously with the socially organized activity. An external object becomes the tool of labor only when it is named, i.e., when it is reflected in the other object (word). The social (collective) memory arises with this activity, determining the development of social evolution.

Language, besides the words designating external objects included into the psychosemiotic structure, and operations which could be conducted by them, should unavoidably include the designation of just an ability to signify external objects which makes possible the inclusion of objects into the expanding Umwelt. Thus the designation of objects which determine just a possibility of semiotization of the whole world appears. This 'object' does not exist at the same level as the level of objects of the external world, therefore it is absent and simultaneously present in all, contradictory combining the existence and the non-existence and determining the existence of all objects as included in the semiotic Umwelt being non-present in the set of these objects. Cultural systems are constructed according to the modes of solution of the initial contradiction of the Oedipus Complex. The subject via internalization of external objects and their inclusion as symbols in its own structure puts itself in a relation to the external reality by the generation of a non-enumerable set representing an organizational invariance of the social semiotic system. The temporality (and therefore historicity) of signification corresponds to certain structures located in the unconscious and presented as a result of history. Different societies construct themselves in correspondence with different solutions of the initial contradiction of the structure of psyche (the Oedipus complex) (Fromm, 1950).

THE EXTERNAL WORLD AS A SEMIOSPHERE

To exist, the world should be semiotically closed by including potentially its observer. The physical spacetime appears in this world as a subset of the semiotic set of interconnected Umwelts common to all observers. Each functional component of an Umwelt has a meaning and so represents the organism's model of the world. An organism creates its own Umwelt when it interacts with the world and reshapes it. Consequently, the Umwelts of different organisms differ, which follows from the individuality and uniqueness of the history of every single organism. When two or more Umwelts interact, this creates a semiosphere (Lotman, 1990) in which organisms exhibit goal-oriented or intentional behaviors. Semiosphere is a set of all interconnected Umwelts arising from their interaction.

Following this logic of interconnected Umwelts, we can approach a simple and non-contradictory explanation of the anthropic principle: the creation of a sign in the semiosphere corresponds to the conditions of observability of the world because signs themselves are formed on the basis of the principle of observability. This "bootstrapping" formulation of the anthropic principle substantiates physical constants as the only solutions for fixed points in the branching history of observations (quantum measurements). Solutions for the physical constants potentially can be of any value, but only those that are realized are consistent with the condition of observability. The objective reality of the spacetime appears as corresponding to the basic ideal principles of construction of the physical world. From branching patterns of the quantum wave function, the world appears in a way that it is appropriate for life and consciousness. All other possible worlds remain potential and cannot be actualized.

The spatiotemporal relations between objects of the physical universe are governed by limits of computation (Igamberdiev, 2007, 2009). The relational spacetime, being semiotically constrained and having a semiotic value, is a robust fitness landscape for all observers. The supposition that all observers are equivalent generates objective spacetime patterns of the general theory of relativity (Igamberdiev, 2008). However, the equivalence of all observers is an approximation and, in reality, the spacetime patterns imposed by them acquire relative equivalence via some kind of a fitting process. This process becomes more uniform with the appearance of living systems based on similar reflective and functional cycles that can interact with a relative predictability. Living systems, being active players in the world and having different clocks, interact, thus generating the perpetually evolving fitness landscape.

The presented analysis of objectivity in the physical, the biological, and the psychological worlds shows that objective patterns are formed in the relational universe as necessary conditions for the operation of reflective loops. These loops arising independently have common values uniting them in the branching history of actualizations. The objectivity of the truth of reason in logic and mathematics, in semiotic loops substantiates the objectivity of the truth of fact of the physical world, in other words, the actual physical objectivity has its origin in the ideal objectivity of ultimate logical structures of the world. These structures are actualized via unique sets of physical parameters making the world observable and intelligible. The reality can be described as a set of self-maintained semiotic systems exhibiting themselves externally (on macroscales) and interacting via perpetual process of signification (reducing the microscale), which introduces universal computable laws

harmonizing their interaction and making it organizationally invariant. The evolutionary growth of information occurs via language game of interacting programs, an open process without frames. The solutions coming to existence are based on the most optimal way for physical embodiment of a semiotic process, and this comes in line with Leibniz's notion about the most perfect world among all possible, which corresponds to contemporary formulations of the anthropic principle. Possessing free will and consciousness, we may accept this world as a suitable place for living or reject it (i.e. express optimistic or pessimistic ethical views), but semiotically determined physical parameters of the world may strictly correspond to its observability by embodied living organisms having internal semiotic structure with alphabet and grammar, which generates a unique solution for the appearance of free will and consciousness (Igamberdiev, 2004).

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Chapter 9

CORPUS-BASED APPROACHES TO METAPHOR AND METONYMY: REVIEW OF STEFANOWITSCH, ANATOL, GRIES, STEFAN TH. (EDS.)

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Within the broad domain of Cognitive Linguistics, empirical methods do not yet attract deserved attraction to become a dominant tendency. Therefore, *Corpus-based Approaches to Metaphor and Metonymy* (edited by Anatol Stefanowitsch and Stefan Th. Gries) makes a vital contribution by providing corpus-based studies into a most important subfield of cognitive linguistics, Conceptual Metaphor Theory. Meanwhile, *Corpus-based Approaches to Metaphor and Metonymy* is a companion volume to *Metaphor and Metonymy at the Crossroads: A cognitive perspective* (2000), edited by Antonio Barcelona, and *Metaphor and Metonymy in Comparison and Contrast* (2003), edited by René Dirven and Ralf Pörings. It is obvious that the intriguing phenomenon of metaphor and metonymy has been the pet subject of cognitive linguists. But these previous researches are mainly on the differences and similarities between metaphor and metonymy, and are traditional in their intuitive or introspective approaches. In the book under review, instead, the researchers argue for the objectivist basis of linguistic descriptions by "laying the methodological foundations for a strong emphasis on authentic data and the empirical verification of many of the fascinating theoretical claims" (1). The contributions present case studies of metaphor and metonymy involving structural, textual, contextual, cross-linguistic, (cross-)cultural, social, and/or ideological aspects. By challenging and refining established theories, and putting forward frameworks for conducting corpus studies, the collection makes a timely, valuable and inspiring contribution to the development of cognitive corpus research. In the following sections I will summarize general conclusions this volume highlights, with particular consideration for approaches and methodologies in the identification and retrieval of

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metaphors and metonymies. Then I will elaborate on some essential problems revealed by the contributions with respect to corpus research.

In the initiating chapter, Anatol Stefanowitsch gives a critical overview of data-retrieving methodologies and significant results of the corpus research concerning conceptual mappings. Meanwhile, as one of the editors, he is careful to succinctly introduce the reader to the methods adopted and major findings of each chapter. He starts by reflecting on the ways metaphors and metonymies are extracted from the corpus by pointing out both advantages and problems of each strategy. Early "manual searching" limits the size of the corpus. The method of "searching for source domain vocabulary" can be exhaustive but criteria for identifying target domains are badly needed. "Target domain orientation" such as "keyword-based method" will not identify metaphorical expressions exhaustively or systematically. The method of "searching for sentences containing lexical items from both the source domain and the garget domain" allows fast annotation but predicts problems of imperfect recall and partial identification, etc. "Searching for metaphors based on 'markers of metaphor'" realizes automatic retrieval, but the markers are not always signals of metaphors. The strategy of "extraction from a corpus annotated for semantic fields/domains" extends the first three strategies. But here problems concerning semantic fields arise. Stefanowitsch is for the method of "extraction from a corpus annotated for conceptual mappings" which is, unfortunately, not available yet. Despite the problems of these data extracting strategies, results of the corpus-based approaches are fairly important and noticeable. Relating to the achievements of the volume, Stefanowitsch highlights the following aspects: the reexamination and evaluation of certain conceptual mappings; new insights into structural as well as textual features of metaphor and metonymy; and discoveries relating to "cross-linguistic and diachronic issues". Stefanowitsch then proposes three criteria for appropriate annotation of metaphorical mappings. In his view, such annotation must establish workable and reliable procedures to spot metaphors and metonymies. In addition, it must define relevant features for metaphor and metonymy, such as the source domain, the target domain, and "degree of metaphricity, metonymicity, and inter-rater reliability." Concerning "annotation formats", he recommends "SGML (Standard Generalized Markup Language) / XML (extensible Markup Language)" and several others. Stefanowitsch concludes his chapter by drawing attention to the necessity of "strict quantification and sophisticated statistical methods" and the importance of putting empirical results into theoretical considerations.

In the following chapter "Metaphoricity is gradable", Patrick Hanks argues for a continuum of metaphoricity instead of the traditional dichotomous distinction. Inspired by Max Black's semantic "resonance" theory that metaphoricity is determined by "resonance between at least two concepts, in which one (the primary subject) is interpreted in terms of the other (the secondary subject)", Hanks explores the "gradability" of metaphoricity by focusing on *sea* and *oasis* in the British National Bank. The empirical investigations reveal that there exists a "metaphoricity cline" (29) in the usages of these words. At one extreme of the cline is the literal meaning, and at the other extreme are highly metaphorical uses. To use Black's terms, the fewer semantic features shared by two concepts, the more resonance, and the greater metaphoricity. Therefore, some metaphors are more metaphorical than others (31). To take *oasis* as an example, in "one of several splendid *oases* of green in the city", the use of *oases* is more metaphorical than its literal meaning (a place in desert), for it refers to a place without any attributes of a desert. However, in "it's about *oases* of control where there should

be none," the use is much more metaphorical because here *oases* is used as an abstract term. There are no shared semantic properties between *control* and the conventional use of *oasis*. Hanks also notices the close relationship between "syntagmatic patterns" and the metaphorical use of lexical items. Unfortunately, this is not fully elaborated.

The chapter "A corpus-based study of metaphors for speech activity in British English" examines how metaphor is used in written contexts to present verbal communication. Elena Semino bases the research on a manually annotated corpus of "20th century written British English". The investigation is narrowed down to the "Narrator's Representation of Speech Acts". In this category, the focus is on expressions relating to two well-known conceptual metaphors for communication—AUGUMENT IS WAR and the CONDUIT metaphor. Concerning the former, the observations show that Lakoff and Johnson's formulation is simply too narrow in terms of the source domain as well as the target domain. Therefore, Semino presents a proposal for refining their mapping, namely, "ANTAGONISTIC COMMUNICATION IS PHYSICAL CONFLICT". Concerning the latter, the findings support Grady's refinement. That is, the CONDUIT metaphor is best accounted for in terms of "a set of partly independent primary metaphors" (55). In the concluding section, Semino briefly also touches on some metaphorical patterns not covered in the chapter. Together, the authentic data reveal that verbal communication is dominantly realized by metaphorical expressions to do physical, concrete interactions (57). In addition, Semino hints at the complementarity of corpus research and experimental investigations.

In the chapter entitled "Words and their metaphors: A corpus-based approach", Anatol Stefanowitsch succeeds in demonstrating the superiority of metaphor pattern analysis over the traditional introspective approach in identifying, extracting and quantifying metaphors. The chapter is lucidly written, highly-organized, and well-argued. Stefanowitsch introduces the reader to the data retrieving method of metaphor pattern analysis. There are two steps in the procedure. First, instances of a certain target domain were extracted. Second, of all the instances, metaphorical patterns are exhaustively identified (66). This was followed by a systematic comparison between metaphor pattern analysis and the introspective method in collecting data. Kövecses is targeted because his work on "emotion-specific metaphors" represents the traditional method. Centering upon the five basic emotions of ANGER, DISGUST, FEAR, HAPPINESS, and SADNESS, Stefanowitsch extracted a sample of 1000 hits for the most frequent emotion term for each of the five emotions from the British National Corpus (71). His findings are surprising and convincing. In comparison with metaphor pattern analysis, the introspective method is handicapped in several ways. Typically, it fails to include coverage of many important metaphorical manifestations for each basic emotion. Statistics show, for instance, the introspective method misses 20.03% of the metaphorical expressions from the domain ANGER (75), even 23.26% from the domain of SADNESS. After the corpus illustration of the preciseness and much wider coverage of metaphor pattern analysis, Stefanowitsch readdresses the issue of emotion-specific metaphors. Here he sets the "frequency of occurrence" as the criterion because it is objective and "relatively exhaustive" in identifying central metaphors for each emotion domain. The analysis reveals, for example, that "the most strongly associated metaphor for ANGER is EMOTION IS HEATED LIQUID" (92). In the final section of his discussion, Stefanowitsch highlights the advantages of his corpus-driven strategy through metaphor pattern analyses of representative lexemes within and across target domains of emotion. Stefanowitsch concludes his chapter with an optimistic prediction of the practical and theoretical significance of metaphor pattern analysis.

Alice Deignan challenges Conceptual Metaphor Theory by exploring "the grammar of linguistic metaphors". Based on the findings of her previous studies, relying on data retrieved from the Bank of English, Deignan concentrates on the word classes of metaphorical and literal uses of lexical items, in particular, those form the source domains ANIMALS and PLANTS. In addition, taking *rock* and *flame* as examples, she examines the relationship between single/plural inflections of these words and their metaphorical uses. Concerning the results of her investigation, the following two attributes deserve special attention. First of all, it is observed that word-classes may change in the process of conceptual mapping. Typically, nouns from the source domain tend to perform as verbs in the target domain (119). Secondly, different inflectional paradigms of words from the source domain may have quite different, sometimes even opposite "evaluative patterns" in the target domain. For instance, *rock* often appears together with lexical items of positive denotation while *rocks* is generally associated with negative connotations. Thirdly, metaphor has a close connection with collocation. That is, different from literal meanings, metaphorical expressions require fixed grammatical structures. In Deignan's view, these empirical observations on the one hand confirm the studies of other corpus linguists. On the other hand, traditional "theory-driven" approaches will have to learn much from the booming "data-driven" methods. For example, her findings question Conceptual Metaphor Theory, especially Lakoff's Invariance Hypothesis, from at least two aspects. Deignan's concordance analysis shows, instead of mere replication of relationships from source domain to target domain, the mapping often involves grammatical, especially inflectional changes. Besides, the mapping tends to be dynamic instead of static. That is, there exist interactions between the source domain and the target domain. She ends her discussion by advocating inductive strategies in metaphor studies.

In his contribution "Keeping an eye on the data: Metonymies and their patterns", Martin Hilpert deals with metonymy through an empirical exploration into linguistic patterns favored by metonymies relating to the single lexical item *eye*. He begins by revealing the problems with the traditional cognitive methodology for analyzing metonymy. Then he does some ground-clearing work for his research by defining and classifying metonymy in terms of domains. In short, metonymy is an "intra-domain mapping", which has two basic types, i.e. E-Metonymies (part-of relations) and C-Metonymies (kind-of relations) (127). Here Hilpert also touches on chained metonymies (129-130). He goes on to give a detailed explanation of the methodology adopted in this chapter. Particular attention is given to the aims of his corpus-based investigations and the six-step data retrieving procedure. A 10 million word sample of the British National Corpus was searched for metonymic expressions with *eye*. The largest portion of the discussion is devoted to listing the 22 expressions found, each with brief interpretations and supporting examples. The author continues his empirical examinations by distinguishing and contrasting literal and non-literal uses of *eye*. The parameter adopted is the word class in co-occurrence with *eye*. In terms of right-side word classes, literal *eye* favors verbs and nouns while figurative *eye* prefers prepositions. In terms of left-side word classes, definite determiners indicate literal uses and indefinite determiners figurative uses. In addition, the concordance reveals 13 meanings of *eye*. Among them, "watching" and "attention" take up more than half of the total metonymic patterns. Hilpert's intent is to convince the reader that conceptual metonymy can be and should be approached through corpus analysis.

Of all the papers in the present volume, Katja Markert and Malvina Nissim's paper "Metonymic proper names: A corpus-based account" concentrates most deliberately on

annotation studies. Therefore, their contribution is of particular significance. The authors aim to establish a framework for metonymy annotation. They first of all propose seven principles for building a qualified annotated corpus. The principles include "platform independence", "domain and genre", "annotation extent", "regularities", "underspecification", "coverage", and "hierarchical structure." Then these principles are elaborated in terms of metonymy annotation. Firstly, a word corpus is chosen and encoded into a markup language (here Extensible Markup Language). Secondly, the data should cover domains and genres as many as possible. Thirdly, the annotation extent is the word level. Fourthly, semantic classes and metonymic patterns are used as criteria for annotation categorization. Fifthly, both base classes and metonymic patterns are annotated. Sixthly, both conventional and unconventional metonymies are annotated. Seventhly, the categories are arranged in hierarchy (156-160). To illustrate how the annotation framework operates, the contributors focus on two class-specific annotation systems for location names and organization names. In the system for location, patterns of PLACE-FOR-PEOPLE, PLACE-FOR-EVENT, and PLACE-FOR-PRODUCT are introduced and explained. In the system for organization, ORGANIZATION-FOR-MEMBER, ORGANIZATION-FOR-FACILITY, ORGANIZATION-FOR-PRODUCT, ORGANIZATION-FOR-INDEX, and ORGANIZATION-FOR-EVENT are distinguished and exemplified. As for class-independent patterns, the authors set the categories OBJECT-FOR-NAME, OBJECT-FOR-REPRESENTATION, OTHER, and MIXED. In order to verify the validity of the annotation systems, the authors conduct an annotation experiment. The findings show that their system is of high reliability. Their annotation research also enriches the study of metonymy in that some mappings are discovered, for instance, ORGANIZATION-FOR-INDEX and ORGANIZATION-FOR-EVENT. Despite the striking achievements, they acknowledge that their work is facing problems raised by the fuzziness of categories. In the conclusion, they predict the expansion of their annotation schemes and the cooperation with other annotation systems.

The chapter "On groutnolls and non-heads: A case study of the interaction between culture and cognition in intelligence metaphors" by Kathryn Allan has provided an example of empirical diachronic investigations into metaphors. Based on historical data extracted from the *Historical Thesaurus of English* at Glasgow, which is characterized by its categorization of lexical items by concept, Allan concentrates on the target domain INTELLIGENCE and one of its three most important source domains—DENSITY. The analysis shows that all entries in the source domain identify stupidity (177) and three subgroups, i.e. WOOD, EARTH, and FOOD take up three fourths of the total entries. How has the property of these everyday things evolved to metaphorize intelligence? Allan turns to cognitive theories, culture and linguistic successes for possible answers. In his view, the conceptual mapping STUPIDITY IS DENSITY is motivated by an integration of different events (179). If something is dense, it is hard to go through; the mind is like a thing in that it also has texture; if the mind is dense, it is hard to let ideas in. Allan thinks culture plays its role in the mapping too. Wood, earth and food are common and of everyday use and not of high value. However, why have these substances entered the source domain instead of other things of low value? Allan believes that there are two possible reasons: "linguistic failures" and convention. In my view, Allan's discussion is thought-provoking but not very convincing. Etymological, typological, and cross-cultural evidences would sound necessary.

In their joint paper "Sense and sensibility: Rational thought versus emotion in metaphorical language", Päive Koivisto-Alanko and Heli Tissari also make similar chronological explorations into metaphors, though their interest lies in the complex emotion-

reason relationship in lieu of intelligence. Based on introspective studies on conceptual metaphors for both emotion and reason, the contributors focus on the metaphorical expressions containing *fear*, *love*, *mind*, *reason* or *wit*, for these words are common to the two target domains (194). They drew their data from four English language corpora, two of Early Modern English, and two Present Day English. The data collection involves three steps. To begin with, metaphors concerning both domains were extracted separately. Then, for each word the metaphorical expressions with highest frequency were identified. Finally, only those metaphors appearing in both domains were analyzed. The huge analysis section describes in detail their findings by paying special attention to diachronic comparing. Three types of metaphors are elaborated: ontological metaphors, personification, and metaphors involving force. The first is subcategorized into INSTRUMENT/TOOL/WEAPON, OBSTACLE/WHIP, VALUE COMMODITY, CONTAINER, and BODY. For each (sub) category, frequencies are compared, diachronic changes are examined, and typical examples are provided. Their comparative historical cognitive corpus linguistic investigations can be evaluated from four aspects. To begin with, it is a careful attempt at integrating cognitive linguistic theories with historical studies. It is the authors' contention that the two disciplines should negotiate and cooperate so as to realize transdisciplinary operations. In addition, their findings challenge the present cognitive concepts. Here is an example. Lakoff and Johnson regarded UNDERSTADNING IS SEEING as the central metaphor for reason (192). However, it is "very rare" in their data. Moreover, the literature of metaphor is enriched, especially about the similarities and differences between the two domains EMOTION and REASON. Both do share some conceptual metaphors such as CONTAINER, and BODY. Yet there exist striking differences as well. For example, the lexemes indicating *emotion* favor VALUABLE COMMODITY while INSTRUMENT/WEAPON is much more strongly associated with the domain REASON. Finally, the chronological approach shows that the metaphorical process reflects gradual changes in word meaning, cultural connotation and evaluation orientation.

"A corpus-based analysis of context effects on metaphor comprehension" by James H. Martin develops and verifies his notion of "Metaphor Prediction Hypothesis", i.e. the metaphor-prediction capability of different types of context determines the degree of difficulty or easiness in metaphor interpretation. Martin begins with an introspective discussion about how to estimate the metaphor-predictive value of context. First is to locate a "test sentence" (in which a metaphor is contained) in its "context" (the proceeding text). Second is to pick up the information needed for metaphor prediction, including source/target/ground concepts. And finally, how the context presents the information (i.e. context types) is considered from three aspects, namely, literal source concept, literal target concept, and metaphorical reference. The hypothesis assumed is then tested for validity with corpus investigations and psychological experiments. In the fist testing, texts from the Wall Street Journal corpus is tagged at the sentence level for four metaphors: NUMERICAL-VALUE-AS-LOCATION, COMMERCIAL-ACTIVITY-AS-CONTAINER, COMMERCIAL-ACTIVITY-AS-PATH-FOLLOWING and COMMERCIAL-ACTIVITY-AS-WAR. Here the context is operationalized based on "five sentence context windows". That is, a test sentence followed by a four sentence window (221). The author calculated the base rates for each metaphor as the "ratio of the number of metaphors found to sentences examined" and the "ratio of 4 sentence windows containing a metaphor to the number of windows". These base rates are regarded as yardsticks to measure the metaphor-predictive capability of the three types of contexts given in the hypothesis. The higher the metaphor occurrence frequency than the

base, the higher the predictive value of the context. According to the results, for each of the four metaphors, contexts containing metaphorical references have the strongest power in metaphor predication, while contexts containing literal source concepts have the weakest. To take a striking example, for the metaphor COMMERCIAL-ACTIVITY-AS-WAR, no literal contexts were found. On the contrary, the change from base rate of the metaphorical contexts is as high as 25.20. Martin then surveys some recent psycholinguistic research that offers experimental support for his hypothesis. This review is helpful and informative though none of the experiments were conducted with measurements similar to his investigations. Martin also defenses his hypothesis from discursive coherence perspectives. Concerning the main implication of his findings, the ultimate goal is to construct a computational model for metaphor processing in natural environment. According to Martin, such a model should met five constraints, namely Total Time Constraint, Non-Optionality Constraint, On-Line Constraint, Differential Behavior Constraint and Contextual Influence Constraint (228-229). His proposal is a framework based on the theories of Construction Grammar and its extensions, and of course, the findings of his corpus analysis.

The essay "Of critical importance: Using electronic text corpora to study metaphor in business media discourse" by Veronika Koller attempts to offer a transdsciplinary approach to the study of metaphorical mappings. Koller shows her ambition to integrate cognitive theories, functional linguistics (especially systemic functional grammar), critical discourse analysis and corpus methodologies into the understanding of metaphors. In my view, this rather broad viewpoint indicates a promising future but definitely invites problems. However, Koller's contribution deserves loud applause in that it provides a platform for readers from different disciplines to negotiate for feasible cooperation. She is careful to devote a very large portion of the article to the theoretical foundations and methodological considerations in doing quantitative and qualitative metaphor investigations. The gist of her argument is that cognitive theories of metaphor have pretty much to offer to functional linguistics and critical linguistics. Meanwhile, cognitive studies will gain inspirations from the approaches whose orientations are more social, cultural and ideological. Assumptions and statements about metaphor usage have to be verified with empirical evidence. Her case study is limited to "printed media articles" in *Business Week*, *The Economist*, *Fortune*, and *Financial Times*. Two corpora were constructed, one on marketing and sales and the other on mergers and acquisitions. Three lexical fields were defined for each corpus: war, sports and games for marketing and sales, and fighting, mating and feeding for mergers and acquisitions. For each field, 35 lemmas were selected. The corpora were searched for all these words. She calculates the absolute frequencies of metaphors and average metaphor density of the corpora, and examines relative frequencies of metaphors across domains. And the type-token ratio is shown as well. The results indicate that in both corpora the metaphors of war and fighting are the most frequent and are realized by the highest number of various metaphorical expressions. This prominence of the "masculinized" domain of war and fighting can be explained when positioned at a broad social and ideological stage. The related metaphor BUSINESS IS WAR in fact construes the reality in the world of business. And the fact that more than two thirds of the readers of these publications are men contributes to the masculinization of this type of discourse. After listing several questions not covered but of research significance, the article ends with an emphasis upon the importance of interdisciplinarity in future studies.

Alan Partington devotes his article entitled "Metaphors, motifs and similes across discourse types: Corpus-Assisted Discourse Studies (CADS) at work" to two roles the corpus

plays in metaphor studies on the one hand, and empirical discourse analysis of metaphor and other figurative uses of language, on the other. In his view, corpora are used either to identify genre-specific metaphors and their discursive functions or to readdress issues concerning the nature of metaphor. From a discourse analyst's point of view, in uncovering the behavior of the central metaphor (s), corpus investigations help to describe and define discursive features of given discourses. This contributes, in particular, to revealing the stance taken by discourse participants. The main body of Partington's paper is divided into two parts. In the first part, he proposes a six-step corpus designing procedure to identify genre-specific metaphors. He illustrates his proposal with detailed analyses of several case studies. The genres of press editorials, leading articles of dailies, election speeches and political briefings are covered. The analyses are of the double function to familiarize the reader with the proposed corpus construction model, and to capture the discursive behavior and functions of dominant metaphorical expressions. Throughout the paper the author argues for the evaluative function of metaphors (271). They are used to assess events, people and people's actions. In the second part, Partington revisits metaphor and simile. Here three large corpora are employed to display their differences and similarities as well as their discursive functions of evaluation. He takes *like* and its relevant patterns as the case study, with special focus on the two *likes* in *Encyclopedias are like dictionaries* and *Encyclopedias are like gold-mines*. His findings indicate that the second *like* represents greater distance between the two terms it links and is of stronger evaluative orientations. As for the differences between simile and metaphor, in his view, since simile takes up the final position in sentence structure, the figure as the end focus is more emphasized than the base. In addition, simile provides more chance for comparison expansion. In the concluding section, he identifies another difference through the discussion over *might have been*. Partington believes that simile means more remoteness in the comparison than metaphor does.

It seems nowadays an academic fashion to have a book entitled *Corpus-based approaches to X* or *Corpus-based analysis/studies of X*. This mirrors the increasing awareness of the significance of empirical investigations. However, many of these books, including the collection under review, are not genuinely empirical researches. Despite the various studies and researches, empirical methodology, including corpus research, is in fact at its initial stage. According to Geeraerts (2006: 23-25), empirical studies should meet the following five criteria: data-driven, quantitative methods, formulation of hypotheses, operationalization of hypotheses and empirical circle (see also Grondelaers *et al*. 2007). To be tested against these parameters, in fact, most of the contributions simply fall into the scope of corpus-illustrated approaches (objective data but subjective analysis). To date, corpus-based investigations can be groups along a cline according to the empiricality of their methodologies. On one extreme, there are corpus-illustrated ones, while on the other advanced extreme, there are corpus-driven ones (see also Geeraerts 2006). In the book under review, the majority of the contributions are close to the corpus-illustrated extreme (e.g. in Deignan, Allan) despite the fact that a couple of articles are fairly close to the other extreme (e.g. in Stefanowitsch, Martin, Markert and Nissim). Of course, it is not the present volume to be blamed since this is the current situation concerning corpus research. However, the standard would have to be raised if such collections are meant to be academically valuable and to attract enough attention. In fact, I had expected an eye-catching methodology-oriented book containing more workable empirical frameworks for exploring metaphor and metonymy. Therefore, it is a

variety of applicable models for metaphor/metonymy processing that are badly needed for this volume and suchlike.

Another problem that hooks my attention is that in the volume little is discussed about the methodological relationships between corpus research and other empirical methodologies. This is related to the position of corpus-based approaches within the realm of empirical studies. Although the method of experimental psychological investigations is mentioned (e.g. in Martin), it is, unfortunately, not much elaborated. The reader is still left in the dark how corpus research and experimental psychological study may be complementary, or, from a corpus linguist's perspective, how experimental explorations can contribute to her work. I might be accused of demanding too much from a collection, but my concern is advantageous, I think, to the expansion and enhancement of empirical methods in the study of metaphor and metonymy nonetheless.

Some of the contributions, for instance, give the impression that hasty conclusions are drawn because the empirical evidence is far from sufficient and the findings require testing against other resources and by other means (e.g. in Semino, Koller). To me, many of the findings and proposals are at most hypotheses. It might be necessary for us to be well aware of the limitations of corpora and to properly interpret the relationship held between empirical methods and introspective ways.

The increasing interest in empirical study or the renaissance of inductive reasoning does not necessarily mean its superiority over introspective methods. In language description, conclusions drawn from a certain corpus have to be regarded as extrapolations, not statements about the language. The reason is that what a corpus reveals is the frequent and the central, not facts. However, empirical thinking does necessitate theoretical development in that it turns our focus from the ideal to the typical. The relationship between theory and empirical study is better seen as dynamic. I think, the dialogue between the theoretical and the empirical will go on and on towards a best description of language. It is, therefore, not too bold to say that "the future of linguistics is likely to be determined by methodological issues." (Geeraerts 2006: 21)

The volume could have been structured a little more so as to be more reader-friendly. The reader might have expected that the contributions were arranged into two or three sections, with short introductions to each section.

The papers might have been grouped according to the investigating methods used, or whether they are methodology-oriented or case-study oriented, or the types of metaphor/metonymy they deal with. Similarly, a conclusion that establishes connections and puts forward future research directions would have been welcome. In addition, a couple of printing errors in the table of contents suggest that more careful proofreading should have been necessary.

On the whole, in my view, this is a fine collection. It offers an in-depth exploration of metaphors and metonymies based on empirical investigations. The volume thus highlights the potential of new ways of readdressing some long-established topics and traditional research areas. Meanwhile, the contributions have raised further questions for us to consider (e.g. polysemy and metaphor, in Hilpert, and Koivisto-Alanko and Tissari). In this way, this book serves to extend the methodological tools of corpus linguistics as well as the scope of cognitive linguistic studies.

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Chapter 10

THE ROLE OF SIGN VEHICLES IN MEDIATING TEACHERS' MATHEMATICAL PROBLEM SOLVING

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ABSTRACT

This chapter introduces the basic semiotic concepts of sign, sign vehicle, meaning content, meaning giving and shared meaning as understood in the European semiotic tradition, and investigates the role of semiotic tools as sign vehicles in mediating in-service teachers' mathematical problem solving. Our particular interest is to interpret the basic semiotic concepts from the cultural historical perspective for the analysis of discourses. The participants in our study were a group of teachers participating in an in-service course whose pedagogy draws on the sociocultural perspective. A specific discourse analysis method to unravel the nature of the semiotic tool as a sign vehicle was developed for the study. The dimensions of the discourse analysis method, grounded in the discourse data of the study, were discourse moves, the role of the semiotic vehicle and the cultural focus of interaction. The results of the study suggest that socially shared meaning making around the semiotic sign vehicle consisted of three types of content episodes, namely problem solving, clarification through mathematizing and clarification through hands-on activities. Four different participant roles emerged in the analysis of discourse moves. These roles were the tutor, clarifier, questioner and silent supporter. On the whole, the semiotic sign vehicle and discourse moves investigated in this study supported socially shared meaning making and hence teacher learning in the problem solving situation in this study.

1. INTRODUCTION

This study is based on the earlier work of the first writer (Kaartinen, 2004) and it emphasizes the role of in-service teacher education for enhancing teachers' participation in

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culturally organized activities and the development of their pedagogical thinking. The need for large-scale educational reform is currently being discussed (Kwakman, 2003; Sfard, 2001) at all levels of education. New skills addressing social and technological competencies are being embedded into curricula alongside traditional domain specific understanding (Kwakman, 2003), but we lack, however, research-based evidence of teachers' readiness to fulfill their new role as facilitators of students' learning processes for life-long learning. The sufficiency of traditional professional development activities such as attending courses, training, conferences and reading professional journals to refresh and update teachers' pedagogical approaches has been widely debated (Bransford et al., 1999; Darling-Hammond, 1998). Despite recognition of the limitations of the traditional sphere of professional knowledge, teachers lack the necessary support and tools to modernize their pedagogical thinking. This paper applies the concept of a "community of learners" (Rogoff, Matusov and White, 1996) for enhancing teachers' readiness to respond to the challenges that modern society poses for mathematics education. The theoretical stance of a community-of-learners approach highlights transformation of participation in a collaborative endeavour (Goos, Galbright and Renshaw, 1999). In this process, the participants build on each other's initiations and develop a joint solution for the problem. Therefore the focus of this chapter is to investigate how mathematics teachers negotiate their role in joint problem solving. Specific attention will be paid to the adopted stance during problem-solving and the nature of participation in the communicative activity.

2. THEORETICAL FRAMEWORK

In recent years cognitively-oriented approaches to education have been challenged by sociocultural theories. The former have approached learning as an acquisition process which takes place as a result of the individual's active reconstruction of domain specific knowledge. Since the acquisition approach conceptualizes knowledge as a kind of property that can be transmitted, the goal of learning is seen as the individual enrichment of domain specific concepts and procedures (cf. Sfard, 1998).

The sociocultural learning theories approach learning by examining teacher learning in its culturally situated context (Cole, 1996; Vygotsky, 1962; 1978; Wertsch, 1991; Wertsch, del Rio, and Alvarez, 1995) and hence, define the learner as a cultural and historical subject embedded within, and constituted by, a network of social relationships and interactions. Learning and development, then, is explained by the changing nature of these relationships and types of participation in cultural activities (Goos, Galbraith, and Renshaw, 1999). From this perspective, teacher learning can be seen as an open-ended process with the possibility of diverse ways of acting, feeling and thinking (Renshaw and Brown, 1998). See also Kaartinen and Kumpulainen, 2001.

2.1. Collaborative Activity Mediated by Sign Vehicles

The roots of sociocultural theories for learning and development lie in the cultural historical tradition of Soviet psychologist Vygotsky (1962; 1978). Parallel to the development

of sociocultural thinking(Wertsch, 1995; Kozulin, 2003; Säljö, 2004), our contemporary Timo Järvilehto (2000a; 2000b) has reflected in his general system theory on the role of the relationship between organism and environment in collaborative action. For Järvilehto, the elements of the social, material and intellectual environment, combined with the properties of the acting human being, create the preconditions for learning and development. In Järvilehto's words, it is the relationship between a human being and one's environment that explains learning and development. He also stresses the role of language in social interaction and in making up socially shared intentions, aims, knowledge and consciousness. In our study, we investigate the relationship of collaboratively acting human beings with sign vehicles, as conceptualized in the following paragraph.

2.2. Sign, Meaning and Understanding

The basic concepts of semiotics can be used to clarify the concept of semiotic tool. We make use of the European tradition of semiotics, sign theory and two forefathers of semiotics, Ferdinand Saussure and Ernst Cassirer. In the European semiotic tradition, a dyadic model of sign has been presented. This model of the two-member sign has been commonly adopted in semiotics as a basic concept. The founder of European semiotics (or semiology) Saussure presented it at the beginning of the 20th century. Soon after this Cassirer refined the two-member sign in a way that is useful in the empirical analysis of mental meaning giving and shared meaning giving.

In Saussure's semiotics, *signe* is composed of *signifiant* and *signifié*. Common and generally used English translations of *signe*, *signifiant* and *signifié* are sign, signifier and signified but they have also been translated in other more concrete ways. In one English translation of Saussure's work (2005) the used terms are sign, signal and signification. In the same translation sign and its two aspects have also been articulated with the terms sign, sound pattern and concept (Saussure 2005/1916.) In the English edition of Wilfried Nöth's handbook of semiotics (1990), Saussure's terms are translated as sign, sound image and concept, further concretizing to some extent the abstract terms sign, signifier and signified. The concept of sign in the semiotic theory of Ernst Cassirer consists of a concrete sign to be sensed, or an expression (sinnlicher Ausdruck) and its contents, significance (seeliche Inhalt, geistiger Gehalt) (Cassirer 1964/1925; 1969).

The two-member sign and the terms used by Saussure and Cassirer are enlightening and useful in understanding sign, signifier, signified, meaning and understanding. They can be used when analyzing the process of shared meaning giving as well as in the analysis of when shared understanding is created. The two-member sign consists of a signifier that is perceptible or has been perceived, and of meaning that had to be or has been interpreted (or sign vehicle and meaning content, expression and content). Signifier and signified are two aspects of sign. Together they form sign (Figure 1.). Put in another way, the signifier always has meaning content that must be interpreted, and the meaning contents are always expressed with some perceptible sign vehicle, a signifier.

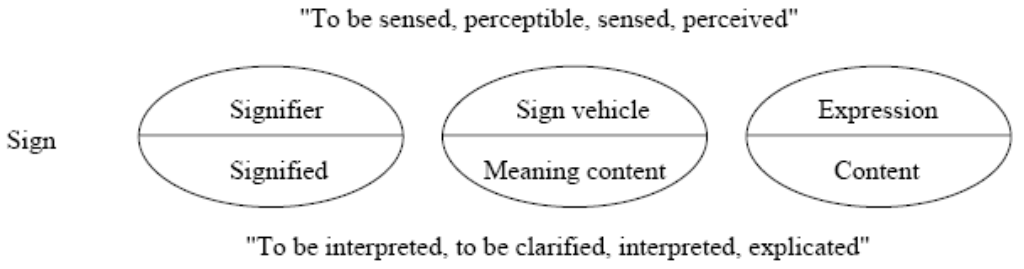

Figure 1. Two-member sign.

We can say that we understand something when we are able to connect signified to signifier, or meaning content to sign vehicle, content to expression. In other words, we understand something when we have mental possession of both halves or aspects of sign, both signifier and signified, and so we have a mental sign which means something; it represents something. The understanding process can be examined in an empirical meaning making process by following empirical dialogue and linguistic expressions.

2.3. Pedagogical Challenges to Mathematics Learning and Instruction

Alongside discussion of the theoretical grounding for learning and development (Lave and Wenger, 1991; Wertsch, 1991; Wenger, 1998), there is also a growing interest in a sociocultural approach to mathematics education (Sfard, 2002; Hoyles, 2002). The key constructs in defining the application of the sociocultural framework to mathematics pedagogy in this paper are the communicative approach to cognition (Sfard, 2002) and the mediational role of semiotic tools (Säljö, 1995) in the collaborative meaning making of the participants in the domain in question.

The theoretical constructs represented by socioculturalists challenge the traditional views of mathematics learning and instruction where pre-organized pieces of mathematical knowledge are transmitted to consumers.

The task of instructional design in mathematics education from the sociocultural perspective is to give to participants the possibilities to use mathematics in structuring and re-structuring their experiences in social practices where mediational tools are put to use for specific purposes (Säljö, 1995).

The adopted stance in this paper holds that promoting participatory student learning in mathematics also requires the teacher to go through participatory processes in similar types of activities.

The communicative approach to cognition (Sfard, 2002) stresses the role of language in the collaborative meaning making of participants.

In this paper Halliday´s (1978, p.2) formulation of “language as a social semiotic” is applied to interpret language within a sociocultural context in which the culture itself is interpreted in semiotic terms. In the analysis of this study, the language took a specific meaning in communal discourse and was further interpreted to construct cultural meanings across contexts.

The role of language for collaborative inquiry is also reflected upon in the writing of Järvilehto (2000a), who stresses the importance of the development of joint language as a tool for collaboration and the importance of the development of consciousness in the evaluation of collaborative action.

3. THE STUDY

3.1. Research Goals

The goal of this study was to investigate mathematical problem solving processes in a collaborative learning situation with in-service teachers. An analytic tool for highlighting the mechanisms of collaborative problem solving was applied (Kaartinen and Kumpulainen, 2001) and further developed. The specific research goals for this study are:

- To construct conceptual tools for the analysis of collaborative meaning making
- To develop an analytic tool to highlight collaborative problem solving processes in the learning of mathematics.
- To investigate the role of sign vehicles in the collaborative learning of mathematics teachers.
- To investigate the processes of teacher participation in the collaborative learning of mathematics pedagogy.

3.2. Participants

The data for the study was collected from two in-service teacher education courses carried out at the Department of Educational Sciences and Teacher Education, Oulu University, Finland, during the years 2000 and 2003. Altogether twenty in-service teachers, who represented either early childhood education (10) or primary education (10), participated in this study.

3.3. Description of the Professional Activities

The activities presented in this study are part of a teacher education course with the aim of giving the participants tools to anchor their instruction around the collaborative application of semiotic vehicles. The semiotic vehicle selected for the activity was algebra tiles. The selection of this tool was due to its ability to mediate the abstract domain of algebra in the mathematical curriculum.

The specific activity was to model the algebraic expressions of polynomials with the help of algebra tiles.

The activity itself involved collaborative inquiry and experimentation. During the course, the in-service teachers worked in self-selected small groups. The average size of the mixed-gender groups was four to five participants. The whole group of twenty teachers worked

simultaneously in the same classroom, carrying out their research designs for executing the activities. In this paper, the empirical example of the usage of algebra tiles will be discussed.

3.4. Data Collection

The primary data for the study consist of videotaped and transcribed episodes of social interaction in the collaborative problem solving situation. In the investigated activity, the role of algebra tiles as semiotic vehicles is investigated in collaborative learning activity. Specific research questions posed for the study are the following: *"How are semiotic vehicles applied to instruction building in primary mathematics?"* and *"What is the mediational role of semiotic vehicles for algebraic/arithmetic computations in collaborative meaning making?"*

3.5. Data Analysis

This paper applies discourse analysis (Kaartinen and Kumpulainen, 2001, 2002) in the investigation of collaborative interactions within mathematics learning situations.

The analysis method and its specific categories were grounded in the discourse data of the study. In the analysis procedure, the collaborative interaction is approached from three dimensions, namely from the viewpoint of *discourse moves, the evolving role of the sign* and from the viewpoint of *cultural focus*.

The analysis of discourse moves highlights the nature of the conversational exchanges between the members of the learning community, and consequently sheds light onto the participatory roles of the group members in communal activity. Moreover, the analysis of discourse moves supports content analysis by highlighting thematic patterns emerging in joint problem solving.

Discourse moves identified in the discourse data are *initiating, continuing, extending, organizing, agreeing, evaluating, tutoring, thinking aloud and concluding.* To highlight the interplay between problem solving elements in the collaborative activity of in-service teachers, the second dimension in the analysis method investigates the cultural focus of the social interaction on a moment-by-moment basis. The cultural focus of the interaction data consisted of the *procedural, identity, material and semiotic modes.* To investigate the role of sign in the meaning making process, the evolving role of the sign consisted of categories of *no elements of sign, elements of signifier, signifier aspect of sign, signifier connected to signified, elements of signified, sign and social sign*. Table 1 summarizes the analytic frames and categories of the analysis method.

4. RESULTS

The results of this study are discussed via a case-based description derived from one teacher group, to highlight joint reasoning and the application of cultural tools in the collaborative learning of mathematics pedagogy.

Table 1. The analytic method for analysing collaborative problem solving in mathematics

Discourse moves	Description	Example
Initiating	Begins a new thematic interaction episode	*this is x squared*
Continuing	Elaborates either own or colleagues' reasoning	*umm and these equal four x*
Extending	Bringing in new perspectives	*yes, should we draw*
Agreeing	Accepts the ideas or explanations proposed in the previous conversational turn	*okay, clear*
Evaluating	Evaluates reasoning	*so there it is*
Tutoring	Tutors the colleagues in reasoning	*may I still advise, we had this x squared four x and three as given*
Organizing	Organizes the working space	*should we move this, so they don't hinder us*
Thinking aloud	Makes reasoning explicit	*this was one, two, three, four x*
Concluding	Draws together explanation building processes	
Cultural focus	Description	Example
Procedural mode	Focuses on procedural elements, such as negotiating working strategies for joint investigation	*so we should organize this with the help of one tile, four rods and three ones*
Identity mode	Highlights the evaluation of prior learning experiences in the light of new experiences through the processes of reflection, dialogue and collaborative inquiry	*I am totally unfamiliar with these*
Material mode	Concentrates on physical features of the learning situation	*should we move this, so they don't hinder*
Semiotic mode	Highlights the visibility of meaning making via mediational tools	*so this colour connected with ordering these pieces carries the meaning*
The evolving role of the sign	Description	Example
No elements of sign	The sign vehicle and meaning content aspect of the sign cannot be traced in the speech turn.	*I am totally unfamiliar with these*
Elements of signifier	Elements of the sign vehicle aspect of the sign can be traced in the speech turn.	*so we should organize this with the help of one tile, four rods and three ones*
Signifier aspect of sign	Sign vehicle aspect of the sign can be traced in the speech turn	*x plus one*
Signifier connected to signified	Meaning content of the sign connected to sign vehicle can be traced in the speech turn	*so this colour connected with ordering these pieces carries the meaning*
Elements of signified	Elements of meaning content aspect of the sign can be traced in the speech turn	
Sign	Meaning content of the sign can be traced in the speech turn	*this is x squared, umm and these equal four x*
Social sign	Meaning content of the sign can be traced in the speech turn in joint social action	*so there it is, so there it is*

4.1. A Case-Based Description

This case-based description highlights the collaborative processes of one teacher group when factoring polynomials with the help of algebra tiles. The extract characterizes the teachers' discourse as they negotiate and apply the usage of algebra tiles in collaborative problem solving.

Table 2 shows the discourse data of the teacher group. The extract consists of 24 conversational turns in total, from a 3-minute continuous working period. The data presented in Table 2 will be discussed here by firstly summarizing the findings from the analyses of the teachers' social interaction within the group.

Special attention will be paid to the identification of problem-solving episodes in the teachers' discourse. This is followed by a micro-level investigation of three interaction episodes in the teachers' discourse.

The analysis of the teachers' discourse reveals altogether three thematic episodes in the construction of an application for the usage of algebraic tiles. The themes for episodes are problem solving with the help of algebra tiles (Episode 1), clarification through mathematizing (Episode 2), and clarification through hands on activities (Episode 3). The analysis of discourse moves shows that the thematic episodes started from the initiation, questioning and tutoring moves, leading to several conversational turns which took the form of problem solving elements such as questioning, extending, evaluating and tutoring. The analysis of the cultural focus of the teacher participation reveals the interplay of procedural, identity and semiotic modes of interaction.

In the procedural mode of interaction, the mathematical activity included problem solving and problem posing and the symbolic nature of the interaction was grounded in the pictorial and procedural application of algebraic tiles.

In the identity mode of interaction, the prior learning experiences were reflected upon through the application of new cultural tools. In the semiotic mode of interaction the problem was clarified by negotiating the nature and meaning of algebra tiles and the mathematical activity was approached through mathematizing the situation either verbally, symbolically or pictorially. The material mode of interaction was seldom present and it was used for organizing the working space.

4.1.1. Episode 1

In Episode 1 the teacher group started the activity by posing the problem. The episode suggests that the usage of algebra tiles was new to all of the participants. Maritta was eager (6 turns of 11) in participating and tutoring the others. Annikki (turn 2) expressed here unfamiliarity with the usage of cultural tools and Maritta and Liisa made their thinking visible in their turns so that Annikki had the possibility to follow the joint problem solving. Karra was mainly silent but when participating (turns 6 and 10) he supported the group's problem solving by questioning and evaluating. In this episode the group reached the solution for the problem. Episode 1 clearly shows the evolving role of the sign in the shared meaning making process.

4.1.2. Episode 2

This Episode 2 nicely highlights how the group of teachers deepened their understanding of the situation. Liisa starts the episode by saying *"but I don't understand this either"* referring to the mathematical meaning of algebra tiles. This turn (turn 12) raises the semiotic nature of interaction. In her turn (turn 13) Maritta explains the meaning of algebra tiles by tutoring *"but the length of this equals x and this one and this three"* Liisa (turn 14) extends the joint reasoning by suggesting the modelling of the solution by drawing. This leads Karra (turn 15) to join the discourse by writing the expression *"x plus one"* and Maritta (turn 16) continues *"multiplies three x plus three".* The mathematical modelling of the situation doesn't help Annikki who in her turn (turn 17) says *"I* fell off *the cart".*The end of Episode 2 highlights that although understanding deepened, no shared meaning was yet constructed.

Table 2. Teacher participation

No	Name	Transcribed discourse	Discourse moves	Cultural focus	The evolving role of the sign
Episode 1: Problem solving					
1	Maritta	so we should organize this with the help of one tile, four rods and three ones	initiating	procedural; problem posing	elements of signifier
2	Annikki	I am totally unfamiliar with these	evaluating	identity ; evaluation of one's learning history	no elements of sign
3	Maritta	should we move this, so they don't hinder us	organizing	material ; organizing working space	
4	Liisa	so this colour connected with ordering these pieces carries the meaning	extending	semiotic; clarifies the problem	signifier connected to signified
5	Maritta	yes	agreeing		signifier connected to signified
6	Karra	this	questioning	procedural; problem solving	
7	Maritta	that is how I would imagine	agreeing		signifier connected to signified
8	Maritta	this is x squared	initiating	semiotic; mathematizing	sign
9	Liisa	umm and these equal four x	continuing		sign
10	Karra	so there it is	evaluating		social sign
11	Maritta	so there it is	evaluating		social sign
Episode 2: Clarification through mathematizing					
12	Liisa	but I don't understand this either	questioning	identity ; evaluation of one's understanding	elements of signifier
13	Maritta	but the length of this equals x and this one and this three	tutoring	semiotic; the meaning of algebra tiles	sign

Table 2 (Continued)					
14	Liisa	yes, should we draw	extending	procedural; symbolic pictorial	signifier as a sign of signified
15	Karra	x plus one	continuing	semiotic; mathematizing; symbolic algebraic	signifier aspect of sign
16	Maritta	multiplies three x plus three	continuing		signifier aspect of sign
17	Annikki	I fell off the cart	evaluating	identity; evaluation of one's understanding	no elements of sign
Episode 3: Clarification through hands on activities					
18	Maritta	may I still advise, we had this x squared four x and three as given	tutoring	procedural; starting information of the problem	signifier aspect of sign
19	Annikki	yes okay but this handicraft carried the important meaning	questioning	procedural; clarifying the meaning of action	signifier connected to signified
20	Maritta	The handicraft was to collect these pieces into a connected region in a way that there are no holes	tutoring	semiotic; the meaning of the action	sign
21	Annikki	this was one, two, three, four x	thinking aloud	semiotic; the meaning of cultural tools	sign
23	Maritta	and now edge multiplied by edge	tutoring	semiotic; the mathematical meaning of the action	sign
24	Annikki	okay, clear	agreeing	identity; understanding the meaning of the action	social sign

4.1.3. Episode 3

This Episode 3 starts with Maritta's (turn 18) reaction to Annikki's comment by tutoring *"may I still advise, we had this x squared for x and three as given".* In doing so Maritta refers back to the starting information of the problem situation. In her turn (turn 19) Annikki expresses that she could not connect the bridge between the mathematical meaning of the situation and the hands-on-activities with algebra tiles. Maritta's tutoring turns (turns 20 and 23) connected with Annikki's agreeing and thinking aloud turns nicely highlights the interaction pattern where concrete activity was connected with the abstract nature of mathematical reasoning. A Social sign and shared understanding were constructed.

DISCUSSION AND CONCLUSIONS

In this study, the interplay between the three dimensions of the analysis procedure in collaborative problem solving of mathematics teachers nicely highlights the nature of the communicative meaning making of these mathematics teachers. The analysis of discourse moves makes visible the nature of reasoning from the viewpoint of participation in social activity. Four different participant roles emerged in the analysis of the discourse moves. These roles were the tutor, clarifier, questioner and silent supporter. From a mathematical point of view, the communicative problem solving consisted of procedural, identity, material and semiotic modes of interaction. The patterns of interaction were constructed around these modes when groups of teachers negotiated the mediational meaning of cultural tools. The analysis of these patterns revealed diverse thematic episodes in collaborative meaning making, such as problem posing, problem solving, clarification through mathematizing and clarification through hands-on-activities.

This study shows an interesting connection between cultural focus of interaction and the evolving role of the sign. Turns coded as procedural and semiotics modes of interaction carried the key elements of the evolving role of the sign. Besides, the evolving role of the semiotic vehicle was traced in discourse moves categorized as initiating, extending, questioning and tutoring moves. The analytical method developed for the study brings in the nature of educational interaction that is needed to support the collaborative negotiation of abstract ideas.

The study suggests the power of mediational tools to make visible the abstract nature of mathematical ideas behind the computational rules of algebraic procedures. Furthermore, the analysis of the data revealed that the usage of cultural tools in the collaborative problem solving of mathematics teachers aided them in elaborating their conceptual understanding of mathematical ideas. On the whole, the study yields useful information about teacher learning and development from both the social and the mathematical point of view, and provides educators and researchers with tools to develop curriculum as well as instructional solutions for mathematics classrooms, both at the school and at the teacher education level.

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Chapter 11

INTERACTION AND INTERACTIVITY: A SEMIOTIC COMMENTARY

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ABSTRACT

Law is the field in which today the application of semiotics remains essential. It has furthermore "interaction" as a fundamental concept and guiding principle for its social activities. However, legal discourse leaves important philosophical implications of this principle untouched. The concept of interaction, theme of this commentary, shows a *static* character despite its suggestion of dynamics, and a *rigid sender-receiver* scheme qualifies its idea of interaction as "action between (*inter*) actors". These, however, do not fit our experience that relating to others equals the unfolding of a dynamic vision and interpretation of life! That *other* mode of experience is expressed with the concept of "interactivity", which this commentary forwards as a semiotic alternative to "interaction". The process of "being in a state of interactivity" thus changes the substance of "interaction" when semiotics is applied to law.

Interaction is not the same as interactivity—but neither word articulates the essence of their difference. That simple observation goes for the context of social sciences as well as for semiotics. Both use the notion of "interaction" to indicate the phenomenon of "the social" without specifying any particular quality of action, which could eventually be meant by that expression. Semiotics and social sciences are strongly intertwined, so that considerations about the first concept immediately affect the second. This imports in particular since "interaction" prevails in semiotic approaches of foundational discourses in modern society that are implied in social sciences, such as law and legal discourse.

Long before law, there was *medicine*, a major field of semiotic application — approximately two millennia, since the days of Galen until the second half of the 20th century. The patient was understood as a bearer of signs, and the physician was expected to read them.

His reading formed the basis for diagnosis and therapy. Modern medicine lost most of this semiotic sensitivity and replaced it by applying powerful techniques of visualization. Reading a patient's signs transformed into reading and interpreting images, graphics and numbers. A physician's clinical picture thus became a pictured sample of visual data. However, next to theology and literature, *law* maintained its semiotic sensitivity to our days, so that features such as truth, justice and equilibrium are still an issue of a sign-directed legal interpretation. Lawyers create meaning through their expert language and their particular understanding of signs folded in texts. Modern law thus remains a discourse in which an unfolding of semiotic sensitivity seems essential. That discourse has *interaction* as the fundamental concept for its social activities whilst leaving important philosophical implications untouched. The difference between interaction and interactivity is one of those unrevealed implications.

"Interaction/interactivity" is a theme that profiles legal semiotics in particular. *Interaction* exhibits — despite its suggestion of dynamism — a *static* character. Its inherent *sender-receiver* scheme determines the idea of interaction and qualifies it correctly as "action between (*inter*) actors". This does, however, not fit our experience that each action in life focusing on others is never a duplication story but rather the unfolding of a new vision and interpretation of life! Precisely that awareness is folded in the concept of *interactivity*. Does the latter meaning fit law and legal thinking, like it does the meaning of "interaction"? The question is a central issue in semiotic analyses. The process of "*being in a state of interactivity*" changes the quality and substance of all that is meant by "interaction", so that the two expressions (interaction and interactivity) are *not* interchangeable. However, emphasis on *interactivity* characterizes all sorts of semiotic approaches in contrast to *interaction*. Interactivity pertains to all fragments of social reality, not in the least because most of our social activities are in the first place folded in *modes of activity*: first of all the establishment of relations with sub-/objects, and further pertaining to the perceiver(s) of it all. Changes and variations in the process of activity can take place in one and the same activity mode. This view leads away from traditional models of communication, which have been so fundamental and natural in law and social sciences. But what shape has human communication, lawyers would argue when confronted with semiotics, if one has to accept that creating meaning is a multifaceted process, which is built upon the acceptance of indeterminacy and the refutation of invariant stories or definitive codes?

Such considerations emphasize the *dynamics* of signs and sign formation, and elucidate how social relations are a *process* and at the same time a *process-result*, but never a *static* issue engendered by autonomous actors in relation with other autonomous actors. "Activity" is a keyword that transcends all varieties that take the 'sender-receiver' model for granted. Postmodern psychotherapy has forwarded the issue of "not-knowing" as a key feature, so that the therapist's ego does not predetermine the path, which the client's ego has to go, so that fixed, frozen or monologue constructions begin to change. This is not an “anything goes"—philosophy but a forceful attempt to change the speaker-hearer model in communicative practices. Do not forget how the latter model dominated our occidental philosophies for centuries, forcing us to understand social life as the mirroring of *ego* and *alter* with their particular focus on representation. But again, no 'activity' is based on fixed positions in public space that create the social world through departing from the *ego* either as *ego* or as *alter*! We tend to understand the public space as a space of the *politeia*, the 'body politics' so prominently formulated in the writings of Thomas Hobbes, in which positions change and are understood as changing. This determination of a public space seemed the only condition

under which citizens, subjects and social actors could transcend themselves and their monologue position, and also acquire a legally empowered status. In particular Civil Law formulates what Roman law already suggested in that context about a subject's position *sui iuris*, which entails *emancipation*. The Latin *manus* means *hand* as well as *power*. To get out of the power of an idea or social regimen is in Latin *e manu capere* – the basis for emancipation. Enlightenment used the concept with its roots in Roman law and in law in general: to be in the situation of acting under the guidance of one's own legal power is the key to be a bearer of rights and duties, as the emerging EU legal system emphasized.

This entire pattern development depicts hitherto unknown worlds and world-concepts. Communication does not relate human individuals in a one-to-one manner but stems from a world image in which individuals occupy a place and construct a diversity of realities according to their various positions, expectations and values. The EU Treaties are made to secure these places for the Union citizens in all regards. Interaction becomes an inappropriate concept in that evolution, because it appears too static. Challenges pertaining to that concept come from within the emerging legal system. The construction of the European Union shows how nation states can no longer make decisions and policies for themselves in autarchy. Webs of indeterminacy became a normal context for nation state decision-making and laws. Once decisions are made, they seem to be grounded in fragmentary assessments that refer haphazardly to the common good. The sum total of references becames problematic: not only citizens but also other Member States determined the common good beyond fixed determination. One particular issue shows this problematic character at hand: the Union's requirement of a single institutional framework and a single voice and identity on the international stage. The heart of the matter is here, that the image of public life as related to a common good is based on a 'public', which is immensely diversified. Nevertheless: there remains this important tension between the idea of "interactivity" and possible legal practices, who—as the Napoleonic Code showed—need that subjects of law possess a position in public life that determines them physically and spiritually. Applied semiotics considers: is law indeed able to leave "interaction" behind and to perform its actions with legal subjects who are by definition in a continuous "state of interactivity"?

It is fascinating how Ludwig Wittgenstein's 1958 *Philosophical Investigations* formulate his widely recognized "private language argument", saying that a language remaining within the limits of a personal consciousness—and thus excluding other minds by means of continuously mirroring its proper position—cannot exist. Those considerations, from §202 to many paragraphs in the §§ 300, reach from sensations to impressions, from memory to meaning, from expression to reference and from rule to sign. They sustain Charles Sanders Peirce's observation that *signs never fit exclusively one individual*. His observation that *everything can become a sign* does consequently not focus a single consciousness and its proper position in social space, but implies already a different social philosophy! Hence, in the words of Peirce, there *are* no signs; in other words: nothing *is* a sign, nothing *is* exclusively a sign, nothing *is* in essence a sign, a fixed sign, or in any other "*is*"- regard, but everything *can become* a sign! Only *dynamic* or *process* sign functions function in the course of life. He thus emphasizes the human situation as *being in process*, and introduces the semiotic subject not as a fixed *means* to perceive reality but as one of the many *ways* of perception. A sign is not a fixed semiotic entity but rather a meeting ground for independent entities. Semiotics, including their applications in whatever field of communal interest (scientific theories included) entails therefore a theory about the quality, engenderment and

patterning of human relations: patterns that contravene the major implications of the concept "interactivity". The anthropologist Geertz emphasized this relation between sign systems and their various modes of implementation, suggesting:

> If we are to have a semiotics … (or for that matter, of any sign system not axiomatically self-contained), we are going to have to engage (…) away from an investigation of signs in abstraction toward an investigation of them in their natural habitat (…).

Such a natural habitat is a specific culture as well as a specific style of life. One can distinguish various *semiotic subjects* in different cultures, discourses and styles. The semiotic subject as a way of looking at the world segments the universe and thus couples semantic units with expression units: by means of this labor it becomes entitled to continuously abolish and restructure its social and historical concretions. The activity of the semiotic subject is first of all a *conceptual* activity. In other words, humans do not perceive reality with their 'eyes' but rather with their 'mind'. They do no longer strive for *representing* an appearance in their social contacts but rather grasp "an appearance to unveil among others" – indeed: in such a manner, "everything can become a sign". When establishing social relationships, we encounter the challenge that *activity* is the key to *understanding reality* as an active process and not just a fixed idea to be applied in line with codified rules. Roland Barthes once described how

> The structural mind gets hold of something given, dissects it, reduces it to its component parts and puts these parts together again —this seems to be little, but this little is, observed from another viewpoint, decisive (…)
>
> Creation or reflection are here not a reprint of the original world but a real creation of a world, which resembles the first, does not copy or reprint it, but makes that first understandable."

Social life is thus understandable as an *event* and thus as an activity that unfolds in the multiple fragments of reality — always unfolding a different function, surface, line, circle, volume, color, sphere or mood. What is more: all have an equal chance to become entangled in acts of communication, whereby the latter can be understood as a specific activity. A communicative subject creates many forms of social contact in segments of interactivity and never in fixed positions of fixed inter-actions. Human individuals can only be creative in the context of a culture and more precisely in one of a culture's many forms of interactivity. We learned from neurology that we do not exclusively see with our eyes but with our brain as well, which means that we perceive only as a complete person—which is a process in itself! Perception is a total engagement and therefore a matter of conceptualization, of mind, of vital rhythms. This stimulates insights of important philosophical and above all semiotic relevance for our view on life. Are there lessons to learn and conclusions to drawn for lawyers and legal thinking? Yes, there are indeed: "semiotic relevance" is an expression easy to formulate but difficult to explain and even more difficult to prove. We meet this at various levels: (a) There is first and foremost Peirce's call to be aware of how all reality is always involved in a process of achieving *sign value*. (b) Then one should mention how this relevance pertains to understanding the basic structures of human *activity*. (c) That activity, whatever character it has, functions in the dynamics of *meaning making*—itself an apogee of semiotics. (d) An

understanding of a strict *equivalence* of all segments or elements that compose the communication follows from there. (e) This goes to the semiotic understanding of *meaning* in general. Meaning seems to be the result of a human activity directed towards the *order* of things rather than to any fixed and durable *essence* they should possess. (f) Issues of human consciousness are thus to be understood beyond philosophical idealism, which says in general, that human activity is always *inter*activity and thus focuses *meaning as a matter of order*.

All these remarks stem from a wealth of philosophical considerations related to applied semiotics. They could, however, be formulated with more precision, expanded and deepened for instance into the logic and semiotics (Peirce), visions on human growth (Lacan) and hermeneutics (Gadamer). One issue would nevertheless remain central in all those contexts: what have these philosophies and their inherent semiotic notions to do with legal thought formation and lawyer's activities? In other words, how can actors in legal discourse acquire insight in the fact that their texts and reasoning are shaped by *iconic revolutions*? Although not directly focusing legal rules, norms or logic, the question touches upon many preconditions of legal meaning and expressiveness. So one should ask: what has a way of presenting reality as perceived by an artist—as a specialist in perception, perhaps more so than any lawyer—to do with legal judgment? That is a truly challenging question! We do not know how problematic the shift from *verbal* to *visual* expressiveness and the completion of *words* by *images* is for law and legal discourse. Does verbal expressiveness suffice to understand reality the way legal discourse does? Or should semiotics inspire lawyers to continuously reconsider their proper articulation? Imagine that law's communicative character changed under the influence of the completion of words by images, so that communication in law is no longer restricted to words or other linguistic entities. CNN's slogan that "an image is worth a thousand words" has indeed communicative weight. The function of *visual* legal semiotics, based on the integration of word and image, challenges modern law and widens its verbal traditions. "Finally, … reality depends on the ultimate decision of the community", Peirce once noticed and he could have added that *community* also means *culture*! Although law presents itself in a variety of images in Courts and other public places, there is no visual component in legal thought formation that fulfils a decisive function. Al these notions inspire the formulation of four coherent conclusions that have a general character:

1) No semiotics is separated from cultural values, styles, norms and ideas—law itself is an excellent example of *intertwining semiotics*, which always plays a role in cultural complexities.
2) There is no fine line to maintain between *specific types of semiotics, such as literary and visual semiotics*. Paintings have abundantly demonstrated by means of its surfaces how literary motives can become visual, carrying important semiotic consequences, vice versa!
3) What is *important for art, is also important for law*: in both discourses is a central place for the functioning image of a human being. Law's articulations are ultimately expressions of a *legal image of man* that law holds for foundational.
4) Many aspects of these conclusions underline the semiotic importance of *rhetoric* in law: legal discourse fascinates in *communication processes* where emancipated participants can make decisions that have important legal consequences.

Peirce's idea that the human subject is an *order* in itself, and the self itself is for itself a *sign*, forms the basis for an observation that combines literary and visual semiotics. That image could be finalized in a legally correct and elaborated *citizen participation* as explored today in the legal system of the European Union. Is not the ultimate goal of legal rhetoric (sustained by legal semiotics) to create an emancipated opinion, combining visual and verbal elements of discourse? Take for instance "*two* faces in *interaction*": that expression embraces the meaning of 'a face' as it is restricted to the 'sender-receiver' model and its concept of interaction. More offensively stated: two faces conceived within the boundaries of the sender-receiver model *are no faces*! They cannot be 'open' and in interactivity because they just mirror each other. To see someone in the face: does one want to see oneself in the face of the other? The question makes clear that any face beyond interactivity has no expressivity and is therefore irrelevant in semiotic perspective. Faces are in essence interactivity; they cannot become a *sign* outside that realm and they are just for that reason relevant for semiotics. In other words, a face is never an entity in itself but always an entity in process. That process is semiotic and precisely what Peirce described as *the process of becoming a sign*. Faces show meaning in the context of recognition. Look in the mirror and experience how interactivity gives life to that mirror image beyond how others might perceive it. The dynamics of interactivity (in itself a full actualization of interaction) concretize an enriched "Janus"-experience, which articulates itself whilst saying, "I am the one I was, and will be!" As a consequence, the semiotics of interactivity is about human individuals embedded in the encompassing energy of change and transition, which we often vaguely indicate as 'culture'. Faces are culture signs and can become symbols of the specifically human character of that change. It is important and philosophically difficult to grasp how this semiotics of interactivity is not the result of an individual (inter) action. Individuality is rather the product of change and in essence a culturally inherited articulation of an evolving position in the process of growth and development.

Where law and legal discourse want to fixate an individual as being in interaction, they do so by means of using, for instance, concepts such as right, identity, or property. Those concepts function as signs, which transfer and communicate information about a human individual in its social setting without considering how these positions are just tentative because of the context of the flow of dynamics traditionally called 'human history'. This type of semiotics is founded upon interaction as understood along the pattern of the sender-receiver model. The openness of human faces shows, in contrast, a flow of feelings, emotions, and expressions, so that the principal virtue of a face is potentiality in Peirce's category *Firstness*. Here is the key notion that can serve as a basis for any deeper understanding of our thesis pertaining to the shortcomings of "interaction" and the surplus value of "interactivity". The semiotics of interactivity are most effectively linked to facial expressiveness. Is this the reason for the difficulties law has with the human face? One should, when answering that question, keep in mind how the explanatory power of the interaction concept appears limited: a face-to-face situation is never exclusively a situation of solely two individual faces! If everything around us can become a sign that opens up to its proper signification, then each face-to-face situation is satiated by the dynamics of signifying processes (the dynamics of culture) and never reduced to two acting faces and two actors. Do the limitations of the number two fit the essence of a human face? Lawyers encounter this question when they have law and legal discourse as their frame of reference and at the same time see a human face. Are they aware, how ours is the age of semiotics, the method of questioning and research, of

growth and transition, which focuses interactivity because its subject is ultimately indeterminable and its activity beyond fixation? That highlights a new sympathy for Bergson, Peirce or James. The pragmatism of each *élan vital* expresses itself in signs, symbols and Thirdness. Theirs is not a metaphysic of process like Teilhard de Chardin developed, but a pragmatic *élan* engraved in the images of a human face. Do not forget that any face is cognized in its process character whilst an insight in the human body unfolds. Shown is a surface in growth, a skin in change, a glance in futures based on a past that etched what is mirrored and projects what is shared in life's experiences.

Our age of semiotics does not proclaim any *interactionism* as its basic philosophy. True interactivity is not in the countenances around us, since faces are essentially evolving in time and space and thus *becoming*: becoming sign or symbol and infinitely more, perhaps a subject that recognizes itself as an "I"—until also this "I" withdraws from our recognition and becomes a name, a psychic entity, "an/other" in a process that can not become encountered the way lawyers experience. So they must turn their own faces around to solely operate in a world of fixated meanings. Is this how lawyers make meaning—with faces turned away? Consider the sentence that "the Court may say for law": a performative speech act with predominantly institutional character. Does that utterance fit the features of "an individual in interactivity"? The question is a key to the central thesis of this note. It says that semiotics applied in legal discourse show how problematic it is to maintain "interaction" because all implications of that concept withstand our experiences of social life. Once more: semiotic analyses unveil how life unfolds in "interactivity" that focuses the human subject in its relations to others: a process of "being in interactivity". Does this commentary propose to just change words, propagate to no longer use "interaction" and use "interactivity" instead? It seems most challenging to conclude with this ironical, naïve and clearly inappropriate proposal, which inspires nevertheless!

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Chapter 12

MULTIMODAL STYLISTICS – THE HAPPY MARRIAGE OF STYLISTICS AND SEMIOTICS

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INTRODUCTION

Stylistics is the systematic study of the ways in which meaning is created by linguistic means in literature and other types of text. It arose from a wish to make literary criticism more "scientific" by anchoring the analysis of literature more solidly in the actual grammar and lexis of the texts put up for analysis. Since the first major flourishing of stylistics in the 1960s, different linguistic paradigms and other academic trends of the times have caused the field to branch off into a great variety of sub-fields such as formalist stylistics, functionalist stylistics, cognitive stylistics, corpus stylistics, feminist stylistics and others, which all from each their perspective pivot around linguistic aspects of meaning-making. Gradually, the range of text types that stylisticians engage with have furthermore expanded to also comprise non-fictional texts such as news reports, advertising, doctor-patient discourse, academic writing, etc. While forceful in its rigour and systematism, the traditional stylistic approach (whether of a formalist, functionalist, cognitive or other orientation) has until recently largely failed to embrace meanings which are created by semiotic systems other than the verbal. By fusing the theories, methodologies and practices of stylistics and multimodal semiotics, *multimodal stylistics* is a new direction in the field which aims to develop analytical frameworks that will allow systematic analysis of literature and other types of text which, in addition to wording, employ semiotic modes such as e.g. typography, layout, visual images and colour for their meaning-making. It is the aim of this article to provide a brief introduction to this new semiotic trend in stylistics, its promises, problems and areas which need to be explored.

MULTIMODAL STYLISTICS

One of the main trends in multimodal stylistics combines the traditional stylistic focus on verbal text with the work done on multimodality by proponents of social semiotic multimodal theory such as Kress and van Leeuwen (1996, 2001), O'Halloran (2005), Baldry and Thibault (2006) and Bateman (2008). With M. A. K. Halliday's Systemic Functional Linguistics, or "social semiotics", as their theoretical foundation, these scholars of multimodality have set out to explore whether and to what extent the principles of Halliday's linguistic theory of language may apply to semiotic modes other than the verbal. In their seminal work, *Reading Images. The Grammar of Visual Design* (1996), Kress and van Leeuwen, for instance, examine the ability of visual images to construct ideational, interpersonal and textual (or compositional) meaning similar to the types of meaning which Halliday described in relation to verbal language in his *Introduction to Functional Grammar* (1994). Later followed research into a larger variety of semiotic modes: e.g. sound (van Leeuwen, 1999), colour (Kress and van Leeuwen, 2002), typography (van Leeuwen, 2005b, 2006) and layout (Bateman, 2008), as well work with a more explicit focus on the meaning created by the multimodal *interaction* of semiotic modes (Kress and van Leeuwen, 2001; van Leeuwen, 2005a; Baldry and Thibault, 2006; Boeriis, 2008). Currently, this work in social semiotic multimodality is crystallizing into a systematic descriptive apparatus geared towards handling semiosis which includes – yet extends beyond – the verbal.

To stylisticians with an interest in multimodal texts, combining the traditional stylistic focus on wording (i.e. grammar and lexis) with the descriptive apparatus developed by multimodal scholars would seem appealing. In addition to providing new (multimodal) tools for the stylistic tool box, the linguistic grounding of the social semiotic take on multimodal theory would seem to provide a more consistent terminology and descriptive apparatus than would the combination of traditional stylistics with other semiotic paradigms. As illustration of this, modality will serve as an example. In linguistics, modality is seen as an interpersonal resource of meaning which enables speakers to express their commitment to a given utterance in terms of probability, usuality, inclination and obligation (cf. Halliday, 1994: 88-92). It is realised as the space between absolutely positive and absolutely negative, between "is" and "isn't", "do" and "don't". In addition to the polar utterances "Peter is a student" and "Peter is not a student", the speaker may hence qualify – and thereby interpersonally colour – her statement in terms of how committed she is to the truth value of the polar expression: "Peter may be/could be/should be/is probably/etc. a student". In linguistics, modality is typically realised by means of modal verbs ("may", "can", "should", "would", etc.) and modal adverbs ("possibly", "certainly", "always", "rarely", etc.). According to Hodge and Kress (1988: 128-142), and later, Kress and van Leeuwen (1996: 159-180), modality may also be seen as an interpersonal resource in visual communication where it concerns the truth value of the visual representation. Here modality is realised in terms of parameters such as the articulation of detail and background, of light and shadow, of depth and of colour – parameters which can be manipulated (i.e. increased or decreased) and thereby have an impact on our judgement of "as how true" or "as how real" something is represented (cf. van Leeuwen 2005a: 160). The modality of a photograph of a tree where the details of the tree and its background are fully articulated will hence be higher than one in which such details cannot be made out. Similarly, the modality of the same photograph will be high if the colours are polychrome (i.e.

differentiated) and low if monochrome (e.g. greyscale). The use of modality in explicitly multisemiotic novels is preliminarily explored by Nørgaard (2010b; 2010c fc.).

Another recent take on multimodal stylistics is the approach which combines work in cognitive stylistics with cognitively informed work on multimodality by scholars such as Forceville (1996), Forceville and Urios-Aparisi (2009) and Currie (2004). The applicability of cognitive multimodal frameworks in stylistics is explored by multimodal stylisticians like Montoro (2010) and Gibbons (2010).

PROMISES, PROBLEMS AND FURTHER PERSPECTIVES

One advantage of combining stylistic and multisemiotic approaches to meaning-making concerns the consequent stylistic acknowledgement of and interest in *all* the semiotic modes that go into the meaning-making of a particular text as well as the pronounced focus on the meaning which is created by the *interaction* of the modes involved rather than by modes in relative isolation. In the field of literary stylistics, such an approach not only enables more comprehensive analyses of explicitly multisemiotic literary texts, whose numbers are currently on the increase because of the new affordances of the technologies employed in publishing. It also invites the stylistician to recognise that even the visually most conventional literary texts are multimodal, since such texts always and without exception involve the modes of wording, typography, colour and layout. A multimodal stylistic approach to literature furthermore enables the stylistician to analytically extend the concept of the 'text' and, for example, acknowledge that elements such as the paper quality and the book cover ultimately also play a role in the meaning created by a given novel. Finally, the multimodal semiotic extension of stylistic practices also paves the way for more comprehensive multimodal stylistic analyses of genres such as film and drama, where the traditional stylistic analysis of verbal language can be combined with equally systematic observations about the other semiotic modes involved in the meaning-making of such texts (cf. e.g. Simpson and Montgomery, 1995; McIntyre, 2008; Montoro, 2010).

Although the fusion of stylistics and multimodal semiotics seems promising in many respects, the enterprise has its problems, too. One of these is the possible risk for multimodal stylistics of inheriting some of the weaknesses from the paradigm of multimodality which is still fairly young and in need of qualification. An example of this concerns the application in multimodal theory of linguistic categories and descriptive apparatus to semiotic modes which in some respects differ significantly form the verbal. In some cases, this transfer of concepts and categories appears to work well, yet in others it seems more problematic, as when Halliday's experiential categories are transferred with little critical reflection from the description of verbal language to the analysis of visual communication as done, for example, by Machin (2007: 123-128). In verbal communication, Halliday (1994: 106-175) argues, we represent – or rather construct or construe – the experiential world in terms of linguistic configurations of participants, processes and circumstances. The processes and their associated participants are categorised according to their semantic content and Halliday is operating with six categories of which the following four are the most prevalent: material processes of doing, mental processes of cognition, affection and perception, verbal processes of saying and signifying and relational processes of being. While such processes are fairly

easily spotted and categorised in verbal language, since they differ semantically as well as in their grammatical realisation, they are far more difficult to spot and categorise unambiguously in visual communication. In verbal language, "Peter and Janet are playing football" allows only one interpretation: a material process ("are playing football") of which "Peter and Janet" are the (active) participants. In visual communication, the depiction of the same experiential situation is far more open to interpretation. It may just as well realise the meaning of e.g. "Peter is kicking the ball to Janet", "Janet receives the ball from Peter", "Peter and Janet have a ball", "A girl, a boy and a ball are in the football field" as that of "Peter and Janet are playing football". Although visual images appear to construct experiential meaning similar to that of verbal language, inherent differences between verbal and visual semiosis clearly call for adjustments of the categories employed for analysis when the descriptive apparatus is transferred from one semiotic mode to another. It is thus imperative that multimodal stylisticians are aware of possible weaknesses of the paradigms they draw on for their analysis. With this awareness sharpened, however, practitioners of multimodal stylistics may in turn help qualify the multimodal paradigm itself through systematic practical analysis which may reflect back on the theory and methodology employed, whether as a by-product of the analysis or as its main incentive.

Another challenge inherited from multimodal semiotics and faced by multimodal stylisticians concerns the question of how to actually handle the multitude of semiotic systems involved in multimodal meaning-making. Where, broadly speaking, practitioners of more traditional stylistics need a grammar of verbal language for their analysis, proponents of multimodal stylistics will have to operate "grammars" of several semiotic modes at the same time: a verbal grammar, a grammar of visual images, a grammar of layout, a grammar of typography, etc.

Ultimately, multimodal stylisticians (and proponents of multimodality) will have to recognise that a systematic multimodal grammar of all semiotic modes and their interaction is a laudable yet utopian ideal. It has to be faced that few academics will be experts in all modes but will have to specialise in one or two and make do with a more general knowledge about the rest – or, alternatively, cooperate with experts on modes of which they themselves have less knowledge.

Altogether, the comprehensiveness of multimodal theorising so far has resulted in a general coverage of a lot of multimodal ground, yet also makes for a tendency to scratch the surface, due, perhaps, to its being the "first wave" of a new academic paradigm. It is time to qualify the initial claims of multimodal theory by more detailed qualitative and quantitative investigations.

In addition to contributing to such qualifications, multimodal stylisticians may furthermore remind other multimodal scholars of the central premise of multimodal thinking that all semiotic modes are equally worthy of analytical attention and thereby counter the tendency of much work in multimodality to focus on semiotic modes other than the verbal. This being said, one of the weaknesses of multimodal stylistics at its present stage is exactly this tendency to focus far more on modes other than the verbal (cf. Nørgaard, 2010b), presumably because such modes have not previously been paid much attention in the field. For multimodal stylistics to truly qualify as a branch of stylistics, this imbalance must be addressed and gradually levelled out.

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