

Metaphors

A constructivist approach*

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The purpose of this paper is to contextualize the study of metaphors within constructivist-informed research, in the hope that this process will orient cognitive scientists to the usefulness of implementing qualitative research methodologies, especially to using the person of the researcher as the primary research instrument. First, I explore some of the differences between Johnson and Lakoff's Contemporary Metaphor Theory (CMT) and approaches evolving from it on one hand, and the clinical approach to metaphor based on a constructivist therapy model, on the other. CMT has been one of the most significant forces that helped shift cognitive science toward an embodied approach to cognition. While it has succeeded to place physical experience back where it belongs in reason and meaning, CMT has, however, also fallen into some positivist traps which lead to problems such as a dualism, a split between the knower and the known, and with that, to a distrust of introspective, first-person accounts. In the process of finding conceptual metaphors — generalizations that govern metaphorical expressions — CMT often deletes the idiosyncratic characteristics and presuppositions implicit in linguistic metaphors; it divorces them from people's sensory experiences, the "here and now" and the intent of their communications. The constructivist approach to metaphor that I present here accepts as a priori assumptions much of what workers of CMT are out to prove. In particular, it takes the correlation of conceptual metaphors and physical experience, as well as the unity of language and thought as pragmatic givens. Emulating the constructivist therapist's approach to metaphors, I show how it is possible to deconstruct conceptual metaphors into minute sensory distinctions, using one's own person as the main tool, for the purpose of helping people change their experiences in desired ways, at will. I illustrate this process by numerous examples from a wide field of applications, including mathematics education and psychotherapy.

Quite simply: what I believe is missing is ... this paradigm-consciousness ...
to human communication itself. Reddy (1993: 164)

Human communication will almost always go astray unless real energy is
expended. Reddy (1993: 174)

1. Introduction

This paper is part of my long-term collaboration with Mary Hale-Haniff, a systemic (family) and communication therapist. While my work as a cognitive scientist has been concerned with the structure of subjective experience, Hale-Haniff's work has been largely practical in nature, helping human systems implement significant changes in their experience. When I first became familiar with Hale-Haniff's clinical research methods, I was struck by the differences in approaches to and assumptions about subjective experience that informed our respective work: While the field of cognitive science seemed "stuck" on questions such as whether it is even possible for a third person to know a first person's subjective experience (Chalmers 1995), Hale-Haniff was able to demonstrate ways of attending to inter-subjective experience in a manner that affected people deeply, helping them change in ways they found useful. This led to a series of dialogues where it gradually became clear that the patterns of "differences that made a difference" (Bateson 1972) between each of our respective approaches directly paralleled the set of distinctions Lincoln and Guba (1985) described in contrasting two major paradigms of scientific inquiry: the traditional positivist paradigm and the emerging naturalistic paradigm referred to as constructivism.

Since that time, we have focused on the overall theme of exploring practical applications of the two paradigms or thought system's foundational assumptions and implications in a number of fields of inquiry including cognitive science and psychotherapy (Hale-Haniff and Pasztor 1999); pragmatics (Hale-Haniff and Pasztor 2000); mathematics education (Alacaci and Pasztor 2002, 2003; Pasztor 2003, 2003a, 2003b); women's studies (Pasztor and Slater 2000; Pasztor 2001); and organizational leadership (Hale-Haniff 2001, 2002).

The goal of this paper is to extend this approach to inquiry in the area of metaphor: to study metaphor through the lens of constructivist therapy (Hoyt 1994; Neimeyer and Mahoney 1995), which I view as situated against the backdrop of a general paradigm shift occurring in a wide range of fields of scientific inquiry, such as biology, chemistry, consciousness studies, ecology, linguistics,

mathematics, philosophy, physics, politics, sociology, psychology, and the arts, and which was already evident to Schwartz and Ogilvy (1979; cited in Lincoln and Guba 1985) over twenty years ago.

With this intent, I explored the differences between two approaches to metaphor: Johnson and Lakoff's Contemporary Metaphor Theory (CMT henceforth) (Johnson 1987; Lakoff 1987, 1993; Lakoff and Johnson 1980, 1999; Lakoff and Nuñez 1997, 2000) and approaches evolving from it (e.g., Alloway et al. 2001; Boroditsky 2000, 2001; Boroditsky and Ramscar 2002; Gibbs 1996; Murphy 1996) on one hand, and Hale-Haniff's primarily clinical, sensory-based approach to metaphor (Hale-Haniff 1985) which was informed by distinctions in sensory awareness first made explicit by Bandler and Grinder (1975), and was elaborated in Bandler and MacDonald (1988), on the other. Before discussing and comparing the two approaches, I will begin with a brief presentation of the paradigms that inform them, respectively.

2. Paradigms and the paradigm shift

2.1 Defining paradigms

The term 'paradigm' "stands for the entire constellation of beliefs, values, techniques, and so on shared by the members of a given community" (Kuhn 1970: 144). While theories, models, or dogmas are also paradigms, here I am concerned with foundational paradigms. While many might think of foundational paradigms as abstract distinctions of interest only to philosophers, their assumptions are immanent in every aspect of our collective and individual communication and actions: "Paradigms represent what we think about the world (but cannot prove). Our actions in the world, including the actions we take as inquirers, cannot occur without reference to those paradigms: 'As we think, so do we act'" (Lincoln and Guba 1985: 15).

2.2 The traditional approach to science

The traditional approach to science has been based on the positivist worldview. The *ontology* presupposed in the positivist paradigm is that there is one *reality* out there, which exists independently of the observer. Furthermore, we have access to this reality, and we can fragment, study, predict, and control it (Lincoln and Guba 1985; Hale-Haniff and Pasztor 1999), and we can decide the truth or falsity of any utterance that refers to it.

As von Glasersfeld (1987) points out, while trying to access reality, we have been caught in an age long dilemma: On the one hand truth is (traditionally) defined as “the perfect match, the flawless representation” of reality (von Glasersfeld 1987: 4), but on the other hand, we all live in a world of genetic, social, and cultural constraints, most of which none of us can ever “escape”. *Who then, is to judge “the perfect match with reality”?*

To answer this question, positivist philosophy has overwhelmingly made the assumption that, given the right tools, pure reason is able to transcend all constraints and the confines of the human body, including those of perception and emotion.

2.3 The constructivist ontology

Constructivist philosophies (Goodman 1951, 1978, 1984; von Glasersfeld 1984, 1987; Gergen 1985, 1991, 1994, 1995; Mahoney 1991; Hale-Haniff 2002; Hoffman 2002) operate from an assumption that knowing is not matching reality, but rather finding a *fit* with observations. Constructivist knowledge “is knowledge that human reason derives from experience. It does not represent a picture of the ‘real’ world but provides structure and organization to experience. As such it has an all-important function: It enables us to solve experiential problems” (von Glasersfeld 1987: 5). With this theory of knowledge, the experiencing human turns “from an explorer who is condemned to seek ‘structural properties’ of an inaccessible reality ... into a builder of cognitive structures intended to solve such problems as the organism perceives or conceives” (ibid).

For the constructivist facilitator of change such as the educator or psychotherapist, “our moment-to-moment experience of living is *constructed* together through language. Therefore, [verbal and non-verbal] language, as a structure for interpretation of experience, *is* [boldface mine] [in vivo] reality, not a representation of it” (Hale-Haniff 2002). By presupposing that realities are *multiple* and *co-constructed*, we are able to free ourselves from the constraints of either/or thinking, certainty, and hierarchy presupposed in beliefs of a unique, objective reality (Watzlawick 1984), and move toward co-creative dialogue and innovation (Hale-Haniff 2002). We then conclude that since we construct our own realities, we might as well make them desirable (Csikszentmihalyi 1997).

3. The Contemporary Metaphor Theory (CMT)

In the past two decades, cognitive science has undergone deep changes. Traditional, positivist views of reason as disembodied and objective have given way, in great part through Johnson and Lakoff's CMT, to a view of reason as "embodied" and "imaginative" (Johnson 1987; Lakoff 1987, 1993; Lakoff and Johnson 1980, 1999; Lakoff and Nuñez 1997, 2000).

In this shift from positivist views to new, emerging ones, however, many of us find ourselves inadvertently caught between the old thought system and the new ones, making an integrated thought flow which follows coherent understanding very difficult. One reason is that the positivist paradigm is highly ingrained in "everyday" experience. Although we are committed to new paradigms, it still remains a daunting task to leave behind a way of thinking and living that is ingrained in our culture and socio-political environments: "If it is difficult for a fish to understand water because it has spent all of its life in it, so is it difficult for scientists to understand what their basic axioms or assumptions might be and what impact those axioms and assumptions have upon everyday thinking and lifestyle" (Lincoln and Guba 1985: 19–20). Thus, we may be unwittingly mixing ideas from the two paradigms and thus communicating mixed messages through our inconsistent narratives and actions (Hale-Haniff 2002). This is certainly true about CMT, as I will explain in Section 4.1.

In developing CMT, Johnson and Lakoff's central purpose was to disprove the Objectivist theory of meaning by developing "a constructive theory of imagination and understanding that emphasizes our embodiment as the key to dealing adequately with meaning and reason" (Johnson 1987: xxi). In particular, their goal was to find the generalizations (called conceptual metaphors) that govern metaphorical expressions, and to prove, against Objectivist claims to the contrary, that they "are not in language at all", but in thought; that they structure abstract thought by mapping relevant aspects of concepts that arise from basic physical experience onto our nonphysical, abstract experience (Lakoff 1993).

Much of Johnson and Lakoff's work is dedicated to proving the "cognitive reality" of their theory, and a number of researchers such as Gibbs, Boroditsky, Ramscar, and Alloway et al., have been out to prove it experimentally, as well. But if we accept the constructivist premise that knowledge is not a *match* with an objective reality, but is instead finding a *fit* with our observations (von Glasersfeld 1987), then it makes a lot of sense that — as Reddy (1993) points out — paradigm conflict (in this case between Objectivism and Johnson and

Lakoff's embodied realism) is "immune to resolution by appeal to the facts" (Schön 1993), and hence to any proof of validity or reality.

Instead, we could appeal to the *usefulness* of the new paradigm to human communication. However, even though Lakoff (1993) traces CMT back to Reddy's (1993) by now classic paper "The conduit metaphor", Johnson and Lakoff do not share their goal with that of Reddy (1993), which is to improve human communication as a tool towards "alleviating social and cultural difficulties".

3.1 Johnson and Lakoff's embodied realism

This paper evolved in great part from my study of CMT. However, in trying to coherently understand it, I found myself unable to integrate Johnson and Lakoff's espoused theory and theory in use (Schön 1983), as well as the relationship between their theory and where they position themselves philosophically.

Johnson and Lakoff position themselves away from Objectivism in a paradigm that they call "embodied realism". Much of their attention is given to disprove the Objectivist theory of meaning that "is compatible with, and supports, the epistemological claim that there exists a 'God's-Eye' point of view, that is, a perspective that transcends all human limitation and constitutes a universally valid reflective stance" (Johnson 1987: xxiii).

With their arguments against Objectivism, Johnson and Lakoff seem to move away from the same positivist assumptions as constructivists do. However, they characterize their embodied realism as "a form of interactionism that is neither purely objective nor purely subjective" (Lakoff and Johnson 1999: 25). In their view, "[s]ubjectivism in its various forms — radical relativism and social constructionism" fails since our concepts are "created jointly by our biology and the world, not by our culture" (ibid). Thus, embodied realism parts ways with constructivism in many crucial aspects. Sometimes, however, it contradicts its own presuppositions, making coherent understanding difficult. I find it important to point out these incongruencies, since they can be very subtle, and yet powerful.

3.1.1 *The issue of coherence between CMT's assumptions and its concept of 'real' knowledge*

Johnson and Lakoff's embodied realism denies "that there exists one correct description of the world" (Lakoff and Johnson 1999: 96) and it treats "knowledge as relative — relative to the nature of our bodies, brains, and interactions with our environment" (ibid). Its three main assumptions are that "The mind

is inherently embodied”, “Thought is mostly unconscious”, and “Abstract concepts are largely metaphorical”, which are also foundational assumptions of the constructivist approach presented here.

Much of Johnson and Lakoff’s efforts, however, go into proving that these three assumptions (that they call “discoveries” of second generation cognitive science) are actually “*real*”. Admittedly, Lakoff and Johnson (1999) go out of their way to show that their meaning of “real” is *not* the same as the metaphysical meaning of the traditional philosophers: “Metaphysics in philosophy is, of course, supposed to characterize what is real — *literally real* [italics mine]. The irony is that such a conception of the real depends upon unconscious metaphors” (Lakoff and Johnson 1999: 14).

At the same time, they also distance themselves from a postmodern meaning of “real”. They argue that embodied realism is not a form of extreme relativism, because it gives an account of how real, stable knowledge, both in science and the everyday world, is possible. But just what is “*real*” then? Here is Lakoff and Johnson’s (1999) answer: “What we mean by ‘real’ is what we need to posit conceptually in order to be realistic, that is, in order to function successfully to survive, to achieve ends, and to arrive at workable understandings of the situations we are in” (p. 109). This seems to be another point of agreement with the constructivist stance I take here. However, they go on to say that, “The only kinds of nonphysical entities and structures taken as ‘real’ are those that are hypothesized on the basis of *convergent evidence* [italics mine] and that are required for scientific explanation” (p. 115).

Paradoxically, Lakoff and Johnson (1999: 117) themselves write: “philosophical theories are structured by conceptual metaphors that constrain what inferences can be drawn within that philosophical theory. The (typical unconscious) conceptual metaphors that are constitutive of a philosophical theory have the *causal effect* of constraining how you can reason within that philosophical framework”, and, we should add, *what is to count as evidence*. Alas, they are trying to position CMT as a “real” theory of metaphor, failing to apply reflexively their own theory, according to which all theories are metaphoric, and hence don’t require validation.

The paradox of Lakoff and Johnson’s (1999) arguments is reminiscent of the following joke: Mr. X says to Mr. Y: “Our rabbi told me that God talks to him”. To which Mr. Y asks, “And, do you believe him?” “Well”, responds Mr. X, “would God talk to a liar?”

Let me further illustrate my point by way of Lakoff and Johnson’s (1999) discussion of the Neural Computation metaphor, which means a “commit-

ment to the reality of neural gates, synaptic weights, thresholds, and mathematical operations ‘performed by neurons’ (addition, subtraction, multiplication, differentiation, integration, vector addition, and so on)”. They state that it “appears to be apt, that is to accurately characterize how biological neural networks function” (p.111). Moreover, “the Neural Computation metaphor, which defines the field of computational neuroscience ... is absolutely necessary to an adequate understanding of how the brain and body function. No serious neuroscience could ‘eliminate’ these higher, *metaphorically constituted* [italics mine] levels of scientific understanding at which computations using numbers are taken as real” (p. 112).

It follows that anybody trying to make sense of the brain’s and the body’s functioning in ways other than using the Neural Computational model, is therefore not doing serious neuroscience. Lakoff and Johnson (1999) go on to say that the same is true about models of linguistic and cognitive behavior constructed by cognitive scientists. While on the one hand they state that these models are human constructs, they argue, on the other hand, for the necessity of “sufficient evidence” for the existence of the theoretical elements that comprise these models.

The situation can be explained by an analogy with *Church’s Thesis* in the theory of computation, which is the principle that Turing machines are formal versions of the *informal* notion of computation (algorithm), and that no computational procedure will be considered an algorithm unless it can be presented as a Turing machine. “It is a thesis, not a theorem, because it is not a mathematical result: It simply asserts that a certain informal concept corresponds to a certain mathematical object” (Lewis and Papadimitriou 1981: 222). This does not make Turing machines “*necessary*” or “*required*” to explain the concept of computation. Furthermore, a Johnson-and-Lakoff-type argument would maintain that, since all the different mathematical approaches such as Turing machines, grammars, μ -recursive functions, and others that were aimed at formalizing the informal concept of computation, are mathematically equivalent; they provide *convergent evidence* for the reality, aptness, and adequateness of the Turing machine approach. What is *not* made explicit, however, in such an argument, is that all these different approaches are constructed on the *same* set of mathematical assumptions (axioms) and use the *same* methodologies and criteria of evidence. At the same time, these are by far not the only humanly possible choices.

3.1.2 *On empirical work proving the cognitive reality of CMT*

Lakoff and Johnson (1999: 74) take issue with postmodern and post-Kuhnian philosophers of science, who believe that inquiry is inherently value-bound and argue that inquiries are influenced “by *inquirer* values as expressed in the choice of a problem, evaluand, or policy option, and in the framing, bounding, and focusing of that problem, evaluand, or policy option”; “by the choice of the *paradigm* that guides the investigation into the problem”; “by the choice of the *substantive theory* utilized to guide the collection and analysis of data and in the interpretation of findings”; and “by the values that inhere in the *context*” (Lincoln and Guba 1985: 37–38).

Instead, they make a case for deferring philosophical assumptions to general methodological assumptions: “What needs to be avoided in science are assumptions that predetermine the results of the inquiry before the data is looked at. We also need to avoid all assumptions that circumscribe what is to count as data in such a way as to predetermine the outcome. ... To make sense of the data — to see the structure in it — we need to require that maximal generalizations be stated wherever possible” (Lakoff and Johnson 1999: 79).

This view of Johnson and Lakoff seems to be consistent with the fact that they obtain *evidence* for the aptness, adequateness, and reality of their contemporary theory of metaphor in great part from *quantitative empirical* results. Empiricists concerned with the cognitive reality of CMT typically obtain their results by inferring from statistics what might have gone on in participants’ minds, Rorschach-ing in their own beliefs and values, while the participants themselves are actually never being asked (e.g., Boroditsky 2000; 2001; Boroditsky and Ramscar 2002; Alloway et al. 2001). But statistical data certainly doesn’t “show”, or “say”, or “suggest” anything, specifically not the (unidirectional) cause-effect relationships between language and thought that empiricists such as Boroditsky, Ramscar, Alloway and others infer, according to which, for example, we “grow to think” about time horizontally or vertically as an *effect* of the metaphors we use (Boroditsky 2001).

Paradoxically, Johnson and Lakoff criticize the Objectivist God’s-Eye-View of knowledge for assuming that “[r]eason is what is at all times and all places, regardless of the person doing the reasoning” (Johnson 1987: xxv), as well as its stance on conceptual structure, which it thinks “*not* to be determined by ‘subjective’ processes of cognition on the part of persons trying to grasp the meaning of a concept” (ibid: xxiv) and that leaves it “to psychology to study the ‘subjective’ cognitive operations that govern how we grasp concepts and how they ‘make sense to us’” (ibid: xxv).

But Johnson and Lakoff's, as well as their followers' perceptual view is not the sense-making individual's, either. Rather, it is a view placed *above* the human species; it doesn't concern itself with in vivo subjective experience where the conceptual and the linguistic are one. Quite on the contrary, they divorce the study of metaphors from people's in vivo sensory experience.

To illustrate what I mean, let us take a look at Boroditsky and her colleague's recent work on "understanding time" through metaphors. Boroditsky (2001) differentiates between "aspects of time that are extractable from world experience (temporally bounded events, unidirectional change, etc.)" and "aspects of our concept of time that are not observable in the world", such as whether it moves horizontally, vertically, forward, back, left, right, up, or down; and whether it moves past us, or we move through it. "All of these aspects", she says, "are left unspecified in our experience with the world" and "are not constrained by our physical experience with time" (Boroditsky 2001: 4).

From a constructivist viewpoint, this language is pretty confusing. Time is a concept. It is a human construction (Klinkenborg 2001). No aspect of time is "observable in the world", or put it differently, all aspects of time are our own observations. The only way we can experience what we have come to call time is through the report of our senses. All aspects of time are constrained by our physical experience. For example, my mother, who is physically handicapped, experiences my birthday "moving toward her", but remembers that when she was able to actively prepare for it, she experienced herself "moving toward it".

What we *can* say is that some aspects of time are more universal across the species, and some are more idiosyncratic, although, they are all context-dependent. For example, one day we may see a rosy future in front of us, another day the future may look dim or we may think that we have no future. One moment we may think we're closing in on our goal, another one we may think the goal is getting away from us. But overall, we all seem to go through similar experiences. However, our time experience is not exclusively horizontal or vertical, either up or down, etc. How we represent/experience time is context and purpose dependent, and may be described in manners that presuppose different *see-hear-feel sensory modalities*.

3.1.3 *On methodologies of research validating CMT*

Methodologies of much of the most recent research aimed at testing "the psychological validity" of CMT, are comprised of *measuring participants' response time* (e.g., Boroditsky 2000, 20001; Boroditsky and Ramscar 2002). Boroditsky (2000) explains: "There is a dire need for more rigorous empirical testing in

this area [of metaphors]. Although there may be a wealth of anecdotal evidence in support of any particular claim, it appears that anecdotal counter evidence is just as easy to come by. Empirical approaches ... [such as those comprised of measuring people's response times] will help shape a more definitive view of metaphoric representation" (p. 25).

Problems arise when we try to approach subjective experience using positivist informed quantitative methods. "Measurement!" writes Pert (1997: 21): "It is the very foundation of the modern scientific method, the means by which the material world is admitted into existence. Unless we can measure something, science won't concede it exists, which is why science refuses to deal with such 'nonthings' as the emotions, the mind, the soul, or the spirit". Quantitative methodologies such as measuring response times do not shed light on the participants' psychological realities as much as on those of the researchers.

For a specific example, let us return to Boroditsky's empirical work on the concept of *time*. Her goal is to understand "how the domain of time is structured and reasoned about" by way of studying "the correspondence between space and time in language" (Boroditsky 2000: 4). Specifically, she focuses on "ego-moving" and "time-moving" metaphors that people use to talk about time. Boroditsky's interpretation of data rests upon the meaning that she *pre-assigns* to people's linguistic expressions. Moreover, the *names* given to these metaphors already presuppose a fixed meaning of people's linguistic time-related metaphors; these meanings originate from CMT and are taken for granted by those who provide empirical evidence for this theory.

According to these pre-assigned meanings, in the *ego-moving* metaphor, the speaker/observer is moving along the time-line toward future time points, whereas in the *time-moving* metaphors, time points or events are moving from the front (future) of the speaker/observer to his back (the past) while he is stationary. Further, these "two metaphors lead to different assignments of front and back to a time-line" (Boroditsky 2000: 5): "In the ego-moving metaphor, front is assigned to a future or later event (e.g., 'the revolution is *before* us'). ... In the time-moving metaphor, front is assigned to a past or earlier event (e.g., 'the revolution was over *before* breakfast')" (ibid.: p. 6).

Let us take a look at the possible "cognitive realities" expressed by the expression "The revolution is *before* us". It certainly allows for the possibility that neither the speaker/observer, nor the time points are moving; we may simply face the future and "see" the revolution in front of us. Similarly, our birthday party may be *before* us, but we might perceive no movement, such as when, say, we are depressed. Or, we might perceive it as we move toward it or it moves

toward us, or, alternatively, as both we are moving toward it and it is moving toward us, such as when we are traveling on a train that moves toward a place X, but the landscape, say, the trees that flank the railway, is moving past us. According to Boroditsky (2000: 6), in “The revolution was over *before* breakfast”, “the ‘revolution’ is said to be *before* because it is further along the direction of motion of time”. But how about “My birthday comes [or is] *before* yours”? How do we know whether at the time a person utters this, *time* is moving for her or *she* is moving? When a person travels by train, one station comes *before* the other. It is still *the person* who travels. Or maybe nothing moves for her, and she just sees the timeline in front of her and sees the ordering of the events just like she sees that 3 “comes” *before* 4 on the real number line because 3 is to the left of 4. And how about “*Before* I’ll take out the garbage, I’ll cook”? Obviously, here we are talking about performing (movement) one action *earlier* than the other.

The above examples are meant to illustrate that empirical evidence from measuring people’s response times is certainly no more rigorous than evidence from first person methodologies, where the person of the researchers is the primary research tool — as I will explain in Section 4.

While Lakoff and Johnson’s embodied realism rejects a strict subject–object dichotomy (see Lakoff and Johnson 1999: 93), its need for validation through “objective” evidence leads to a *dualism*, a split between the knower and the known, which, in turn, leads to a deep distrust of introspection, first-person accounts; to un-useful generalizations and to limiting causal linkages.

In cognitive science, the validity of introspection is *still* greatly disputed. But, as Varela (1996: 333) put it so well, “any science of cognition and mind, must, sooner or later, come to grips with the basic condition that we have no idea what the mental or the cognitive could possibly be apart from our own experience of it”. He recognized the “intrinsic circularity in cognitive science wherein the study of mental phenomena is always that of an experiencing person”, and claimed “that cognitive science cannot escape this circulation, and must instead cultivate it” (Varela 1996: 345–346).

4. A constructivist approach to metaphor, illustrated with examples from math education and psychotherapy

The approach to metaphor I present here shares its purpose with that of Reddy’s (1993) to improve human communication as a tool towards alleviating

communication difficulties. To that end, at a pragmatic level, it accepts as *a priori assumptions* much of what workers of CMT set out to *prove*. In particular, constructivist-informed educators and psychotherapists take the correlation of conceptual metaphors and physical experience, as well as the unity of language and thought as givens. They do so based on lived experience in facilitating, via verbal language, changes in thinking, feeling, and behaving. My intention here is to emulate the constructivist (mathematics) educator and therapist's approach to metaphors, which situates conceptual metaphors in embodied experience and deconstructs them further into minute sensory distinctions that are malleable.

CMT focuses primarily on the “shared”, “public”, “conventional” character of conceptual metaphors, or rather, of the image schemas and the knowledge that come with them. However, in the process of making largely context free generalizations from linguistic metaphors to conceptual metaphors, it often deletes the idiosyncratic characteristics and presuppositions implicit in linguistic metaphors. It strips linguistic metaphors from their mimetic symbolism, which allows us to recreate the speakers' sensory experience (Buchholz 2003). In other words, conceptual metaphors are often divorced from people's sensory experiences, the “here and now” and the intention of their verbal and non-verbal communication.

Let me illustrate this with a concrete example. The sentence “The teacher lost me in the first half hour of the lesson” indicates that the speaker couldn't follow the teacher's explanations. However, as conventional as the image of someone getting lost might be, it doesn't allow us to reconstruct its sensory meaning to the speaker in the same way as, say, the sentences “After half an hour, it all became a blur” (visual) or “After half an hour, his voice became just a distant drone” (auditory) would. As I will explain in what follows in more detail, the knowledge that comes with the image is simply not complete. In contexts such as education or therapy, where it is absolutely crucial that the facilitator's meaning fits the speaker's meanings, such metaphors need further sensory deconstruction before they are put to use to help people change their experiences in desired ways, at will.

4.1 Attending to people's sensory modalities

Let us imagine the following scenario. In my Logic class, I define a concept, and after class three students come up to me. One says, “I don't *see* what this definition means”, the second says, “This definition doesn't *ring a bell*”, and the third

one says, “I can’t *grasp* this definition”. On the one hand, I know that all three students are telling me that they don’t understand the definition. On the other hand, taking cues from their language, I also suspect that they are using three different sensory modalities (visual, auditory, and kinesthetic, respectively) to process the definition. To verify or discard my suspicion, I use constructivist therapy techniques that allow me to elicit the modality of the images these students use in the given context. If my suspicions are confirmed, I proceed by explaining the definition to each student in his preferred sensory modality, using appropriate verbal and non-verbal cues (Pasztor 1998; Hale-Haniff and Pasztor 1999).

Although sensory experience is simultaneously available to all senses, people attend to various aspects of see-hear-feel experience at different times. For example, one member of a couple may “not *see* much evidence that she loves me”, while the other states she “doesn’t *feel* loved”. In this scenario, communication flow is obstructed because each person is attending to a different sense system, or logical level of experience (Bateson 1972). By noticing this, a constructivist therapist typically helps the couple translate their experience so it can be shared and attention can again flow freely. But sensory system mismatches also take place between therapists and clients, or between teachers and their students, for that matter. For example, if a client says, “my future looks dim”, the therapist’s response matching the visual system, “What would it take to make it *brighter*?” might be a better fit than the kinesthetic mismatch of “So you *feel* hopeless?”. Or, if a student says, “Your explanation is somewhat *foggy*”, the teacher’s response matching the students’ visual system by asking “What would it take to make it *clearer*?” might also be a better fit than the kinesthetic mismatch “So you *feel* confused?”.

As Reddy (1993: 174) noted, “[h]uman communication will almost always go astray unless real energy is expended”. Part of this energy has to go into making sure (as much as is humanly possible) that words elicit in the receiver the “same” experience as the one intended by the sender. Gordon (1978: 12) gives the following example where therapy could have gone terribly wrong, had the therapist not spent energy to assure that the modality of his images fit those of the client’s images/experience.

Joe: And so my wife *mopes around* all the time.

Therapist: You mean she *looks* sad and listless?

Joe: Oh no, she looks okay. It’s just that everything she *says* is so pessimistic.
(Italics mine)

Attending to the sense system presupposed in people's language is based on the assumptions that sensory experience or "the report of the senses" reflects the interaction between body and mind, and that one can attend to communication behavior as a simultaneous manifestation of sensory experience (Satir 1967). By carefully attending to (verbal and non-verbal) communication behavior cues in an ordered manner, the constructivist therapist is able to help people co-construct new emotional experiences. These behavioral cues fit into the general categories of *what* you say, *how* you say it, and *body language* (Satir 1967; Bateson 1972; Hale-Haniff and Pasztor 1999, Table 4, summarizes examples of communication behaviors ordered by the sensory modality they presuppose).

Discussing metaphorical idioms, Lakoff and Johnson (1999) argue that their meanings are motivated by a "metaphorical mapping and certain conventional mental images" (p. 68). As an example, they discuss the sentence "We're spinning our wheels in this relationship". The idiom "spinning one's wheels" evokes a "rich conventional image" that comes with a "lot of knowledge about this image" (p. 68). The metaphor Love Is A Journey maps "appropriate parts of that knowledge onto the target domain [relationship]; the result is the meaning of the idiom" (p. 69). So a metaphorical idiom is "the linguistic expression of an image plus knowledge about the image plus one or more metaphorical mappings" (ibid.). But just how conventional are these images and the knowledge that comes with them?

Let us look at some sample sentences.

"This *overwhelmed* me". We understand that there is some kind of excess involved, some kind of "too much-ness". But in which sense system? Was it too much visual, too much auditory, or too much kinesthetic input? For example, when I entered a Western department store for the first time in my life, after fleeing from behind the Iron Curtain, I was certainly overwhelmed visually — my head was spinning with colors and shapes.

"He *forced himself* to do it". How did he do it? Did he threaten himself with words, or did he make pictures in his mind of his mother being mad at him, which made him feel bad enough to do it?

"Thursday comes *before* Saturday" (cf. Boroditsky 2000). Does the speaker visualize a calendar, where Thursday is to the left of Saturday? Or does he visualize a timeline where Thursday is closer to him than Saturday? Or does he zoom into Thursday with all its details and "to do's", while Saturday is still only a faint

idea? Or did he silently repeat the names of the days of the week to himself and heard “Thursday” before “Saturday”?

4.1.1 *Zooming in on mathematics education*

For more than a decade now, mathematics education in the US has been experiencing a movement characterized by extensive efforts to reform school mathematics according to constructivist principles (NCTM 2000).

The traditional, positivist approach to instruction has been referred to as “the age of the sage on the stage” (Davis and Maher 1997: 93), due to its “transmission” model of teaching, where teaching means “getting knowledge into the heads” of the students (von Glasersfeld 1987: 3), that is, *transmitting* knowledge from the teacher to the student. Paulo Freire referred to it as the “banking” model of education (Dascal 1990), whereby the teachers make deposits, which the students then are expected to receive and file away for storage (Freire 1972).

In the reform movement, “the Sage on the Stage has been replaced by the Guide on the Side. It is the *student* who is doing the work of building or revising [... his or her] personal representations. The student builds up the ideas in his or her own head, and the teacher has at best a limited role in shaping the student’s personal mental representations.¹ The experiences that the teacher provides are grist for the mill, but the student is the miller” (Davis and Maher 1997: 94). The “pure act of transference of knowledge” has been replaced by the “act of knowledge” (Freire 1985: 114, quoted in Dascal 1990: 130). But knowledge “can only be assimilated experientially” (Freire 1973: 36, quoted in Dascal 1990: 131).

Abstract mathematical concepts, just as abstract concepts in general, are *metaphorical* and are built from concrete, familiar domains (Lakoff and Nuñez 1997; Lakoff and Johnson 1999). The constructivist teacher’s role is to make sure that these concrete domains *fit* the students’ *own, individual experience*; frustration and confusion ensues when they are incongruent.

English (1997) provides a very good example of what happens if the metaphorical mapping is rooted in an *a priori* construction, rather than in the student’s *own, individual experience*. It concerns the use of a line metaphor to represent our number system, whereby numbers are considered as points on a line. The “number line” is used to convey the notion of positive and negative number, and to visualize relationships between numbers. It turns out that students frequently have difficulty in abstracting mathematical ideas that are linked to the number line (Dufour-Janvier et al. 1987, quoted in English

1997: 8). “There is a tendency for students to *see* the number line as a series of ‘stepping stones,’ with each step conceived of as a rock with a hole between each two successive rocks. This may explain why so many students say that there are no numbers, or at the most, one, between two whole numbers” (English 1997: 8; italics mine). So, when the teacher explains that there are infinitely many (rational) numbers between two whole numbers, she may, unknowingly to her, create serious confusion in the students.

Too many people give up on mathematics because it “stopped making sense somewhere along the way” (Askey 1999: 10). While the result may range from math phobia to lack of self-esteem, the reason of this phenomenon is simple: teachers fail to pace their students by eliciting their existing metaphors for mathematical concepts. Ruth McNeill (1988) shares her story of how she came to quit math:

What did me in was the idea that a negative number times a negative number comes out to a positive number. This seemed (and still seems) inherently unlikely — counterintuitive, as mathematicians say. I wrestled with the idea for what I imagine to be several weeks, trying to get a sensible explanation from my teacher, my classmates, my parents, anybody. Whatever explanation they offered could not overcome my strong sense that multiplying intensifies something, and thus two negative numbers multiplied together should properly produce a *very* negative result (McNeill 1988 — quoted in Askey 1999: 10).

Obviously her mathematics teacher failed to recognize the totalizing effect (Buchholz 2003) of a *kinesthetic* metaphorical representation that made it impossible for her to acquire new knowledge. Instead of being helped to change this representation, McNeil went on to “pretend to agree that negative times negative equals positive ... [u]nderneath, however, a kind of resentment and betrayal lurked, and” she “was not surprised or dismayed by any further foolishness” her “math teachers had up their sleeves” (McNeill 1988 — quoted in Askey 1999: 10).

Often, teachers fail to help their students create metaphors of the concepts they are trying to teach in a way that fits the students’ existing experience. In his 1962 memoirs, Carl Jung remembers with great regret the terror that he experienced in math classes. While his teacher gave the impression that algebra was very natural, Jung failed to understand what numbers actually were. He knew they were not flowers, nor animals, nor petrification — they were nothing he could imagine (i.e., have a sensory representation of). They were just amounts that resulted from counting. To his greatest confusion, these amounts were replaced by letters whose meaning was a sound. His teacher tried hard

to explain the purpose of this strange operation of replacing understandable amounts by sounds, but to no avail. This, what seemed to Jung to be a random expression of numbers through sounds such as “a”, “b”, “c”, or “x”, did not explain anything about the nature of numbers. His frustration peaked with the axiom, “if $a=b$ and $b=c$, then $a=c$ ”, since by definition it was clear that “a” denoted something different from “b”, and so could not be equaled with “b”, let alone with “c”. He was outraged. An equality could be “ $a=a$ ”, but “ $a=b$ ” was a lie and deceit. His intellectual morality resisted such incongruities that blocked his access to the understanding of mathematics. To his old age Jung had the uncorrectable feeling that if he could have accepted the possibility of “ $a=b$ ”, that is, of “sun = moon, dog = cat, etc.”, then mathematics would have infinitely absorbed him. Instead, he came to doubt the morality of mathematics for his entire life. Like so many others, he came to doubt his own self-worth, which, back then, prohibited him to ask questions in class (Jung 1962).

But how is a teacher, a therapist, or a researcher to *elicit* people’s meanings, Rorschach-ing in their own meanings as little as possible? In the following, I will answer this question (see also Hale-Haniff and Pasztor 1999).

4.2 Submodalities

“Metaphors are a way of talking about experience” (Gordon 1978: 9). They help create, modify, and express people’s experiences. They help articulate and categorize “raw sensory material” (von Glasersfeld 2002).

Obviously, “I *flew* to the date” expresses a different experience than “I *dragged myself* to the date”. Similarly, if a person is trying to language the *gap* between, say, their work environment and their personal interests, she might find that the word *gap* doesn’t fit, because it doesn’t express the *darkness* and *the depth* that the person experiences. The word *chasm* might seem to him much more appropriate. Also, she might add that it is a “*deepening and widening chasm*”. Thus, she chooses words that best express the characteristics, the so-called *submodalities* of his sensory experiences.

Submodalities are finer, process-based attentional distinctions of the visual, auditory, and kinesthetic sensory modalities (Bandler and MacDonald 1988; Pasztor 1998; Hale-Haniff and Pasztor 1999). *Visual* submodalities refer to aspects such as: location in space, relative size, hues of color or black and white, presence or absence of movement, rhythm, degree of illumination, degree of clarity or focus, flat or three-dimensional, associated or dissociated (seeing oneself in the image, or viewing from a fully associated position).

Auditory submodalities refer to aspects such as location, rhythm, relative pitch, relative volume, content: voice, music, noise. *Kinesthetic* submodalities include such aspects as: location of sensations, presence or absence of movement (and if moving, the physical locations of sequential sensations), the type of sensations: temperature, pressure, density, duration, moisture, pervasiveness of body area involved, sense of movement and acceleration, changes in direction and rotation.

4.2.1 *Submodalities at work*

Submodalities are distinctions that separate experiences from one another. As such, their significance comes to bear only when we contrast submodalities of images that represent different experiences. To illustrate this, let us look at a person's submodalities of different experiences, specifically at how different contexts are manifested in completely different sets of submodalities. Michael is an architect and he is quite proficient in geometry. First, here is what he reports regarding his experience of abstraction: "As part of a math problem involving triangles, an *abstract* triangle occurs first as a fuzzy shape without any material 'body'. It doesn't have a surface, not even a clear boundary. Its size is also changing between a couple of inches to one or two feet. It is quite far from my face and its distance is unspecific but it is still in the room. As a consequence, its shape, size, and location can easily be manipulated. As it is manipulated, like made equilateral or rotated, these parameters change rapidly. The boundary becomes more defined, the size concrete, and the distance fixed. It still remains, however, a line-drawing without a body or surface. It is always a colorless figure either gray or black and white. There is no definite feeling attached to the pictures. However, the more abstract the picture, the further it is removed from any emotion".

In contrast, Michael imagines an emergency triangle on the road propped up behind a car as a vivid picture with concrete shape, thickness, material, etc.: "It is red with white edges in fluorescent colors set against the gray asphalt background. I see it at a distance of 10 feet in life size, that is, the same size I would probably see it driving by and looking at it from this same distance. I feel some anxiety in my stomach as I probably connect this picture unconsciously with a car break-down or an accident".

A nice manifestation of modalities/submodalities at work comes from an experience with fourth graders in a recent pilot project on teaching sensory awareness in math education. I presented the children with the following problem taken from Wheatley (1997: 289): "Imagine a five by five by five cube

[made of unit cubes]. Paint is poured down over the top and the four sides. How many [unit] cubes would have paint on them?” One kid immediately proposed that we might need to use some other, thinner substance to pour over the cube, as paint may be too thick and may not cover the cube evenly. Other kids immediately asked whether paint could get underneath the cube or into the cracks between the unit cubes. (Remember, there was no physical cube or liquid present at this discussion.)

Of course sensory modalities and submodalities are interrelated. For example, things that people feel are important tend to be larger and vice versa, things feel more important as they are larger. Important things tend to be in a central position rather than peripheral, hierarchically they tend to be at the top rather than at the bottom, and the images representing them tend to have more density. For this reason, someone who has conscious awareness of his submodalities can tune into the way he prioritizes values, for example.

If a person says, “Gosh, I just can’t concentrate on this meeting, this thing is just looming over me”, we might invite him to step back from “this thing” for a minute, maybe put it aside, and think about it in comparison with something that he really believes is important, which is what a therapist would most likely do in constructivist therapy. Usually the person then spatially takes a different perspective, and all of a sudden the image he first had will shrink. *Size* becomes a relative phenomenon. What seemed big will be put in perspective once we think of something that is of high priority or very pervasive. This is also the mechanism by which changing a person’s metaphors (i.e., reframing) changes his perception of an experience. Of course the presupposition in all of this is that metaphors are to be taken *literally* (see next section).² For example, if someone complains that he “can’t seem to digest this”, the therapist may respond with the reframe, “Take one bite at a time...”.

In constructivist therapy, *speed* is also an essential element: often, people feel that emotions, such as anger, happen like lightning and they have no control over them. The process of elicitation slows down people’s subjective sense of time and gives them more time to control their emotions.

Often, kinesthetic submodality elicitations create an overlap into the visual sensory system. The therapist elicits from the client how a feeling went from a location A in the body to another location B, at what rate, at what speed — she might even ask the client what color the feelings are, as when she is working with him on pain control, for example. Or, the therapist might want to know the extent of the feeling — which is overlapping the size. It’s easier to share feelings when we track somebody’s gestures and overlap them into the visual

system — it creates a shared perspective. When people experience an unwanted emotion like anger, all their attention units are usually in the kinesthetic modality and they have no leverage in another modality. They “go blank”. In the submodality elicitation, the therapist takes submodalities which were in the kinesthetic and overlaps them in the visual and/or the auditory, so they have a parallel system and people end up with a choice. In case of useful, wanted emotions, we end up enhancing the feeling.

When people compare two things, they compare the submodalities of the (visual, auditory and/or kinesthetic) images they make of these things. For example, if a person is trying to make a decision and he looks at a few options, he may find that what he wants stands out visually because it is more in focus. Similarly, the person can find out how it stands out by the submodalities in his *other* modalities. So then the person knows his subjective experience for how he *codes* options and how he makes decisions. For example, in the pilot project mentioned earlier, I once asked the kids how they knew that a solution was “right”. One girl explained that “right answers blinked” at her like emergency lights do.

Many times people ask, “But is this experience real?” or “Do these submodalities exist?”. To answer, I simply remind them of the basic constructivist presupposition that this is co-created experience and it is co-created with the other person *for some specific intention*. For example, let us consider a person who feels that he can’t control his anger. When we denominalize his anger and he realizes that it has a beginning, a middle, and an end, and that he can track it, back it up, and raise or lower its intensity, he suddenly experiences being able to control it rather than it controlling him.

We don’t know whether submodalities were there before they were elicited. All we know is this: a person who comes to see a constructivist therapist with the intent to be able to control his anger, can answer the therapist’s submodality questions, and after therapy he can turn his anger up or down, and he can have it or not. So we don’t know whether submodalities were there or are “real” or not, but we know that they are surely *useful*. Traditionally, the criterion is, “Is it true or not?”. Here it is, “Is it *useful* or not for our *intent*?”.

Submodality distinctions help people *perceive* a “difference that makes a difference” (Bateson 1972) for them, and/or gives the therapist a template of options from which to *suggest* differences that make a difference. To illustrate this, let us take a client who has a desire to feel more confident and less fearful in public speaking. The present state is “fear” and the desired state “confidence”. The therapist notes the differences between the client’s distribution

of attention in modality and submodality experience across the two different states. The fear state might be characterized by a general internal orientation of attention to negative self talk, uncomfortable kinesthetics like high shallow breathing, a weak feeling in the limbs and butterflies in the stomach, with almost no conscious visual experience. On the other hand, the confident state might be characterized by an external orientation of attention, visually focused on the entire audience, auditorily focused on the way the speaker's own voice and phrasing is modulating as a function of audience response, and a feeling of relaxed awareness coupled with a sensation of being ten feet tall. Now the therapist may suggest various "techniques" to help shift from the submodalities of the unwanted state to those of the desired state, such as utilizing metaphorical idioms as presented in the next section.

Submodalities allow us to pay attention to the communication *process*, not just the *content*. Attending to content makes it far more likely that we will associate elements of people's communications with our own private meanings rather than with the other person's. As we have seen in a number of earlier examples from mathematics education and therapy, this can disrupt the holistic flow of attention, and even lead to disastrous outcomes. We have also seen how it can lead quantitative empirical research to conclusions that misrepresent participants' experiences.

In constructivist therapy, submodalities are a part of the therapist *as an instrument*, and allow the therapist to gather different data and become a more exquisite instrument. They are part of her template for co-constructing experience. The same way as the painter's squiggle on a "sheet of paper gives the beholder the opportunity to carry out the same perceptual movements of attention that lead to the recognition of a lily in a vase or in the garden", submodalities trigger in the therapist operational patterns that enable her to re-present to herself specific experiences from her own repertoire (von Glasersfeld 2002). For this reason, submodalities have to be learned in a way that they can be used tacitly or intuitively (Hale-Haniff and Pasztor 1999). In other words, the concepts have to *get in the body*, into the unconscious — they have to become the pattern.

Lincoln and Guba (1985: 40) argue "for the legitimation of tacit (intuitive, felt) knowledge in addition to propositional knowledge (knowledge expressible in language form) because often the nuances of the multiple realities can be appreciated only in this way; because much of the interaction between investigator and respondent or object occurs at this level; and because tacit knowledge mirrors more fairly and accurately the value patterns of the investigator". Utilizing

herself as her main research instrument, the investigator is able to capitalize on her subjectivity so that both she and the research participants gain a deeper understanding of participants' experience. To put it in other words, as an exquisite research instrument, the investigator is able to successfully *separate* her own meanings from those of the participants, and thus successfully guide them in the co-construction of new meanings.

4.3 Zooming in on psychotherapy: Shifting submodalities utilizing metaphorical idioms

Metaphoric idioms are a type of language phrase pattern. They are, in the constructivist therapy approach, literal descriptions of submodality experience. Contained in them is information constructivist therapists utilize to facilitate rapid changes in their clients' metaphoric self-concept (Buchholz 2003). They learn to hear idioms in their clients' language. Clients are letting them know literally and exactly what submodality shifts to facilitate in order to make changes they want.

In the compilation below, metaphoric idioms are organized according to submodalities. A study of these phrases and the dynamic linguistic/submodality relationships they reveal enables therapists to do rapid and focused, laser-like change-work (Hale-Haniff 1985). Such work, however, is only done after checking on the ecology of the change, and requires adequate training (Hale-Haniff and Pasztor 1999). Therapists may do this directly by instructing their clients what specific shifts to make, and/or indirectly using gestures or the tool of their own language. Indirect use of language is possible because the structure of language comprehension is based on submodality patterns shifting. To comprehend or process an utterance, an individual *must* make a submodality shift. An example: "Don't think of a blue sail boat racing past a row boat" — to process this utterance, you have to form a colored moving image.

Below I list submodality patterns using primarily the *visual* system. The other sensory systems can be utilized analogously, as well as be "overlapped to" during the change-work process. For example, an extremely elegant way of utilizing submodality experience implicit in people's kinesthetic/movement metaphors (such as "throw" information upon someone) to help them create "a new attitude and a new awareness" is described in V. Dascal (1992). Similarly to the approach described here, Dascal takes metaphors literally and helps her clients express them in movement. Her presupposition is that "bodily expression is more directly an expression of the unconscious than verbal expression" (Dascal 1992: 152).

The information in this compilation is cited from its original presentation in Hale-Haniff's (1985) manual, and represents generalizations made from doing change-work with many clients with a lot of different presenting states, as well as studies of metaphoric idioms. The examples and categorization of the examples should be only taken as illustrations, keeping in mind that there are many other possible representations for all patterns. Furthermore, they are not meant as 'fast tools' for doing change work.

Most patterns included in the following compilation reflect general submodality representations held by native speakers of American English. It is by far not inclusive. Many other collective cultural as well as idiosyncratic idioms exist.

4.3.1 *Submodality shifts to increase or decrease the perception of a feeling*

A. *Vary the size of the image*

For most people the larger the image, the stronger the feeling. Below are idioms that identify size as the critical submodality:

- blow it all out of proportion
- shrink the problem down to size
- you're making this bigger than it is
- of small importance
- larger than life
- a big problem
- miniscule importance
- make a mountain out of a molehill
- a major issue
- a big important issue
- make him feel small
- shrink him down to size

B. *Vary the height or eye level*

Varying the height or eye level of the client relative to a person in his image is often useful for changing feelings of superiority or inferiority. Below are idioms that identify height as the critical submodality.

- | <i>Above</i> = higher status | <i>Even</i> | <i>Down</i> = lower status |
|------------------------------|---------------------------|----------------------------|
| - towers over me | - see eye to eye | - below eye level |
| - put up on a pedestal | - we're on the same level | - look down on him |
| - look up to him | - on even footing | - put him down |
| - one up on her/him | | - I'm under his thumb |
| - put him above the others | | |

C. Vary the distance between image and observer

Varying the distance of the image relative to the actual perceptual position of the client changes his feelings. Specifically, for most people moving an image further away diminishes the feeling and moving it closer intensifies it. Distance and size are generally closely correlated, just as in the external world. As an object moves away or one moves away, it appears smaller, and as it moves closer or one moves closer, it appears to get larger. Sometimes images are so close that they literally are in contact with the person and create a feeling of pressure or weight.

The perception of time in terms of how far in the past or future an event occurred or will occur is also coded by location. The further an image is in the direction of past or future, the greater the perceived time interval tends to be.

Below are idioms that identify distance as the critical submodality.

- | | |
|---|-----------------------------|
| - too close for comfort | - near future |
| - the closer you get, the better I feel | - foreseeable future |
| - too far away for me to care | - on my mind |
| - distant future | - this problem surrounds me |
| - this problem is too close to home | - weight on my shoulders |

D. Time: Vary location by direction and distance

Time - past - present - future: When people access a memory, they tend to know *when* it happened by the location of the memory (where they see it or from where it moves to them). The present is now: the image is perceptual, not recalled like for past or future. It is being *here* in the *now*.

The two main types of patterns people frequently use — the In Time and the Through Time patterns — are differentiated by the directional orientations used to map time: back to front and left to right. There are many other possible timeline representations (loops, spirals, etc.). Some people sometimes have multiple time lines. Timeline representations shift depending on the *state* of the individual and how the inner time points are elicited.

In Time: Front to back

- | | | | |
|-----------------|-------------------------------|---------------|-------------------------------|
| <i>Future</i> : | - nice future in front of me | <i>Past</i> : | - put it behind you |
| | - look forward to something | | - look back and laugh |
| | - whole life's in front of me | | - don't look back in the past |

Through Time: Left to right

- | | | | |
|-----------------|--|---------------|---------------------------|
| <i>Future</i> : | - time is on my <i>side</i> | <i>Past</i> : | - <i>left</i> behind |
| | - I'm moving in the <i>right</i> direction | | - <i>left</i> in the past |

Notice that the left/right temporal idioms are all ambiguous (containing the past tense form of the verb 'to leave' — left).

Generally, when issues/situations are resolved (and no high emotional energy is attached) they tend to be placed "in the past" for storage. Issues/ideas yet to be resolved or let go of, are often located to one side or another (procrastination, being avoided, denied, etc.), rather than stored in the past. It is easily possible for a change-worker to ask an individual to access the location of an event and for the individual to point to an area off, say, to his left, not because his time organization is left-to-right, but because he has "brushed" or "pushed the issue off to the side" or "put it out of his mind" or "doesn't want to see it".

How long into the future or in the past an event occurred is coded by the distance in the past or future (behind or left, in front or to the right):

- near future
- distant future
- distant past
- it's still too far away to think about

A person's sense of time may be varied by altering the distance (while maintaining the forward to backward, left to right, or any other orientation).

Eliciting *where* an event belongs (spatially) allows the change-worker to help direct the client where to store an idea/problem which previously was unresolved or not dealt with in some way (and was therefore somewhere crowding or taking up space on the persons subjective "screen") after the change-work was completed. Although many persons spontaneously place memories in "place" when they have cleared themselves, many do not.

E. *What to pay attention to*

Front versus side location: An idea, person, or situation can be made to seem more important by shifting its location. For example, one can make what is now a major pressing issue seem minor or less immediate by moving the location of the image from the front to the side.

Major issues of current concern (that have a lot of feeling) are spatially generally located right in front of a person:

- a central issue
- right in front of you
- a direct confrontation
- in front of your nose

Issues of minor importance (without much feeling attached) are usually placed off the side. A picture placed off to the side usually registers cognitively as “do later” rather than “take care of now”.

- a side issue
- of peripheral importance

F. Priorities — arrays of images arranged in high to low positions

Series of ideas, pictures, or words to be ordered in terms of prioritized importance and/or immediacy of attention are often positioned in vertical arrays, with the idea/picture/word in the top position holding the highest priority. Changing the vertical order shifts the perception of seeming importance. Here are some idioms that identify position of attention as critical submodality:

- a top priority
- a high priority
- a low priority
- at the top/bottom of the list
- ranks high/low
- a top official
- a high rating

Note also that a vertical array is most often positioned in front and central. A person who has a number of such arrays might, for ease of prioritizing, position them left to right or front center to side.

G. Direction of visual attention: Approach or avoidance

Visual orientation can be *toward* or *away* from something (avoiding or denying it). What people avoid or deny or refuse to see tends to acquire energy each time they direct attention away from it. Here are idioms that identify direction of attention as critical submodality:

- face your problems
- turns away from his problems
- look the tiger in the eye
- look away from
- open your eyes
- close your eyes to
- blind to new ideas
- I don't see it
- I can't look
- can't face it

H. Perceptual point of view

Changing the perceptual point of view can make major shifts in perceptions and feelings.

- I need a bird's eye view
- see over the chessboard
- get an overview
- see it from a new angle
- take a different perspective
- see the big picture
- a new point of view

I. Lighting: Change feelings and awareness

Changing lighting can change subjective experience markedly in terms of the intensity experience, or can shift to an entirely new feeling. It can also bring about dramatic shifts in perception and point of view. There are many ways that lighting can vary:

- brightness:*
- bright future
 - brighter future
 - radiant smile

In general, increased brightness increases feelings.

- dimness/shaded:*
- dim future
 - dimmer future
 - a shady character

If originally perceived as dim, dimming a picture generally intensifies the (usually) negative feeling.

Other parameters that deal with light:

- bring to light
- shed new light on things

J. Color: Mood or shade of feeling

Adding color or changing the tint/sparkle/hue by changing from black and white to color usually intensifies feelings; changing from color to black and white usually diminishes a feeling. Changing a color filter (from gray or blue to pink, for example), or adding sparkle, also changes the mood or shade of feelings. Examples of idioms of this kind include:

- | | |
|--------------------------------|---------------------------------|
| - in the pink | - adds sparkle |
| - world looks black/gray | - everything in black and white |
| - see red | - a dreary world |
| - a horse of a different color | - a vivid experience |
| - feel blue | - a faded memory |

K. Conflicts — left and right

Left and right sides are often used to sort out or represent two different aspects of a conflict with no judgment made as to which side is right or wrong and/or better or worse:

- there's two sides to every issue
- he switched sides
- lets look at the other side

5. Conclusions

The overall intent of this paper is to contextualize the study of metaphors within constructivist-informed research. I illustrated a constructivist approach to metaphor — mainly through the lens of constructivist therapy practice, where the person of the therapist is the major work instrument.

Over two decades now, a wide range of fields of scientific inquiry have been experiencing a paradigm shift from positivism to constructivism — an emerging, more cooperative, and holistic paradigm. I noted that many of us find ourselves caught between these two contradictory thought systems, making an integrated thought flow, which follows coherent understanding, very difficult. In particular, I showed that Johnson and Lakoff's CMT, even though it has played a foundational role in second generation, embodied cognitive science, is still deeply rooted in positivist values that lead to a split between the knower and the known, a distrust of first-person accounts.

Although out to prove the correlation between (verbal) language and thought, workers of CMT and related research have shied away from directly eliciting people's own thoughts. Instead, they have reverted to quantitative methodologies, such as measuring people's response times. Boroditsky (2001: 20) explains: "When sensory information is scarce or inconclusive (as with the direction of motion of time), languages may play the most important role in shaping how their speakers think". In this paper I showed that from a constructivist point of view, sensory information is all we have and it is abundant and very conclusive, even in the case of the direction of motion of time. The "trick" is to devise a shared experiential language and be able to help people communicate sensory information using this language.

I have presented an approach to subjective experience that demonstrates how to separate research participants' (in positivist language, research "subjects") meanings from those of the researchers. The premise of this approach is that by embodying sensory distinctions of subjective experience such as modalities and submodalities in her neurology, and mindfully reflecting them in her language and communication, the researcher creates a basis for a shared experiential language and she is able to literally "make more sense" of people's experiences. The fact that people respond so readily when the constructivist change-worker, be that a therapist or a teacher, starts looking at their experience through the lens of these subjective experience distinctions, demonstrates that what we have at work here is indeed a shared language of experience. This allows communications with participants to be more two-way. In action

inquiry cycles, the constructivist researcher is able to get immediate feedback from the participants on how they literally represent, that is, make sense of their experience.

There are those who might question how the constructivist-informed inquiry presented in this paper relates to the traditional concept of science and scientific method. To them I respond with Varela's (1996: 347) words:

This is not a betrayal of science: it is a necessary extension and complement. Science and experience constrain and modify each other as in a dance. This is where the potential for transformation lies. It is also the key for the difficulties this position has found within the scientific community. It requires us to leave behind a certain image of how science is done, and to question a style of training in science which is part of the very fabric of our cultural identity.

Varela recognized the "intrinsic circularity in cognitive science wherein the study of mental phenomena is always that of an experiencing person", and claimed, "that cognitive science cannot escape this circulation, and must instead *cultivate* it [italics mine]" (Varela 1996: 345–346). Indeed, Hale-Haniff and Pasztor (1999) have also proposed specific ways of cultivating it by enhancing the person of the researcher as a research tool to be able to embody the categories of subjective experience discussed in this paper.

Notes

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1. A word of caution is in place here. In the constructivist view, 'mental representation' "must not be thought of as static but always as *dynamic*; that is to say, they are not conceived as postcards that can be retrieved from some file, but rather as relatively self-contained programs or production routines that can be called up and run. ... [They] are produced internally. They are replayed, shelved, or discarded according to their usefulness and applicability in experiential contexts. The more often they turn to be viable, the more solid and reliable they seem. But no amount of usefulness or reliability can alter their internal, conceptual

origin. They are not replicas of external originals, simply because no cognitive organism can have access to 'things-in-themselves' and thus there are no models to be copied" (von Glasersfeld 1987: 219).

2. Often, we can help people by the opposite mechanism, namely reminding them that the metaphor is just that, a metaphor, and is not to be taken literally. For example, a person says, "He *forced* me do X". The questions, "How did he force you? Did he tie you down or threaten you physically?" might help the person realize that it is ultimately himself that "forced" himself do X. This ties into Reddy's (1993) conduit metaphor: "[I]t is easier, when speaking and thinking in terms of the conduit metaphor, to blame the speaker [or others] for failures" (Reddy 1993: 168).

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