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On Metaphor in a Neuro-cognitive Theory of Language

by

John P. Newell

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IN PARTIAL FULFILLMENT OF THE
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ABSTRACT

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Metaphor is one of the most intriguing topics in cognitive linguistics. In this thesis, I propose a theory of metaphor from within a neurocognitive framework, specifically the relational network model of Sydney Lamb. The basis of metaphor in this model is the shared properties of concepts in the network. Metaphoric associations are created through evoked similarity in a given context. There are three aspects of metaphor in the relational network model: creative nonce metaphors, learned metaphoric expressions, and emergent conceptual metaphors. For metaphoric expressions, there is a cline from nonce metaphors to dead metaphors - expressions that are more toward the nonce end of the cline require more input from context for correct comprehension. Studies of subjects with right hemisphere brain damage show that they have problems with choosing the appropriate context and problems comprehending metaphor. These findings support the theory of metaphor presented in this thesis.
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Chapter 1. An Introduction to the Metaphor Problem

Metaphor is for most people a device of the poetic imagination and the rhetorical flourish - a matter of extraordinary rather than ordinary language.

George Lakoff and Mark Johnson (1980, 3)

1.1. Introduction

With the above words, George Lakoff and Mark Johnson begin *Metaphors We Live By* and sum up what they present as the traditional view of metaphor both within the field of linguistics and outside of linguistics as well. As they point out, metaphor is most often considered an instance of special language, a special, figurative use of language in poetry and literature to achieve some effect. The average language user, fooled by the illusory belief that her or his own language is simple and mundane, would never consider looking for metaphor in his or her everyday speech. It might be noticed occasionally by an average speaker both in his or her own speech and the speech of others, but such occasions would be considered instances of literary language being used in speech, the flower of creativity intruding on the less ornate variety of language used by mere mortals in normal conversation. "Metaphorical expressions were assumed to be mutually exclusive with the realm of ordinary language: everyday language had no metaphor, and metaphor used mechanisms outside the realm of everyday conventional language" (Lakoff 1993, p. 1). According to Lakoff and Johnson (1980), this view of metaphor is the standard definition of metaphor and has a long tradition which stretches back at least as far as Aristotle¹.

¹ This assertion that metaphor was considered separate from normal speech is problematic unless taken as a broad generalization. It may indeed reflect the attitude of most people, including scholars, toward metaphoric speech prior to *Metaphors We Live By*, but it is also true that research into the cognitive aspects of metaphor as a part of everyday speech was already underway. For example, Winner and Gardner, in an early study on metaphor comprehension in brain damaged patients, write "The ability to transcend literal meanings proves essential in normal language use," and "While metaphorical expressions thus constitute a common part of our language, appreciation of such linguistic figures involves a number of discrete cognitive operations, such as the abilities to go beyond the literal and to perceive a similarity between alien
In their seminal work, *Metaphors We Live By*, Lakoff and Johnson (1980) call into question the classical definition of metaphor. According to their view, the classical definition of metaphor is a theory that became so entrenched that it is now taken as definitional without question. Lakoff and Johnson claim that the classical theory should be questioned and evaluated in light of cognitive science. The result is that they propose a new theory of metaphor, one in which metaphor is not merely a part of special language, but instead is prevalent in ordinary language and thought. Metaphor, they claim, structures much of our conceptual system, the way in which we view the world, as well as many of our everyday linguistic expressions. Metaphors are defined as a cognitive phenomenon - conceptual mappings between two cognitive domains, a source and a target. Metaphoric linguistic expressions are reflexes of the underlying conceptual structure. It is within this framework that Lakoff, Johnson, and other cognitively oriented linguists, including Mark Turner and Ronald Langacker, have studied metaphor in the past 20 years.

The purpose of this thesis is to examine the definition of metaphor used in the Lakoffian\(^2\) theory, propose a neurocognitive theory of metaphor, see what supporting evidence from neuroscience can be found for a neurocognitive theory of metaphor and assess the cognitive status of conceptual metaphors when examined in a neurocognitive framework.

In this text, the following orthographic conventions will be followed: Metaphoric conceptual mappings will be in upper case letters, e.g. ARGUMENT IS WAR. Concepts will be represented by bold small caps, e.g. WAR and ARGUMENT. Linguistic expressions will be italicized, e.g. *spinning our wheels*.

---

\(^{2}\) The term *Lakoffian* is used throughout the text to refer to the standard theory of conceptual metaphor.
1.2. Philosophers on Metaphor: An Overview

Before we begin examining the development of the predominant cognitive theory of metaphor, not to mention presenting a neurocognitive theory, it is first appropriate to briefly examine how metaphor was treated before the advent of the Lakoffian theory. According to Lakoff and Johnson (1980), Lakoff and Turner (1989) and Lakoff (1993), prior to the study of metaphor as a cognitive phenomenon, metaphors, as defined by the Aristotelian/classical theory, were mainly thought to be instances of special language and not part of our everyday language. Further, they claim that the pre-cognitive accounts of metaphor did not recognize the role metaphor plays in thought and in our conceptual systems. However, Johnson's (1987) review of philosophical thought on metaphors and Searle's (1979) model of metaphoric processing show that philosophers working on metaphor before 1980 were not holding strictly to the 'classical' definition of metaphor as a part of specialized speech, but were trying to figure out how metaphor is involved in everyday life. Admittedly, much of this work was based on the idea that metaphor, and figurative language in general, "...involves tricks or plays on the literal" (Roher 1995, 3) and the goal of such work was to understand how the literal is transformed into metaphor and other figurative speech, but nonetheless, such efforts, along with Winner and Gardner's (1977) clinical study of metaphor comprehension in patients with right hemisphere brain damage, show that understanding the role of metaphor in normal, casual speech and thought was indeed a goal being pursued prior to Reddy (1979) and Lakoff and Johnson (1980).

1.2.1. Aristotle and the classical definition of metaphor

The Aristotelian view of metaphor, which Lakoff calls the traditional view, is part of Aristotle's view of words and their relation to concepts and things in the world. In this view, words are linked to specific things and concepts. The proper use of words is in
relation to the concept or things to which they are linked. Any use of a term for other than that thing or concept to which it is linked is improper usage of that term. Metaphor is the intentional improper use of words based on perceived similarities. This is usually done in the context of a creative work, such as poetry or literary prose.

The main point of the Aristotelian theory of metaphor, at least as Lakoff construes it, is that the theory is one in which literal meanings are separate from metaphorical meanings and that every concept can be expressed literally. Since every concept can be expressed literally, the use of a metaphor then must be an instance of special speech. It is this that Lakoff et al. call the 'classical' definition of metaphor (Lakoff and Johnson 1980; Lakoff and Turner 1989; Lakoff 1993).

While it seems likely that the common definition of metaphor is based on the above view of Aristotelian metaphor, it should also be pointed out that this is a somewhat simplified version of Aristotle's theory of metaphor. According to Harris and Taylor, Aristotle's theory of metaphor, based on Socrates' concept of words, entails that a metaphor "...is the transference of a name to something that it does not 'belong to'" (1997, 20). Metaphor is an exception in that it "...sets aside the normal correlations which govern the everyday use of words" (Harris and Taylor 1997, 20). Or, as Aristotle writes in Poetics 21:

Metaphor consists in giving the thing a name that belongs to something else; the transference being from genus to species, or from species to genus, or from species to species, or on the grounds of analogy. [from Harris and Taylor, 1997]

So far, this corresponds with the simple view of the Aristotelian definition of metaphor, but it is not the end of the story.

The simplified view of Aristotelian metaphor claims that the metaphors are based on perceived similarity. Lakoff (1993) takes this to mean that metaphors in the Aristotelian theory are based simply on perceived similarities and that there is no systematicity or
conventionality involved. While Harris and Taylor agree that Aristotle considers words to have conventionalized meanings while metaphors are not conventionalized, and in fact work counter to the conventional meanings of words, they do seem to think there is some systematicity involved in Aristotle's theory of metaphors, at least in that there are conceptual relationships that must be present in order for a metaphorical transference to take place (1997). These conceptual relations are not simple perceived similarities of the type Lakoff attributes to the classical definition of metaphor, but are similarities on the conceptual level. However, despite this difference, which shows the Aristotelian theory of metaphor takes conceptual structure into account as well as perceived similarities, it is easy to see where the simplified classical view of metaphor finds its roots in Aristotle's theory.

1.2.2. Ways of Understanding Metaphor in Philosophy

One of the major tenets of Aristotelian logic is that it is based on propositions. It is also an Objectivist system of logic which puts meaning in the objects that exist in the real world. According to Mark Johnson, it is in this framework that the major theories of metaphor in philosophy have existed. According to Johnson, the Objectivist view of metaphor is as follows:

the objective world has its structure, and our concepts and propositions, to be correct, must correspond to that structure. Only literal concepts and propositions can do that, since metaphors assert cross-categorical identities that do not exist objectively in reality. Metaphors may exist as cognitive processes of our understanding, but their meaning must be reducible to some set of literal concepts and propositions. [1987, 67]

This view, Johnson contends, informs the three most influential types of metaphor theory: literal core theories, metaphorical proposition theories, and the nonproposition theory.

Literal core theories are theories of metaphor which hold that metaphors are reducible to literal propositions. These types of theories, the "most long-standing and commonly held" according to Johnson, treat metaphor as a deviation from proper literal core meanings of words. Theories of this type correspond to what Lakoff calls the
'classical' definition of metaphor as discussed above. They are based on comparison and similarity, often on the level of conscious awareness, and treat metaphor as an instance of special, or marked, language, such as literary language (Johnson 1987; Lakoff and Turner 1989).

The second influential type of metaphor theory is what Johnson calls the metaphorical proposition theories. Theories of this type differ from literal core theories by proposing that metaphors have their own existence, and thus there are some metaphors that have their own propositional meaning, "...above and beyond any statement of literal similarities between two objects" (1987, 69). In theories of this type, creation of metaphor creates unified wholes in our experience rather than associating unlike things for effect. Whereas literal core theories relegate metaphor to special language, theories of the metaphorical proposition type place metaphor more in the area of normal speech, and some place it as a fundamental element of thought with linguistic metaphors being expressions underlying metaphorical thought processes. This type of metaphor theory does not seem to really fit with Johnson's characterization of the Objectivist view of metaphor since some metaphors are not reducible to their literal components in theories of this type. However, since metaphors themselves are considered to have propositional meaning in a theory of this type, Johnson (1987) places the type in the Objectivist category.

The third type of metaphor theory, the nonpropositional theory of Donald Davidson, is an Objectivist theory that contends that there is no such thing as distinctive metaphorical meanings and that the only meaning a metaphoric expression has is part of the literal propositional meaning of the utterance. Metaphors have no propositional meanings. "Metaphor is a special use of this meaning to "intimate" or "suggest" something that might have otherwise gone unnoticed" (Johnson 1987, 71). A sentence can only mean what its

---

3 Johnson separates his own experientialist philosophy from propositional philosophies and Objectivist philosophies. Here he seems to have conflated the propositional and the Objectivist theories of metaphors for the purpose of standing them in opposition to his own.
literal propositional content is, but it can intimate something else in a given context. For example, the sentence "Smith is a pig" can only mean that Smith is a literal pig. But, it can intimate certain things about Smith so that one experiences Smith in a way consistent with being a pig (Ibid). Meaning is literal at its base in this theory, and what most people would call metaphorical meaning has no meaning at all. "On Davidson's view a metaphorical utterance is essentially a stick (consisting of a literal sentence) that one uses to hit another person, so that they will see or notice something" (Johnson 1987, 72).

Another influential theory of metaphor is Searle's theory of metaphorical comprehension which contends that metaphor is essentially a 'roundabout' way to express literal semantics (Rohrer 1995). Johnson places Searle's approach mainly in the literal core theories approach but finds it significantly different to treat separately (Johnson 1987). The reason for this is that Searle attempts to account for metaphor comprehension sequentially within what is essentially a literal core approach. The basics of Searle's model is that an utterance will be processed first as literal. If the literal meaning matches what is being talked about in the world, then that is the end of the processing. However, if the literal meaning of an utterance does not match what is being talked about in the world, then the utterance is shunted to a non-literal processing center which attempts to find a paraphrase of a literal meaning that matches a real world representation. In other words, literal processing is attempted first. If it fails, then non-literal processing will take over and search for a literal meaning that matches the real world situation and into which the metaphoric expression can be decomposed (Searle 1979; Rohrer 1995). All this processing in Searle's model, although propositional in nature, takes place against a background that is nonpropositional, non representational, and preintentional, and which can be likened to Johnson's notion of the role of experience in metaphor which will be addressed below (Johnson 1987).
The three types of theories of metaphor presented by Johnson represent the most influential ways of thinking of metaphor in philosophy in his opinion. Two of the types are Objectivist (literal core theories and the nonpropositional theory) and two are propositional (literal core theories and metaphorical proposition theories) as far as metaphorical meaning is concerned and all three types include propositional meaning for literal utterance. Searle's theory of metaphor processing, which fits closely with the literal core theories, is clearly propositional, at least on the level of the utterance⁴, and Objectivist. As we shall see below, Johnson - and the Lakoffian cognitive approach to metaphor - stands in opposition to theories such as the above that work within the Objectivist framework and/or are propositional in nature.

1.2.3. Johnson: The Body - Mind Relationship

Johnson's theory of metaphor is based around his experientialist philosophy, which is nonpropositional and nonobjectivist. Simply put, the experientialist philosophy holds that we construe and understand the world in terms of our bodily experience. According to Johnson, we build up a model of the world, a conceptual reality, based on our bodily experiences. Within this philosophy, meaning in natural language begins in "figurative, multivariant patterns" which are not reducible to a set of propositions or literal meanings.

Propositional content is only possible "...by virtue of a complex web of nonpropositional schematic structures that emerge from or bodily experience" (Johnson 1987, 5). These schematic structures are embodied in that they are based on physical experience and tied to sensory and motor programs. They are also dynamic - they are modifiable by experience.

Thus, according to Johnson, meaning is nonpropositional and emerges from meaning.

⁴ Johnson places Searle's theory as closest to the literal core theories but he also says that Searle recognizes "a nonpropositional operation of metaphorical projection" (1987, 73). This assessment is based on a principle of Searle's theory which says that some metaphorical projections do not seem to be grounded in any propositional similarities at all and on Searle's view that even literal utterances presuppose a nonpropositional background of experience.
through schematic structure. Johnson's view of meaning is absolutely nonobjectionist. Meaning does not exist out in the world, it is constituted from one's experience interacting bodily with the world. (Johnson 1987).

In keeping with the nonpropositional nature of experientialist philosophy, metaphor in Johnson's view is not propositional itself, nor is it based on literal propositions. According to Johnson, metaphor is "...a pervasive principle of human understanding that underlies our vast network of interrelated literal meanings" (Johnson 1987, 65). It is not special language or deviations from literal meaning. Metaphor in Johnson's view is a major part of everyday language and thought. It is not comprehended, as Searle suggests, secondarily to literal meaning only when the literal meaning of an utterance fails to fit a real world representation. Rather, metaphor and metaphoric understanding are central to thought and they constitute much of our view of the world (Johnson 1987).

In Johnson's experientialist philosophy, metaphor is viewed as a major means through which we understand and talk about the world. Metaphor and other figurative devices, such as metonymy, are ways in which order and structure are established in our experience. They are grounded in our bodily experience and a great deal of our knowledge of the world is based on metaphors grounded in direct physical experiences. Most of these metaphors are conventional, but there is also a creative aspect of metaphor in Johnson's system. This creative process is one in which, in general, schemas of concepts closer to direct physical experiences, such as object concepts, are metaphorically projected onto more abstract concepts so that we may understand and act on more abstract entities (Johnson 1987). This view of metaphor is commensurate with the Lakoffian view of metaphor and Johnson's experientialist philosophy is an essential component of conceptual metaphor theory as it currently stands.
1.3. Metaphor in Literary Study

Metaphor is not only important in philosophy, but also to the field of literary study. For the purposes of this thesis, it is not important to address the role of metaphor in literary study in any detail, but it is important to point out that the classical theory of metaphor has predominated in literature. Metaphor in literature is viewed as a special use of language, in keeping with Aristotle's *Poetics*, and only overt cases of metaphor are considered important. It is only recently, under the influence of cognitive metaphor research, that conventional metaphors have come under scrutiny in poetic and literary language (Lakoff and Turner 1989).

1.4. Traditional Treatment of Metaphor in Linguistics

According to Lakoff and Johnson (1980) and Lakoff (1993), the view of metaphor in linguistics before was very similar to that of literary study. The Aristotelian definition of metaphor was accepted by most linguists and metaphoric expressions were treated as instances of marked language that was separate from ordinary speech. Ungerer and Schmid point out that "... the study of this linguistic phenomenon (metaphor) was for a long time the exclusive domain of literary scholars and the odd linguist who was interested in rhetoric and stylistics" (1996, 114). It is only after the publication of *Metaphors We Live By* that metaphor became a major field of study in linguistics and cognitive science. (Lakoff 1993; Ungerer and Schmid 1996).
Chapter 2. Metaphors and Cognitive Linguistics

2.1. Introduction

It is unlikely that any cognitive linguist would dispute that metaphors are important in our everyday use of language as well as being an vital part of our conceptual system. In linguistics, this view has been popularized by George Lakoff and Mark Johnson in their book entitled *Metaphors We Live By* (1980) and the Lakoffian 'school' of metaphor has come to dominate the field of metaphor research. Lakoff, his colleagues and his students promote the view that their theory of metaphor is a cognitive theory which accounts for a particular way in which people think and reason, namely by means of conventional metaphors. In recent years, Lakoff has extended his research from cognitive science and linguistics into social and political commentary based on his theory of conceptual metaphors. This extension into the social dimension, as well as recent attention to neurocognitive considerations (albeit at a superficial level) together with conceptual metaphor theory constitute the Lakoffian Program.

Other linguists working with metaphor in cognitive linguistics generally accept Lakoff’s position that metaphor is a conceptual phenomenon as well as a linguistic phenomenon. That is not to say, however, that the Lakoffian theory is accepted without criticism or modification by other linguists. Mark Turner (1996) and Ronald Langacker (forthcoming) both propose an intermediate domain between Lakoff’s source and target domains, one comprised of elements of both the source and the target domains blended together. Eve Sweetser (1990) uses conceptual metaphor theory to look at diachronic semantic change and in doing so shows that many of our contemporary metaphors of perception have emerged through time in a physically motivated pattern.

In all of the above cases, even though parts of the theory are questioned or broadened, Lakoff’s definition of metaphor is the definition used and the basic framework
of his theory is retained. It is clear that Lakoff's theory is the central influence in metaphor research within linguistics and cognitive science. As such, it will be the focus of this chapter, and other researchers' views will be addressed secondarily. However, before beginning a review of Lakoff's theory, it is important to indulge in some history and examine what Lakoff (1993) characterizes as the first treatment of metaphor in the current cognitive framework - Michael Reddy's conduit metaphor.

2.2. The Beginning: Michael Reddy and the Conduit Metaphor

The importance of Michael Reddy's paper on the conduit metaphor in English lies not in the fact he was analyzing metaphor - as we have seen in the first chapter, metaphor was and is a frequently studied topic in philosophy - nor does it lie in Reddy's acknowledgment that metaphors occur in everyday speech. Rather, Reddy's paper is important because his focus is on metaphor as primarily an aspect of thought rather than of language. According to Lakoff,

Reddy showed... that the locus of metaphor is thought, not language, that metaphor is a major and indispensable part of our ordinary, conventional way of conceptualizing the world, and that our everyday behavior reflects our metaphorical understanding of experience. [1993, 2].

Through the analysis of over 100 utterances, Reddy discovered that the way we talk about communication is largely metaphoric and further, the metaphors we use to talk about communication interact systematically with each other. The result is that we not only talk about communication in a certain way, we think of it that way as well, namely as a conduit (Reddy 1979).

In brief, Reddy's conduit metaphor holds that we talk and think about communication in English in terms of sending packages through a conduit. In the metaphor, ideas and/or meaning are viewed as objects. The idea-objects are packaged in linguistic expressions which are sent, via a conduit, from the speaker to the hearer (or, in the case of written language, from the writer to the reader). Reddy has many examples of
expressions in English which are instantiations of this metaphor. A few examples from Reddy (1979) follow:

1. Try to get your thoughts across better.
2. None of Mary's ideas came through to me...
3. Whenever you have a good idea, practice capturing it in words.
4. The sentence was filled with emotion.
5. Can you actually extract coherent ideas from that prose?

In these examples, it is clear that we treat ideas as objects that are packaged into words. Once we package the ideas, we send them to someone else who understands our ideas by unpacking them from our words.

As stated above, the importance of Reddy's work is not just that he recognized that we talk about communication by means of metaphoric language in our everyday speech, but that we conceptualize communication by means of a system of metaphors. Following Lakoff and Johnson (1980), the conduit metaphor can be distilled into three component metaphors:

IDEAS (OR MEANINGS) ARE OBJECTS
LINGUISTIC EXPRESSIONS ARE CONTAINERS
COMMUNICATION IS SENDING

These three metaphors work together systematically to structure the domain of communication. Although Reddy does not directly make reference to the grounding of this system of metaphors, it is easy to see that Reddy's analysis fits nicely with Johnson's experientialist philosophy. The domain of communication is structured by three metaphors which are themselves grounded in physical experience, namely our experience with packaging and sending objects. For this reason, as well as the fact Reddy recognized the systematic nature of the metaphor and that it was a matter of how we thought about communication, not just spoke about it, Lakoff and Johnson (1980) and Lakoff (1993) pay
homage to Reddy as an originator of the modern (i.e. Lakoffian) cognitive understanding of metaphor.

2.3. George Lakoff

Before evaluating George Lakoff's approach to metaphor, it is first necessary to briefly examine its beginnings so one can better understand its current state. Lakoff's journey began in the land of formal linguistics and ended (to date) on the west coast in a branch of linguistics which, on the surface, does not seem at all like his generativist beginnings. Of course, even as a formal linguist, he was more interested in meaning than Chomsky and many of the other generativists, and his focus over the years has always been on semantics of one variety or another (Lakoff 1995; Harris 1993).

Within the framework of formal linguistics, Lakoff was one of the leaders of the generative semanticist school. Simply put, the generative semanticists, such as Postal, Ross, Fillmore and Lakoff, disagreed with the role of semantics in the Standard Transformational Theory. They proposed that a semantic component should not be ancillary to deep structure, but rather that deep structures should integrate a semantic description. The major thrust of the movement was to increase the role of semantics in formal grammar. Since it was to operate within the generative framework, one of the expectations of the generative semanticist seems to have been to discover semantic universals. However, for various reason, generative semantics died shortly after its birth and its major proponents moved on to other areas of research (Harris 1993).

Lakoff continued to investigate meaning and notions of semantic universals even after the death of generative semantics. At first, Lakoff stuck to his roots, studying formal logic and semantics. However, he soon moved on to fuzzy logic and then to cognitive semantics. Lakoff says that his formal view was destroyed by his learning about cognitive science in 1975 (Lakoff 1995). However, in ways he seems to have retained elements of a
generativist model. As will be shown below, his beginnings as a formal semanticist have ramifications on the direction and substance of his later theories, even though those theories themselves are not in the formal model.

Lakoff’s current work in metaphor began in 1978. According to Lakoff, one day a student in a graduate seminar in semantics, which he was teaching, had expressed some problems she was having with a relationship. She said that her boyfriend had told her that their relationship was "going nowhere" and that they were just "spinning their wheels." Since this conversation transpired in a semantics class, Lakoff and the students decided to try to analyze "spinning our wheels." The result was an analysis that the expression was based on a metaphor of love as a journey (Lakoff 1995).

This event, in conjunction with Michael Reddy’s conduit metaphor, started Lakoff on a path that lead to the development of a theory in which metaphors are not just viewed as linguistic expressions, but are postulated to be part of our conceptual system as well. This theory is first expressed in the book he co-authored with Mark Johnson, *Metaphors We Live By*. The essentials of this theory are that metaphors are not merely linguistic expressions used in poetical and literary situations, but are part of everyday speech, that they are grounded in experience, that they form systematic conceptual mappings, and that these conceptual mappings have a large role in structuring a person’s conceptual system. They go so far as to claim that our conception of reality is largely metaphoric (Lakoff and Johnson 1980).

2.3.1. Lakoff and Johnson: *Metaphors We Live By*

*Metaphors We Live By* (hereafter abbreviated MWLB) represents the first iteration of the Lakoffian theory of metaphor. The book is essentially a synthesis of Lakoff’s move toward cognitive semantics and Johnson’s experientialist philosophy. It is in MWLB that
Lakoff and Johnson first propose that metaphor is a matter of thought and how we conceptualize the world rather than just a matter of language.

...human thought processes are largely metaphorical. This is what we mean when we say that the human conceptual system is metaphorically structured and defined. Metaphors as linguistic expressions are possible precisely because there are metaphors in a person's conceptual system. [1980, 6]

Another important proposal in MWLB is that the metaphors that structure our conceptual systems are systematic and work together to enable us to understand the world. All such conceptual metaphors are conventional and are grounded in experience, with bodily experience being primary. Furthermore, linguistic expressions which are reflexes of these conceptual metaphors are very common and metaphor is central to our everyday understanding of the world as well as our everyday speech.

MWLB is a far reaching work and the importance of it to the modern cognitive study of metaphor cannot be ignored. However, as I will be addressing the contemporary development of Lakoffian metaphor theory below and already reviewed Johnson's experientialist view of metaphor above, and also due to the fact that MWLB is very well known at this point, it is not necessary to go into detail concerning the specifics of the book. It is important to point out that MWLB contains a very rich, informative description of many of the systems of conceptual metaphors found in this culture. In this way, MWLB is mainly an analytical work.

2.3.2. The Contemporary Theory

In a 1993 paper, The Contemporary Theory of Metaphor, Lakoff presents a refined version of the theory found in MWLB. In this paper he defines a metaphor as a static, unidirectional mapping from one domain to another with certain elements of a source domain 'mapped' on to a target domain. Mappings are static in the sense that they exist in the conceptual system as wholes and do not have to be 'computed' every time we use the mapping. In other words, the mapping for a given conceptual metaphor, LOVE IS A
JOURNEY for example, is 'permanently' constituted in a person's cognitive system and
does not have to be recomputed each time it is used. I do not take this to mean that the
mappings are static in the sense that they are not modifiable with new experience. Rather, I
think what Lakoff is trying to convey by calling them static is the idea that such mappings
have a unitary status and are represented separately from the source and target domains. As
for the unidirectional nature of metaphorical mapping, this means that source domains
impart structure on target domains but targets don't impart structure to sources within a
mapping. According to Lakoff, this feature of metaphorical mappings is due to the
tendency of the mappings to go from concrete domains as the source to abstract domains as
the target. He contends that there is usually no reason to structure concrete domains in
terms of an abstract domain because we have greater direct experience with the concrete
domains. Similarly, if both domains seem to be equally concrete, the better known domain
would structure the lesser known rather than the other way around, thus even in a case in
which both domains are fairly abstract, the mappings would be unidirectional (Lakoff
1993).

Metaphorical mappings contrast with metonymy, which according to Lakoff is
using one element of one frame to refer to another element of that frame (1993) - "Metaphor
structures, metonymy refers" (Lakoff 1995, class notes). In other words, metaphor deals
with mappings between conceptual domains in which one domain structures the way we
think about the other whereas metonymy involves mappings within one conceptual domain.
For example, "The Giants1 have a good arm in right field," is a metonymy in which a right
fielder for a baseball team is referred to by one part of his anatomy, his (throwing) arm.
What this means is that the Giant's right fielder has a strong arm2 and can throw the ball in

---
1 This would be the San Francisco Baseball team, the "Giants", not the New York football team of the
same name. Lakoff used this as an example of a metonymy in his 1995 class, The Metaphor System of
English, at the LSA Summer Linguistics Institute.
2 Actually, the arm strength of the right fielder is only partially responsible for the ability to throw a
baseball well. This idea that it is a strong arm that allows one to throw a baseball well is also a metonymy
to the infield well, but since the arm is the most salient part of the anatomy used for throwing, it is used metonymically to refer to the player. This is clearly within one conceptual domain, that of the Giants' right fielder. "The Giants' have a cannon in right field" also means that the right fielder for the giants can throw well, but in this case it is being expressed by means of a metaphoric expression rather than a metonymic one. This metaphoric expression is based on two conceptual metaphors, A BASEBALL IS A PROJECTILE and A BASEBALL PLAYER'S ARM IS A PROJECTILE LAUNCHER/WEAPON. These metaphors structure the domain of baseball player (or more accurately, the domain of a player's arm) in terms of projectile weapons. Other examples of linguistic expressions using these metaphors are "The center fielder rifled the ball back into the infield" and "He fired to second". As the above example shows, the role of metaphor is one of structuring. All conceptual metaphors, according to the current theory, are structural metaphors in that the target domain is structured in terms of the source domain. (This is a change from MWLB in which ontological and structural metaphors had different treatments within the theory).

Metaphorical mappings are motivated by an experiential basis. In fact, the contemporary approach demands that all metaphors either be grounded in bodily experiences or be motivated by more general level metaphors that are themselves grounded in bodily experience. All cases of metaphor in which there is no apparent experiential basis are motivated by generic level metaphors - even if the exact generic level metaphors involved are not yet determined - according to the contemporary theory (Lakoff 1995). Other claims in the current theory are:

- Metaphor is the primary mechanism by which abstract concepts are comprehended and abstract reasoning is performed.

since throwing a baseball involves the whole body, especially the legs, but the arm is highlighted because it is much more obvious to an observer that a person's arm is essentially involved in the act of throwing than that his legs are.
• Metaphor is fundamentally conceptual, not linguistic. Metaphorical language is a surface manifestation of conceptual metaphor.

• Mappings are not arbitrary, but are grounded in the body and everyday experience and knowledge.

• The system of conventional metaphors is mostly unconscious, automatic, and is used with no noticeable effort, just like our linguistic system and the rest of our conceptual system.

• Our system of conventional metaphor is "alive" in the same sense that our system of grammatical and phonological rules is alive; namely it is constantly in use, automatically and below the level of consciousness.

• Metaphor is mostly based on correspondences in our experiences, rather than on similarity.

• Metaphorical mappings vary in universality; some seem to be universal, others are widespread, and some seem to be culture specific.

• Poetic metaphor is, for the most part, is an extension of our everyday, conventional system of metaphorical thought. [Lakoff 1993, 41-43]

Three of the most important features of the current theory, the systematic nature of conventional metaphors, the experiential motivation of conventional metaphors, and extensions of conventional metaphor, will be examined in detail below. In summation of the current theory, metaphors, which are fundamentally conceptual in nature, not linguistic, are systematic mappings from one conceptual domain to another. These mappings are necessarily motivated by an experiential basis or generic level metaphors that have an experiential basis. It is mainly through metaphors that we comprehend abstract concepts and execute abstract reasoning. Use of metaphorical language is a surface manifestation of the underlying system of conceptual metaphors.

One of the major principles of Lakoff's theory from Metaphors We Live By to the present is that metaphors are structural. The target domain is at least partially structured by the source domain. The structure that a source domain can impose on a target domain is governed by the 'invariance hypothesis' which states that the schematic structure of the target domain cannot be changed by the mapping. In other words, properties of the source
domain which are to be mapped onto the target must correspond to properties of the existing structure of the target. Properties of the source domain that would violate the schematic structure of the target domain cannot be part of the metaphorical mapping. In other words, although conceptual metaphors are structural and the target domain gains structure from the source domain, the mapping cannot violate any structure that is inherent to the target domain.

The structuring provided by a metaphorical mapping is systematic. It applies to a wide range of specific instantiations of that mapping. For example, the "spinning our wheels" expression mentioned earlier is one part of a system subsumed under the mapping, LOVE IS A JOURNEY\(^3\). The mapping is structural in that it structures the target domain, LOVE, in terms of the source domain, A JOURNEY. The system includes all possible specific instantiations of this mapping. Any expression that structures the domain of love in terms of the domain of a journey, whether it is a set expression like "spinning our wheels" or "on the rocks", or a novel expression, is part of this particular system. A mapping of the LOVE IS A JOURNEY (or LOVE-AS-JOURNEY) is represented in figure 2.1. below.

<table>
<thead>
<tr>
<th>Source Domain: Journey</th>
<th>→</th>
<th>Target Domain: Love</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travelers</td>
<td>→</td>
<td>Lovers</td>
</tr>
<tr>
<td>Vehicle</td>
<td>→</td>
<td>Love Relationship</td>
</tr>
<tr>
<td>Common Destination on Journey</td>
<td>→</td>
<td>Common Goals of the Lovers</td>
</tr>
<tr>
<td>Impediments to Travel</td>
<td>→</td>
<td>Difficulties in the Relationship</td>
</tr>
</tbody>
</table>

Figure 2.1. Metaphorical Mapping for LOVE IS A JOURNEY

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\(^3\) Lakoff (1993) stresses that the names used to refer to metaphoric mappings, which often have a propositional form, are just labels for specific mappings. The propositional nature of the names should not be confused with the mappings themselves which are not propositional but are "sets of conceptual correspondences".
The arrows in the figure can be read as 'map on to' - thus, in the LOVE IS A JOURNEY metaphor, the element Traveler from the source domain 'maps on to' Lovers in the target domain. Another way of saying this is that travelers correspond to lovers within the structure of the mapping. They form an ontological correspondence between the source and the target domains. Mappings, then, are sets of ontological correspondences that import structure from the source to the target (the LOVE IS A JOURNEY mapping shown above is not exhaustive of all the ontological correspondences of the metaphor, but rather constitutes a representative sample for the purposes of explication).

On a more general level, various mappings like LOVE IS A JOURNEY are related systematically to each other. For instance, LOVE IS A JOURNEY, LIFE IS A JOURNEY, A CAREER IS A JOURNEY, SCHOOL IS A JOURNEY, and all other journey metaphors are part of a larger metaphor, the Event Structure Metaphor. In the later work of Lakoff and his colleagues, there is a drive to capture the highest level of systematicity that exists between specific mappings and reduce them all to a small number of general mappings that are systematically related. One goal of conceptual metaphor research is to find the most general level of the system - the core metaphors that comprise the most basic level of the system (1995).

A second major principle in the Lakoffian metaphor theory is that all metaphors that are 'alive', i.e. that form systems that structure one domain in terms of another, are motivated by experience. The strength of this position has increased many fold since the days of Metaphors We Live By. In the original treatment, Lakoff and Johnson propose that many metaphors are grounded in bodily experience, but it is not a strict requirement that all are thus grounded (Lakoff and Johnson 1980). However, by at least 1987, Lakoff's position had changed from one that proposed that most metaphors had an experiential grounding to one which dogmatically requires that all metaphors be motivated by
specifically physical experiences (Lakoff 1987). If such motivation does not exist for a specific metaphor, then it is necessary to divide the mapping into more generic metaphors which are themselves motivated experientially, thus giving the specific metaphor an experiential basis on a higher level of abstraction.

The rise of this more rigid grounding criterion coincides with Johnson's release of *The Body in the Mind* in 1987, a book which, as discussed above, promotes an experiential philosophy based on the fact that we (*Homo sapiens*) have bodies and interact with the world by means of these bodies. In Johnson's book, it is the physical experiences that have to do with body structure and the spatial orientation of the body which are considered to be the most salient (1987). It is this concept of experience that forms the basis for Lakoff's view on experiential motivation. The Lakoffian school sees this level of insistence on having an experiential basis as being unique to their approach, and highlight it as a reason they are on the right track. For example, Joe Grady, one of Lakoff's students writes, "[o]ne way in which metaphor theory distinguishes itself from other theories of thought and language is by its insistence that body structure and experience play a critical role in shaping our conceptual system..." (Grady 1995).

The third major tenet of Lakoff's view of metaphor is that the systematic nature of conventional metaphors allows for creative elaboration of a specific mapping. The most usual case for these extensions of the system occur in poetry and literary works of prose. However, they can occur in every-day spoken language as well. It is important to note that these creative elaborations must make sense in terms of the system of a specific mapping and must be motivated by experience. In other words, although conventional metaphors can be extended in creative ways, such extensions do not occur arbitrarily. Creative extensions to a metaphoric system must fit into the basic structure of that systematic mapping, they must be motivated by experience (Lakoff and Turner 1989; Lakoff 1993) and they must not violate the invariance hypothesis (Lakoff 1993).
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2.3.3. The Metaphors and The Critics

Lakoff's metaphor theory, as sketched above, is clearly different from the classical definition of metaphor examined in chapter one. Whereas the traditional theory is one that only treats metaphors as linguistic expressions that are formed ad hoc based on the similarities between things or concepts, Lakoff's conceptual metaphor theory defines metaphors as systematic, experientially motivated mappings from one domain to another that structure our conceptual system as well as the way in which we talk about the world. These mappings are elucidated through analysis of linguistic data. In this way, Lakoff maintains that he and his colleagues are engaging in cognitive linguistics since the researchers working on conceptual metaphor theory are using linguistic analysis to make generalizations about the mind.

However, Lakoff's views on metaphor, as well as his belief in the linguistic nature of his work, is not universally accepted. Unfortunately, the most common criticisms do not add anything to a broader discussion of metaphor by either offering a critique of his theory or proposing modified versions to account for problematic areas. Instead Lakoff's detractors usually adopt and/or maintain the traditional view of metaphor in one way or another, and then oppose Lakoff's theory on the grounds that he isn't doing linguistics because he is studying metaphor, and/or he has totally misconstrued the nature of what he is studying, because metaphors just don't act the way he says they do. Neither of these tactics works well against Lakoff since he, in his theory, has redefined metaphor as a cognitive phenomenon and explicitly argued that linguistic analysis of real speech is an integral part of formulating the definition of metaphor as a cognitive phenomenon and therefore he is doing cognitive linguistics. Thus, when confronted with criticism based on a more traditional view of metaphor, all Lakoff has to do is point to his cognitive definition of metaphor and to the generalizations and systematicity his analysis has shown and the
evidence he has amassed for such generalizations. In this way, he never answer the critics by any means except his theory internal definition of conceptual metaphors, while they approach him by means of a theory he considers dead and buried. Three examples of common criticisms, and Lakoff's responses to them, will be examined below to show how this situation plays out.

One common criticism of Lakoff, as well as Mark Turner, is that the type of research they are engaged in is not really linguistics. This view is most often put forth by formalist and grammarians who believe that the only true linguistics is the study of syntactic categories and grammatical rules. This is the position taken by Randy Allen Harris in his book, *The Linguistics Wars*. Harris, in summing up Lakoff's post generative semantics career, says that "[Lakoff] is best known for his studies of image clusters - which have closer ties to literary criticism, philology, and rhetorical theory, than they do to linguistics..." (Harris 1993, p. 247). Linguistics then, for Harris, based on this assessment of Lakoff's work, involves the study of formal grammars, not actual expressions. Either that, or Harris entirely misses the point that the research Lakoff has done recently and is currently doing is not based on literary works, but on actual language use and a linguistic analysis of usage.

Another common criticism is that the expressions Lakoff uses as evidence for conceptual metaphors aren't really instances of metaphor at all. This criticism usually claims that most of the expressions Lakoff sites are collocations learned by the speaker, and that their meaning is in the conventionalized form of the expression, not in a metaphor that underlies the expressions. Lakoff rebuttal to this point of view hinges on the idea that conventional metaphors are systematic. If these expressions are just collocations, how then does one explain a system such as LOVE IS A JOURNEY, in which various types of travel and features of travel can be used to discuss love, and further, creative elaborations are
possible which adhere to the structure of the system but which are not common expressions in English (Lakoff 1995).

The third common criticism of the Lakoffian metaphor theory is that the metaphors he is seeing aren't really 'alive' as he proposes, but rather are dead or near dead constructions that evoke little or no metaphorical sense when used. The common expressions Lakoff cites as instantiations of live metaphors are, according to the dead metaphor view, constructions that were once metaphoric, but have become idiomatic and are no longer analyzed by users of a language. Lakoff responds to this criticism by agreeing that common expressions, like 'spinning our wheels', are idiomatic and not analyzed by language users on a conscious level. However, he would cite the systematic mappings and creative elaborations discussed above as evidence that, even though the most common surface forms may be crystallized, that on a deeper level, in the conceptual system, there are metaphorical mappings which structure the idioms on an unconscious level (Lakoff and Johnson 1980; Lakoff 1993).

2.3.4. The Lakoffian Program

The majority of Lakoff's more recent research, while still involving conceptual metaphor, seems to have moved beyond cognitive linguistics into the realm of politics and ethics. In 1991, Lakoff circulated a paper via electronic mail and the Internet entitled "Metaphor and a War: The Metaphor System Used to Justify The War in the Gulf". The purpose of this paper was to examine the conceptual metaphors used to justify and report on the Gulf War. Basically, this paper used Lakoff's theory of conceptual metaphor and the method he and his students have developed to study metaphor to discover what the politicians, pundits, and journalists were 'really' saying about the Gulf War, Saddam Hussein and Iraq.
One of the conclusions of the paper, beyond the analysis of the metaphors used, is that journalist should be educated in cognitive science so they can unravel the metaphors and metonymies that are used in political and social discourse. In other words, In Lakoff's opinion, journalists need to get past the metaphorical expressions, and the metaphorical thought, used in political discourse in order to understand what is really being said so they can report it accurately. Lakoff reiterates this position in a 1995 paper entitled "The Neurocognitive Self: Conceptual System Research in the Twenty-first Century and the Rethinking of What a Person Is". Although this paper is largely about the conceptual system and where Lakoff envisions his program, and cognitive science in general, heading in the 21st century, it also delves into what Lakoff believes one of the roles of cognitive science should be in the coming century - a tool for journalists and politicians to understand what it is they are really saying and what motivates them to say what it is they are saying. In this same vein, in 1996 Lakoff published Moral Politics: What Conservatives Know that Liberals Don't, a book which examines the metaphors that stand behind, and divide, the two major political parties in the United States. Although most of the book is a fair, dispassionate analysis of the system of conceptual metaphors underlying the beliefs of both parties, Lakoff ends the book by branding one of the belief systems as "pathological". I do not intend to play politics here, nor attack or defend his conclusion in this manner, but I mention it merely to point out that one of the major foci of Lakoff's current research is the relative ethics of various conceptual metaphors and systems of conceptual metaphors.

However, the ethical and political dimension on which Lakoff is largely focused currently are of little consequence for the purpose of this thesis. What is important for my purposes is a second major focus of the Lakoffian program - the goal of tying the tenets of conceptual metaphor theory to neurophysiological research. In the 1995 paper, "The Neurocognitive Self", Lakoff proposes that the next goal of his research in cognitive science is to propose a neurocognitive theory that melds cognitive linguistics, and what
cognitive science has discovered about our conceptual systems, with what is known about
the brain from neuro-science. He sees this as a goal of twenty-first century linguistics and
proposes two "futuristic hypotheses" that would be part of such an endeavor.

The first of the two futurist hypotheses Lakoff mentions is what he calls the
'Neural Representation Hypothesis'. The essence of this hypothesis is that concepts are not
symbolic but are neural representations that are part of a network. Lakoff points out that
"... the representation of concepts using symbols is an artifact of the fact that we write,
rather than an intrinsic part of the nature of concepts" (1995, 5). Based on the 1992
doctoral dissertation of a student at Berkeley, Terry Regier, in which Regier constructed a
model using a connectionist network in which spatial terms are learned and represented in
terms of neural structure, Lakoff proposes that the study of connectionist networks will
lead to a way to represent concepts by models inspired by neurophysiology rather than
models with abstract symbols.

The second 'futuristic' hypothesis Lakoff proposes for cognitive science, and
cognitive linguistics, is what he calls 'the Convergence Zone Hypothesis'. This hypothesis
is based on Antonio and Hanna Damasios' work on convergence zones in neuroscience
(1989). The premise of the convergence zone hypothesis is that there are areas in the brain
where all the properties of distributed, componential concepts 'converge' together - a point
of integration. Based on the Damasios' findings that related concepts tend to group together
in certain areas (e.g. tool concepts closer to the motor areas since motor routines are an
important aspect of the concept, animal concepts are closer to the visual perception areas of
the brain since animals are most often experienced visually, etc.), Lakoff proposes, in what
he calls 'The Neurocognitive Convergence Hypothesis', that we will find convergence
zones that correspond to many of the different types of categorization recognized by
cognitive science. He suggests that radial categories, basic-level categories, prototypes,
complex image schemas, semantic frames, metaphors, etc. are different cognitive
phenomena and result from different loci of convergence in the brain. I take this to mean that Lakoff expects to find a different area of convergence for metaphorical categorization as opposed to other types of categorization, such as basic-level categories or complex image schemas to name a couple.

Lakoff's vision of a neurocognitive program in cognitive linguistics to understand how data from neurophysiology and neuroscience can help us understand language and cognition is admirable and intriguing, but hardly as futuristic as he supposes. Sydney Lamb has been working on just this problem for 30 years and has developed a neurocognitive model of language based on a relational network approach (Lamb 1998a). In keeping with Lakoff's suggestion that we need to adopt a neurocognitive approach to better understand our conceptual system, I will use Lamb's neurocognitive theory to propose a neurocognitive account of metaphor and evaluate the Lakoffian cognitive theory of metaphor as I have sketched it above in terms of Lamb's neurocognitive model. However, before pursuing this, it is first necessary to briefly have a look at some other work that has been done in cognitive linguistics on the topic of metaphor.

2.4. Metaphor and Cognitive Linguistic Theories

It would be a mistake, and a disservice to other scholars, to make it seem as if Lakoff is the only person involved in the study of conceptual metaphors in cognitive linguistics. As I mentioned above, Lakoff is a leading figure in the field of cognitive metaphor research and his theory is the mainstream theory, but Mark Turner, Eve Sweetser and Ronald Langacker have made significant contributions to the study of metaphor in linguistics, and Mark Johnson has been a major figure in the philosophical study of metaphor, as shown in chapter one, as well as in the cognitive science research. The following three sections briefly outline the contributions of Turner, Sweetser and
Langacker and the fourth presents an overview of the cognitive science position on the status of conceptual metaphors.

2.4.1. Mark Turner

Whereas Johnson contributes a philosophical perspective to the cognitive study of metaphor, Mark Turner brings a literary frame of mind to the field. In Lakoff and Turner’s book, *More than Cool Reason: A Field Guide to Poetic Metaphor* (1989), the study of literary metaphor is wedded to the cognitive theory of conceptual metaphors in an attempt to understand what motivates the use of metaphors in literary uses of language. However, the book is more than just a guide to poetic metaphor as its title suggests - it also is an important work on the theoretical basis of conceptual metaphors. Not only does the concept of metaphorical mapping appear in this book (it was lacking in MWLB), but also Lakoff and Turner suggest several of the most generic level conceptual metaphors that come to be part of the Lakoffian theory of metaphor (e.g. EVENTS ARE ACTIONS, CHANGE OF STATE IS CHANGE OF LOCATION, etc.). Turner also played a large role in the development of the invariance hypothesis and is one of its strongest supporters (Lakoff 1993; Turner 1990).

In addition to the generic level metaphors, in *More than Cool Reason* Lakoff and Turner examine the opposite end of the spectrum, image metaphors, as well. Image metaphors are metaphors that do not map concepts but rather images.

Not all metaphors map conceptual structure onto other conceptual structures. In addition to the metaphors that unconsciously and automatically organize our ordinary comprehension of the world by mapping concepts onto other concepts, there are more fleeting metaphors which involve not the mapping of concepts but rather the mapping of images. [Lakoff and Turner 1989, 89]

This type of metaphor involves the superposition of one image on top of another image. An example of such an image metaphor given in *More than Cool Reason* is ‘My wife....whose waist is an hourglass’. Here the shape of an hourglass is being
superimposed on the image of a woman's waist "...by virtue of their common shape (1989, 90). Lakoff and Turner say that image mappings work the same as conceptual mappings except that mental image domains are being mapped rather than conceptual domains.

While the work he has done with Lakoff is important to the field of conceptual metaphor study, Turner has also made significant contributions of his own. The most important of these for metaphor are his notion of blended space and generic space. In his book *the Literary Mind*, Turner claims that on the surface, simple conceptual metaphors like LIFE IS A JOURNEY seem to involve the transference of elements of one space (domain) onto another space (domain) in a unidirectional manner, as the Lakoffian theory maintains. However, Turner sees this model as limiting and prefers to regard metaphors in terms of blended space. Blended space exists when two 'stories', or concepts, share abstract structure. Such blends are contained in a generic space which connects the two inputs of the blend. Generic space consists of "counterpart connections" between two input spaces but does not involve directionality and can be applied to a variety of situations (Turner 1996). In other words, Turner proposes that metaphors are blends between two concepts which are linked by generic, non-directional connections.

2.4.2. Eve Sweetser

In many ways, Turner's ideas of metaphors invoke thoughts of poetry and flights of fancy. This is reasonable since he is approaching the problem from the literary side, albeit in a cognitive manner. Eve Sweetser also studies metaphor in the domain of cognitive linguistics, but in contrast to Turner, her ideas are not only more grounded in pragmatic considerations and linguistic concerns, her research serves to ground the whole notion of conceptual metaphors on an empirical base.
In her book, *From Etymology to Pragmatics: Metaphorical and Cultural aspects of Semantic Structure* (1990), Sweetser uses the Lakoffian theory of metaphor as a means to understand semantic change. Through the examination of perception verbs in English and Indo-European, she concludes that, at least in Indo-European (and likely other cultures as well),

The vocabulary of physical perception ... shows systematic metaphorical connections with the vocabulary of internal self and internal sensations. These connections are nonrandom correspondences, but highly motivated links between parallel or analogous areas of physical and internal sensation. [Sweetser 1990, 45]

A good example of this is the system of visual perception verbs in English. As Sweetser points out, vision corresponds to intellection. This is not an arbitrary correspondence, but is based on the physical abilities of our visual system as well as the primacy of our visual systems in how we orient ourselves in the world. In other words, visual perception verbs lend themselves to metaphorical association with knowing because the visual system, with its ability to focus on the most salient characteristic of a scene, coupled with the importance of the visual system for gathering objective information from the environment, is our most basic, most entrenched means of knowing things. In this way, the internal domain of intellection is constituted in terms of the exterior domain of visual perception.

The specifics of Sweetser’s analysis are interesting in and of themselves, but it is also important for my purposes to point out that her analysis supports the unidirectional and concrete to abstract tenets of Lakoffian metaphor theory. Sweetser’s findings indicate that perception verbs (verbs dealing with touch, taste, smell and hearing as well as vision) tend to go from having meaning based solidly in physical perception to having meanings in the realm of mental perception. She did not find the converse to be true - verbs representing mental activity or perception do not tend to move to the physical domain of perception (Sweetser 1990).
2.4.3. Ronald Langacker

Ronald Langacker, assessing the issue of metaphor in the scope of his Cognitive Grammar, writes

...the entire scheme [of metaphor] rests on a general notion of comparison and specifically categorization, in which established structures are used for assessing novel structures. Metaphor can be seen as the special case in which two structures represent different domains of experience, the target domain being understood with reference to the source domain. [forthcoming, 24]

Langacker proposes that the two basic properties of a metaphorical relationship that emerge out of the above definition of metaphor are one, that metaphor is directional, and two, metaphor depends on correspondences between elements of the source and the target domain. As presented so far, Langacker’s view of metaphor is similar to the others we have seen so far. In the basics of his view of metaphor, Langacker is consistent with the Lakoffian theory.

Unlike Lakoff, and more in keeping with Turner, Langacker proposes the need for a third entity besides the source domain and the target domain. As we saw, for Turner, this third entity is the blend of two domains. For Langacker, it is a schema that is the third component. Specifically, he proposes that for a given metaphorical relationship, there is a schema that describe the commonality of the two domains involved in the metaphor. Langacker claims that a metaphor always involves at least three structures: the source, the target, and a schema. The schema, which links the two domains together, involves an "...apprehension of the abstract commonalities which motivates the extension" (Langacker forthcoming, 25). According to Langacker, this notion is compatible with the invariance hypothesis of Lakoff (1993) and Turner (1990) since the schematic commonality of the target and the source domains is necessarily compatible with any inherent structure of the target domain (if it were not, it would not constitute a commonality between the two domains).
In addition to the third element of the schema introduced by Langacker, he also proposes the need for another entity in metaphoric associations - the hybrid domain. Hybrid domains are similar to blends in that they are a combination of properties of both, the schematic commonalities, into a separate domain that is a distinct structure from the source and target domains. "... the hybrid domain (or "blended Space") is in a sense constituted by the source and target domains being construed in relation to one another, but may well emerge as a cognitive entity in its own right" (Langacker forthcoming, 26). For example, in a metaphor that links a person to a tiger (Figure 2.2.), Langacker claims that there is a hybrid domain in which a person might actually conceive of a hybrid creature part tiger and part human.

![Diagram](image)

Figure 2.2. (from Langacker forthcoming)

Thus, like Turner, Langacker modifies the basic Lakoffian model with the addition of a more units to a metaphoric relationship - a schema and a hybrid domain.
2.6. Conclusion

The Lakoffian theory, as presented above, has been and is the dominant paradigm in the study of metaphor in cognitive linguistics. Even though Langacker and Turner do differ with Lakoff on the internal construction of metaphorical associations, they are all working within the framework first established by Lakoff and Johnson in *MWLB*, the framework of metaphors as a cognitive phenomenon. Yet, to this point, little has been done within the framework of conceptual metaphor theory regarding the role of the brain in processing metaphor. The theories presented above all take established cognitive processes into account in their analysis of metaphor as a cognitive phenomenon, but this is done in a cognitive science framework that, as Lakoff points out (1995), is not yet integrated with what is known about the brain from neuroscience to any great extent. Thus, Lakoff proposes the need to study metaphor, and indeed all of the findings of cognitive linguistics, from a neurocognitive perspective as our knowledge of neural structures increases. This is a proposal that Sydney Lamb also advocates and goal he has been pursuing for the past 30 years. To this end, Lamb has developed a neurocognitive theory of language (Lamb 1998a), one which I will be using in the remainder of this thesis to propose a neurocognitive theory of metaphor as well as evaluate the current cognitive theory of metaphor from a neurocognitive perspective.
Chapter 3. A Neurocognitive Theory of Metaphor

3.1. Introduction

In order to explore a neurocognitive theory of metaphor, it is first necessary to set down the assumptions and goals of proposing such a theory, introduce the neurocognitive model I will use to construct the theory - Sydney Lamb’s Relational Network model - and give an overview of the components of Lamb’s model that are relevant to understanding metaphor. I am working under three basic assumptions in this thesis. The first assumption is that the Lakoffian theory of metaphor (and related/similar cognitive theories of metaphor) is essentially correct and metaphor is both a linguistic and a cognitive phenomenon and not just a use of figurative language in special context. Thus, I adopt Lakoff’s (1993) convention of using the term metaphor to designate the cognitive aspect of metaphor and the term metaphorical expression to designate linguistic expressions that are reflexes of metaphorical conceptual structure. (In the cases of nonce metaphors, I will use the term metaphor to refer to both the cognitive aspect as well as the expression.) The second basic assumption I am employing here is that we should be able to ground observed cognitive phenomena in what is known about the brain from Neuroscience. This is a major emphasis of Lamb’s neurocognitive approach (1998a) and is in keeping with Lakoff’s proposal to “develop” a neurocognitive theory to tie the finding of cognitive science together with the findings of neuroscience. The third basic assumption is that Lamb’s neurocognitive model is appropriate for such a task. I believe this last assumption to be valid based on what I consider to be one of the major strengths of Lamb’s model - the fact that the primary development of the relational network approach occurred concurrently with, but significantly independent of, neuroscience, and yet is largely compatible with the findings of neuroscience.
There are two basic goals in this thesis. The primary goal is to develop a theory of metaphor that takes assumption two above into account and grounds the cognitive approach to metaphor with respect to neuroscience. Thus, my primary goal is to propose a theory of metaphor, one that accounts for conceptual metaphors and metaphoric expressions, within a neurocognitive framework. The primary goal involves not only developing a neurocognitive theory of metaphor, but it also involves examining whether the theory and the predictions it entails are neurologically plausible. The secondary goal of this thesis is to evaluate the Lakoffian approach to metaphor from a neurocognitive perspective. The presentation of the theory will be contained in this chapter, relevant data concerning metaphors and the brain will be examined in the following chapter, and a neurocognitive evaluation of the Lakoffian theory of metaphor will be presented in Chapter Five.

However, before proceeding further with explication of a neurocognitive theory of metaphor, it is first necessary to give a brief account of what the neurocognitive model of language is, what the nature of the relational network is and what specific aspects of the model are important for understanding the nature of metaphor.

3.2. An Introduction to Neurocognitive Linguistics and the AWG Model of Language

To understand what the network model of language is, and what neurocognitive linguistics is, it is profitable to indulge in a little history concerning the main proponent of such an account of language, Sydney Lamb. Neurocognitive linguistics emerged out of Lamb's attempt to account for linguistic outputs in terms of relational networks. During the same era in the history of linguistics that saw the birth of generative linguistics, Lamb observed that in order to account for linguistic output it is necessary to posit relationships between linguistic entities and that such relationships make grammatical rules unnecessary. The relationships among the linguistic entities form a network of connections. This
approach to language was first instantiated as 'Stratificational Grammar.' Stratificational Grammar proposed that the linguistic system was multi-stratal and that each stratum had its own tactics and other structure (Lamb 1966). Lamb refined this theory over the years as a relational network model of the linguistic system.

The goal of the relational network model is to understand the linguistic system through an analysis of linguistic facts. In the process of refining the network model and the network diagrams, the representational system used by the model. Lamb noticed a striking similarity between the representational system of his network model of language and models of real neural networks. This led Lamb to explore the similarities between his linguistic model and models being developed in neuroscience in order to determine how well his theory of relational networks matched up with the neural network models. Lamb labeled this endeavor 'neurocognitive' linguistics.

According to Lamb (1998a), the goal of neurocognitive linguistics is to try to construct a theory of language, specifically a model of the linguistic system, which accounts for linguistic data as well as for actual production and other linguistic processes while being neurologically plausible. Such a theory ought to provide a window into how the mind works. Such a neurocognitive model of language should be built in a top down manner, with real linguistic output ('texts') constituting the data to be considered. The result of the top down model, based on linguistic data, is then compared with what is known from bottom up modeling in neuroscience. Where the top down linguistic model and the bottom up neurological model are commensurate, there is at least circumstantial evidence for the validity of the conclusions drawn from the linguistic data. Where neurological findings specifically contradict the linguistic model, then the linguistic model needs to be re-evaluated and adjusted to more closely fit with the neurological data. In other words, where the linguistic model fails to agree with what is known from neuroscience,
Lamb contends that is probably the linguistic model that needs to be revised. Harrison, a student of Lamb, writes,

As the quality of neurological data increases, so neurologically responsible models become progressively more constrained. To the degree that they can continue to be both descriptively adequate (in terms of the linguistic behaviour they account for), and biologically accurate, then such models can be said to genuinely exhibit the kind of “plausibility” that is often proffered as a significant variable in the discussion of a model’s merits. [1997, 1]

Compare the position taken by Lamb and Harrison to Chomsky (1993) where the opposite position is taken. According to Chomsky, one reason that neurphysiologist have not found anything in the brain to account for computational components of grammar may be that they are looking at the wrong parts of the brain or asking the wrong questions. As for the neurophysiological basis of mental activity, Chomsky writes:

We know a lot about the mental from a scientific point of view. We have explanatory theories that account for a lot of things. The belief that neurophysiology is implicated in things could be true, but we have very little evidence for it. So, it’s just a kind of hope; look around and you see neurons; maybe they are implicated. [1993, 85]

Here, Chomsky is placing his analysis of mental activity as more explanatory than neurophysiological evidence. Since the neurological evidence does not fit his analysis of the way mental activity works, he concludes that the neurological models are wrong.

Chomsky engages in a form of what Lamb calls ‘introjective’ modeling. An introjective model is one that takes an analysis of external data and introjects that analysis into the model of an internal system, the brain. Such introjective models operate in what Lamb calls the ‘as if’ mode. Many theories concerning how the brain work talk about in terms of symbols, transference, and transformation. For example, consider a simple (hypothetical) theory of the linguistic system that posits ‘lexical semantic representations’ which are ‘sent’ from one location in the brain to another where they are ‘inserted’ into larger structures and ‘sent’ to another location where they are transformed into ‘phonological representations’. As Lamb (1998a) points out, this type of model relies on
symbols and the manipulation of objects, but there is nothing in the brain that can read symbols (no little eyes) and nothing that can manipulate objects (no little hands). Such a model is introjective because it takes external means of representing linguistic units and explains the internal workings of the linguistic system in terms of its output. The system can be explained in this way on a superficial level as long as one understands that it 'as if' there were things like symbols and objects in the brain.

In the neurocognitive approach, the goal is not to make an analysis of language, which is breaking language down into smaller units based on observable data. An analysis only works to model directly observable phenomena. Thus, when an analysis is used to make inferences about the brain, the observable units of the analysis are often introjected into our mental system. The goal of neurocognitive linguistics in not to analyze data, but rather to build a catalysis. According to Lamb,

Catalysis...is a modeling process performed by the theoretician, in which structures are built up which are not directly observable but which may be presumed to exist on the basis of evidence that is observable. What the neurocognitive linguist is doing in building a cognitive model is catalysis. [1998a, IV, 5]

The network of relationships proposed by Lamb is an example of catalysis. Based on the observable data that there are relationships between linguistic entities, the idea of a network of relationships is built up. However, the network is not directly observable - only the consequences of the network structure are directly observable.

It is important to stress that the relational network of Lamb’s model does not contain symbols or objects of any kind. It is a system of connections, a network of relationships. In the model, linguistic ‘units’ are not objects but are ‘points of interconnection of relationships’. Lamb writes, “We may conclude the linguistic system (unlike its external manifestations) is not a symbol system after all, but a network of relationships, a purely connectional system, in which all of the information is in its connectivity” (1998a, III, 17; cf. Lakoff 1995a). There is no need for symbols or labels in
the network because the information and the meaning are in the relationships of the network. It is important to make clear that the relational network proposed by Lamb is not infinite nor unconstrained - it is ‘linked’ to the real world through the perceptual system (input) and the muscular system (output).

Since the network is relational with no symbols or objects, it follows that concepts will not be found as symbolic units in the network, but rather as points in the network that integrate distributed properties. However, the relational network is not a purely distributed system - it is also a local representational system. This may seem counterintuitive at first, but as has been pointed out by Harrison (1997), it is one of the real strengths of the model. The network is distributive in that the particular component properties of a given concept are distributed in the network and are both other concepts as well as direct inputs from the sensory modalities, i.e. percepts. It is local in that a particular concept node\(^1\) is integrated in a particular place in the network, a convergence of the properties of a given concept. The local node does not contain any information about a concept. It is not a symbol. It is the convergent point of a multitude of experiential inputs. This is a purely connectionist, or in Lamb’s words, a “radically connectionist” model. Lamb has named his relational network model the Augmented Wernicke-Geschwind model of language, or AWG for short, since it is in keeping with the connectionist views of Karl Wernicke and Norman Geschwind and is largely compatible with the Wernicke-Geschwind model with a few modifications or elaborations, as the name suggests.

To summarize, the neurocognitive approach to linguistics is one in which the goal is to account for the linguistic system and make predictions about the way the mind works in a manner that is neurologically plausible. The method by which this is done is not analysis, the tearing down of linguistic data, but catalysis, the building of a model of a indirectly

\(^1\) The use of the term ‘node’ is a simplification here. Lamb’s theory uses the more complex idea of a ‘nection’ which better captures the structure of the relational network (Lamb 1998). However, for the purposes of this thesis it is more economical to use the more general ‘node’.
observable system by means of the observable data. This is a top down process with linguistic expression as its data, but it must be in accord with bottom up neurological modeling. Where it is not, the model must be re-examined. The result of this method is Lamb's relational network model, also called the Augmented Wernicke-Geschwind model, which is a purely connectionist network with no symbols or objects in the network. It is a local distributed network in which a concept node is a convergence point for the distributed properties of the concept. There is not one particular place in the network where information is stored or encoded. In a local distributive network, "...information is an emergent quality of a network of connections representing complex associations and convergences between experiential inputs (Harrison 1997, 11). Since the network emerges from experience, each individual will have a unique network of relationships. It is from our own unique network that each of us construct our model of reality, the conceptual system, through which we interact with the world. In so far as two people develop with similar experiences (physical, linguistic and cultural) they can meaningfully interact and understand each other, but the understanding is never complete - no two systems are identical.

3.3. Important Principles for the AWG Model of Metaphor

The cursory explanation of the AWG model of language given above is not detailed enough for a complete theory of metaphor. I will present in greater detail those principles of the AWG model that are the most important for developing a theory of metaphor. These major principles of the model are distributive processing, shared properties, bottom up learning, the proximity principle, spreading activation, feedback activation, parallel processing, bi-directional processing and lexicalization.
3.3.1. Distributed Processing and Shared Properties of Concepts

As stated above, the AWG model is a relational network model in which information is an emergent property of the network. Nowhere in the network is there a location where information is stored. Concepts are both distributed and local, with a local node integrating the distributed properties of the concept. This is similar to Damasios' notion of convergence zones (1989) in many with the different aggregate properties of a concept converging on a specific locus in the cortex.

The distributed properties of a given concept can include either perceptual properties that come directly from the sensory modalities (percepts) as well as other concepts. In general, more concrete concepts will have a greater number of properties that come directly from sensory percepts while the properties of abstract concepts will be themselves concepts (Lamb 1998a; Rohde 1997a). For instance, the concept CAT will have connections to concepts like PET, MEOW, FELINE, etc., and connections to perceptual properties, e.g. tactile properties (the feel of the cat's fur), auditory properties (the sound image of a cat's 'meow') and visual properties (what a cat looks like). Figure 3.1. is an example from Lamb (1998a) of what the node for CAT would look like with connections to several of its properties.

![Figure 3.1. CAT Node with Connections to Select Properties](image-url)
For the cat node to be activated in the network, enough of the distributed properties must be satisfied to meet an activational threshold. If the threshold function of the node is met, the node becomes active and passes activation along in the network.

It is important to point out that even though the connections of the various properties have different strengths, and certain combinations of properties with stronger connections will satisfy the threshold more easily, this is not a concept of the ‘feature bundle’ type. There are no specific properties of a given concept that are ‘necessary and sufficient’ for satisfying the category. Some properties have stronger connections because, in our experience, they are more often associated with a given concept, but there is no set of properties ‘necessary’ for any concept. If there is enough activation through weaker connections to satisfy the threshold of a concept, then the concept will become active.

The properties that form a given concept are not unique to that concept. For example, in an individual’s relational network, the dog node integrates those properties that the individual, through experience, has come to recognize as properties of a dog. Some of these properties, such as the sound image ‘bark’ and the concept bark, are unique to dogs, but others such as being four legged and a kind of pet are not. Cats also have those properties, but the cat node integrates them with other properties that cats have and dogs don’t. That is, an individual’s concept cat will share properties with his or her concept dog. The similarity of cats and dogs lies precisely in that, in our experience, they share properties. Thus, the dog node and the cat node do not integrate entirely separate structures as in figure 3.3.
Figure 3.3. Separate CAT and DOG Integration Nodes

Note: Figures 3.3. and 3.4. are designed only to show hypothetical, respective integrating structure of the concepts CAT and DOG. The diagrams are not intended to show substantive properties of the two concepts represented.

Rather, they are two different convergence points in the network which share some properties but not others, as shown in figure 3.4.

Figure 3.4. Overlapping CAT and DOG Integration Nodes

Thin solid lines: CAT only connections
Thin dotted lines: DOG only connections
Solid thick lines: Shared connections
An important aspect of the above view of concepts is that all our concepts are connected to other concepts, and moreover, all concepts are composed of sensory inputs and other concepts. All of these componential concepts, through shared properties, are interconnected - they form conceptual relationships. It is through the relationships among concepts that our conceptual system, the system by which we understand the world and interact with the world, is formed. According to Lamb, “A crucial property of a conceptual system is that none of its components can be described without an account of its relationships to various other concepts” (1998a, VI, 5). All the concepts of our conceptual system are interrelated via shared properties.

3.3.2. Spreading Activation / Feedback Activation

As stated in section 3.3.1. above, concepts become active through the excitation of the properties of that concept. However, the activation in the network does not stop with the activation of a particular concept. An activated concept in turn sends activation to all the concepts to which it is directly connected. Since any given concept will have connections of different strengths to different concepts, with closer related concepts having stronger connections, some connected concepts will be more strongly activated than others. If the activation is sufficient to satisfy a connected concept's threshold function, that concept will become active and spread activation to all concepts directly connected to it. This is spreading activation. The newly active concept node will also send activation back to the concept node that sent it activation, thus keeping the ‘source’ concept node activated (if the threshold of that concept is still satisfied). This is feedback activation.

It is important to realize that it is not just the integrating concept node that is activated in spreading and feedback activation, but the components of the concept as well, including perceptual properties. The activation of enough components of a concept will activate that concept (i.e. when the threshold of the node is satisfied) and through spreading
activation and feedback activation, all the properties of a concept will become active after
the concept is activated, even those properties that did not contribute to the initial activation
of the concept. Since all the properties of a concept receive spreading activation when the
concept is activated, the individual properties can then send activation to all concept nodes
to which they are connected. Thus, if another concept shares enough properties with an
activated concept, even if the two concepts are not directly connected, the second concept
node, if its threshold is satisfied, will be activated (Lamb 1998a).

3.3.3. Parallel and Bi-directional Processing

As activation spreads through the network, different concept nodes become excited
to different degrees and thus send on different degrees of activation. This activation is not
linear, but as was pointed out above, is spreading. It is not just the next concept in a line
that receives activation, all concepts connected to an active concept will receive some
activation. Thus, at any given time, there are several concept nodes in the network that will
be activated (I should note here that, due to lateral inhibition, closely related concepts to an
active concept node may not become activated because the active concept is inhibiting them.
Very closely related concepts activated simultaneously could no doubt be problematic, so it
is necessary for a concept to inhibit its closest neighbors to avoid confusion). The
activation of different concepts in the network at the same time (or very nearly the same
time) allows parallel processing. The relational network model is not a serial processor in
which one concept feeds into one and only one subsequent concept, rather it is a model in
which different concepts can be activated simultaneously in parallel. Furthermore, different
processes can occur in the network at the same time (Lamb 1998a).

Processing in the relational network model is also bi-directional as seen in the above
discussion on feedback activation. This allows the network to work in both production and
interpretation without having necessarily different structure for each. It also allows a
concept to be activated by its component properties and/or through the activation of concepts that it may be a property of. (Lamb 1998a).

3.3.4. Learning, the Proximity Principle and Creativity

According to Lamb's relational network model, learning is mainly a bottom up process consisting of the building and strengthening connections in the network. For the most part, the process acts at the lower levels before it acts at higher levels. Lower level nodes that are 'recruited' by the learning process serve as 'parent' nodes for higher level nodes. In regard to the learning of concepts, this means that lower level nodes, those with more connections to the sensory modalities, will be recruited first for concrete concepts. In turn, the concrete concept nodes will serve as properties of more abstract concepts as the more abstract concepts are learned (Lamb 1998b).

It is important to point out that, according to Lamb's model, new connections are not really built, i.e. constructed from nothing. Rather, they are recruited (as indicated above) from latent connections that are built into the system. Lamb proposes that the connections already exist in the network before learning, but until they are involved in learning, the connections, and the nodes they are connected to, are latent. When we learn something, new connections are recruited and new nodes become active in the network. This recruitment is not random or unordered. According to Lamb, "Learning is a process of selection" (1998a, XI, 11). It is achieved through competition based on the proximity of latent connections to concepts which are similar to what is being learned. When something new is learned, the latent connections that are recruited are those nearest to other concepts that share the properties of the new concept being learned. In other words, similar concepts will be in close proximity in the network. This is one aspect of the proximity principle, which Lamb characterizes as a consequence of the learning hypothesis used in his model (1998a).
The proximity principle states that of the multiple competitors (latent connections) that are available to be used when a new concept is learned, the ones that will become active are those that connect to a node that is closest to the component properties of the concept being learned. It follows from this that a new concept that is learned will be located in the network close to similar concepts, i.e. those that share a significant number of properties in common. It also follows from the proximity principle that concrete concepts, which have more connections to percepts, will be located more on the periphery of the network, whereas abstract concepts, which have more connections with other concepts than with percepts, will be more central, i.e. farther from the periphery. Furthermore, concepts that have more properties from a particular sensory modality will be closer to where that particular sensory modality interfaces with the network. Thus, concepts for animals, which are mainly apprehended through the visual system, would be closer to the visual system in the network whereas tools, which involve motor routines and somatosensory perception, would be closer to the motor and the somatosensory areas. In other words, certain types of concepts "converge" at certain areas of the network as a consequence of the proximity principle and competitive (Darwinian) learning in the network (cf. "The Convergence Zone hypothesis" in Lakoff (1995a) and Damasio (1989)).

One of the basic principles of the learning hypothesis in Lamb's model is that new structure in the network is built on existing structure. New concepts are learned based on shared properties with existing concepts. That learning takes place in this way in the network is of fundamental importance to how the mental system works.

It is a general property of our mental systems that newly encountered things and processes and relationships are apprehended on the basis of resemblances to things, processes, and relationships that have been previously apprehended. [Lamb 1998a, VII, 10]

Lamb identifies two 'strategies' that our mental system uses to apprehend the world and make sense of it, i.e. to build models. These are segmentation and categorization. Segmentation is the process of dividing up reality into segments created by boundaries
imposed by the mind. The segments are classified into categories on the basis of properties that they share. According to Lamb, "In general categorization is based on identifying or assuming certain properties; while segmentation is the isolation of certain chunks of experience, real or imagined, on the basis of the identification of properties" (1998a, V11, 9). However, the shared properties that are perceived do not include all of the properties of what is being categorized. "All imposition of structure in our mental models is made at the cost of ignoring some properties of the phenomena being modeled" (Lamb 1998a, VII.7).

Many of our categories, indeed most of the organizing structure of our mental system, is not original to us. According to Lamb, many of the mental structures by which we understand the world come to us from our parents, siblings, teachers, etc. We receive these structures, as those that influence us did before us, mainly through linguistic communication. And, for the most part, we accept these structures as they are. Modification of existing categories, according to Lamb, is far less common than acceptance of those we have learned from those who came before us, and the invention of new categories is even less common (1998a).

Lamb does not discount the existence of creativity, though. He does state that it is a much rarer phenomenon than it is often thought to be. According to Lamb, creativity involves building new structure in the network. Our ability to put words together is not creative, as generative theories of language often claim it to be, since very little new structure is built, and for the most part we are just selecting categories in sequence. What is creative is inventing new lexemes for new or old concepts, building new concepts (especially building new concepts that integrate ideas in our conceptual system that were not previously integrated), inventing a new story or a tune, constructing a new metaphor to account for some complex facet of experience, or anything else that builds new structure in our network (Lamb 1998a). Thus, in Lamb's model, creativity is the building of new network structure. There are different degrees of creativity depending on the amount of
new structure built. Relatively low level creativity involves adding new connections between existing structures. Constructing a large interconnected structure, involving the addition of new nodes in the network, would be a higher level of creativity.

However, not all building of new structure in the network is creative in Lamb's model. He distinguishes between guided structure building and unguided structure building. Unguided structure building is creative, allowing for degrees of creativity based on how much structure is built as well as how closely the new structure is related to existing structure. Guided structure building, on the other hand, is relatively uncreative. An example of guided structure building is listening to a story. New structure will be built (assuming the story is new) in the process of understanding the story, but the structure of the incoming message (the structure of the story) will direct where the new structure is built and what it is attached to in the network (Lamb 1998a).

3.3.5. Lexicalization

According to Lamb's theory (1998a), a great deal of what we say in everyday speech involves complex lexemes, idiomatic expressions, and constructions that lie somewhere in-between them. Furthermore, he proposes that the complex lexemes we use are learned as units from the speakers around us as we acquire language. Many of the expressions that Lakoff and Johnson (1980), Lakoff and Turner (1989) and Lakoff (1993) use as examples of instantiations of conceptual metaphors seem to fall into this category. Therefore, it is important to briefly look at the process of lexicalization as presented in Lamb's model.

In Lamb's neurocognitive theory, lexicalization occurs through the entrenchment of a construction in the network gradually over time. The first time a specific combination of units is used, i.e. a 'nonce-formation', it is constructed based on previously learned units. However, if that combination continues to be used, it gradually becomes a complex
lexeme. Repeated occurrences of a linguistic expression strengthen the connections in the network to the meaning of the construction. Over time, the construction lexicalizes and becomes a complex lexeme. Once the construction becomes lexicalized, it functions as a unit, i.e. it is linked to one concept as a whole - a multi-word lexeme. However, even though complex lexemes have unit status, the individual elements of a multi-word lexeme are still analyzable. There is weak activation in the network of the concepts the individual terms of a lexicalized construction are linked to. Thus, a term like *blackbird*, which is a complex lexeme linked to the concept *blackbird*, has unit status and it is analyzable as *black* + *bird*. Both the understanding of *blackbird* as a combination of its components and as a unit is possible and both understandings may be active in the network in parallel (Lamb 1998a). As complex lexemes become more entrenched, the activation of the original components decreases, the unit interpretation strengthens, and the constructions become idiomatic. The meaning of the complex lexeme *blackbird* is obviously transparent, as discussed above, but an idiom like *hit the sack* is less transparent. According to Lamb's model, the individual components of *hit the sack* would receive weak activation only and the unitary meaning is primary (Lamb 1998a).

Once again, this is a gradual process, and the labels 'complex lexeme' and 'idiom' to not mark bounded states but rather areas of a continuum from a nonce expression to a completely lexicalized form, i.e. a single word. The English word *understand* is an example of a fully lexicalized form according to Lamb. In the case of *understand*, the activation of the meanings of the individual components is effectively blocked by the meaning of it as a unit (Lamb 1998a). For modern speakers of English, *understand* is an opaque idiom that is learned as a single word.

Thus, there is a lexicalization cline which has nonce-expressions at one end and single lexemes at the other. As we learn language, we will learn expressions that are at different points along this cline. Constructions that have the status of complex lexemes for
speakers around us when we learn language will be learned as units by us, although the
meaning may be more or less transparent from the components depending on where the
expression is on the lexicalization scale when we learn it.

3.4. Metaphor in the AWG Model of Language

Metaphor, according to Lamb, is a type of categorization by which abstract
concepts are labeled and understood by means of metaphoric extensions from physical
processes and objects.

It appears to be a general property of human linguistic systems all over this
planet that abstract concepts are labeled by means of metaphoric extension
from physical things and processes. This principle applies also to the
labeling of relatively more complex physical things and processes by
metaphorical extension from simpler things and processes. [Lamb 1998a,
VII, 9]

Lamb suggests that many of the metaphors we have in our mental system have been
accepted by us, "via language" from those around us, i.e. our parents, siblings, teachers,
etc. (1998b). This is an important distinction in Lamb’s model. Unlike the Lakoffian
approach, in which metaphor as a cognitive phenomenon is separated from metaphor as a
linguistic phenomenon, in Lamb’s model the linguistic use of metaphor is inextricably
bound to the cognitive aspect of metaphor. It is from the use of linguistic metaphors
interacting with the conceptual structure of the relational network that conceptual metaphors
of the type detailed by Lakoff and his colleagues emerge. Metaphor is a cognitive
phenomenon, as it is a type of categorization, and Lamb writes "Probably all new structure
is metaphorical to some extent in the sense of having shared properties with already
existing structures" (1998a, XVI, 3), but it is through language, through metaphoric
expressions, that our metaphorical conceptual models emerge, models that are based on the
shared properties of the concepts being associated by the metaphor.

It is also important to note that in Lamb’s theory, metaphors are creative - they build
new structure in the network. This would seem to be especially true of nonce metaphors
since they make associations between two areas of conceptual structure that were not previously associated, at least not in the way the metaphor associates them. The type of structure built by nonce metaphor would be unguided structure building and thus more creative. Conversely, using Lamb’s definition of creativity, conventional metaphors would build little to no structure when used, at least once they are well established in the network. Such conventional metaphors would not be as well established in the mental system of a young child as they would be for an adult or an older child, so, as a child acquires the conventional metaphors of those around him or her, the first uses of a conventional metaphor will build quite a bit of structure in the child’s network. Further uses of the metaphor will not build as much structure as the metaphor becomes an established part of his or her mental system. Elaborations of a conventional metaphor would build some structure, even if the conventional metaphor they are elaborations of is well established, since the elaborations would add to the associations already in place in the person’s mental system. However, this would be limited structure building of the guided type and would only be slightly creative.


In Lamb’s model, similarity plays a major role in categorization and thus in metaphor. Concepts are similar to the extent that they share properties within the network—that is, similar concepts have overlapping structure. This seems at odds with the Lakoffian theory of metaphor since, as we saw in chapter two, Lakoff explicitly denies that metaphors are based on similarities between the source and the target domains. Rather, he maintains that metaphors are motivated by an experiential basis that allows us to structure the target domain systematically by the source domain (1993). However, aside from saying that they are motivated by experience, Lakoff does not explain how the mappings work.
Instead, as seen in the metaphorical mapping for LOVE IS A JOURNEY in chapter two (figure 2.1), the convention within conceptual metaphor study is to describe the mapping and analyze what elements of the source domain correspond to which elements of the target domain. For example, in the LOVE IS A JOURNEY mapping, lovers correspond to travelers. However, aside from implicit knowledge that both the lovers and the travelers are people, there is no explanation in the mapping as to why these elements of the source and target correspond. The obvious answer is that they correspond because travelers and lovers are both 'roles' people play. In this way, despite Lakoff's claim that similarity is not involved in conceptual metaphors, the domains of LOVE and JOURNEY are indeed similar - they both involve people as the primary participants.

I don't actually think Lakoff would deny that this similarity exists - one of the properties of metaphorical mappings is that elements of the source domain map on to elements of the target domain in such a way that the inherent schematic structure of the target is not violated in the mapping (see the Invariance Principle in Ch. 2). This entails that the source domain elements mapped on the target domain elements would have to be similar enough to those target domain elements so as not to violate the structure of the target domain. Similarity is implicit in metaphoric mappings, i.e. it through similarity that elements of one domain correspond to elements in the other. In no way does the presence of these similarities contradict Lakoff's position that metaphors are motivated by an experiential basis. The elements of the two domains are similar to us because we have experienced their similarities.

The difference between Lamb's model and Lakoff's lies in how Lakoff defines similarity, domains and mappings. Domains, as envisioned by Lakoff, are closed entities which encapsulate some area of our experience. Metaphoric mappings transfer structure from the source domain to the target domain. The two domains involved in a mapping each have their own inherent, separate internal constituency, but the structure of the source
domain is used to understand the (usually) more abstract target. The structure from the source is 'imposed' on the target domain so that we might better understand the target. Similarity, defined by Lakoff as perceived similarity between domains, (1993) does not play a role in the mapping because the domains do not share features and are not really being compared to each other - the source is exporting structure to the target, not being compared to the target. Figure 3.5.A. below is a schematic representation of this type of mapping.

A)  
Source Domain
Target Domain
Schematic Representation of Metaphorical Mappings

B)  
Source Domain
Target Domain
Blended Domains

C)  
Hybrid Domain
Source Domain
Target Domain
Linguistic Expression
Metaphorical Extension Schema

D)  
Source Domain
Target Domain
Aggregate Field Model

Figure 3.5. Four Ways of Understanding Metaphoric Mappings
From a neurocognitive perspective, the problem with viewing metaphors in this way is that, although the mappings describe what elements from both domains are involved in the metaphor, they do not account for how the elements themselves are related. Part of this problem stems from Lakoff’s notion of domain, which here is pretty abstract. Lakoff considers different domains to be separate entities, but the internal structure of the domains, and how they relate to each other, is left unspecified. Furthermore, since mappings involve the transference of the structure the source domain to the target domain, it is apparent that Lakoff conceives of domains as bounded entities which contain elements that can be sent from one domain to another. This view, which seems to based on the idea that the elements of a domain are objects which can be transferred between one domain and another, runs counter to the neurocognitive proposal of Lakoff (1995), which says objects don’t exist in our conceptual systems, as well as to Lamb’s neurocognitive model (1998a) which proposes the same thing.

Since in a neurocognitive model metaphors are based on the shared properties of concepts it is not appropriate to characterize them as mappings between domains as Lakoff’s theory maintains - there is nothing being transferred from one domain to another. The source domain and the target domain overlap, i.e. they share componential structure with each other (and with other domains as well) in the same way that dog and cat share structure. This is more like the overlapping domains, or blended domains, found in Turner’s account of metaphor (1996), as represented in figure 3.5.B. However, like Lakoff, Turner does not account for how the blends come about except in the same vague way of attributing metaphoric correspondences to experiential basis and the invariance hypothesis.

Langacker’s approach to metaphor, with its two additional components, a schema that accounts for the commonalities between the source and the target and a hybrid domain which is comprised of the characteristics of the source domain being blended with the
characteristics of the target domain (figure 3.5.C.), seems more compatible with a neurocognitive approach than Lakoff’s and Turner’s method since it takes the similarities that exist between the two domains into account as a structural element of the metaphor. However, it is not a sufficient means of characterizing metaphoric associations within a neurocognitive model because it does not make the role of shared properties between concepts explicit. The schema that relates the two elements of the metaphor captures the fact that the commonalities between the two domains exists, but it does not indicate what those commonalities are that make the metaphor work.

Another possible way to characterize metaphorical associations is by means of an aggregate field model. In such model (image 3.5.D.), domains are seen as irregular fields that circumscribe a set of component properties. Where the source and target domains share properties, they overlap. This overlap is where the metaphoric associations are to be found. This model takes shared properties into account, but it does not show how these properties are connected to one another. In other words, even though the aggregate field model captures the similarities between two domains, it does not show the similarities are connected. As in the above cases, the notion of domain here seems too abstract, and even though shared properties are explicitly shown in the diagram, the aggregate field model fails to account for how those shared properties are connected so that metaphoric associations emerge from them. Since I invented the aggregate field model to try to keep the notion of ‘domain’ in a neurocognitive model, its failure to show metaphorical connections leads me to the conclusion that the idea of domain, at least as used above, is too abstract for a neurocognitive theory of metaphor².

² Ungerer and Schmid (1996) also find the term ‘domain’ as it is used in the cognitive literature to be rather vague. They conclude that what is transferred in a metaphor is the ‘logic’ of a cognitive model - the mapping of the structure of a source model onto a target model. Although I agree with them about the vaugeness of the term ‘domain’, I see them as having the same problem as Lakoff in regards to neurocognitive considerations - there approach to metaphor relies on the tranference of properties from one entity to another rather than on the shared properties of concepts.
Instead of domains, it is better in a neurocognitive framework to say that metaphors involve associations between two different concepts that have overlapping sets of relationships in the network. These sets of network relationships are not static, rather they are dynamic activation patterns. Each time a set of relationships becomes active, it will have a different pattern (in regard to what properties are activated first, which are activated more strongly, which are blocked, etc.), even if just a little different, than it had in previous instances of activation. The active connections within the set of relationships, i.e. the active properties of a concept, change with regard to context. Therefore, these sets of network relationships are not like the unitary domains used in the above approaches. They are not static, bounded sets of related concepts - they are transient patterns of activation in the network integrated by a particular concept node.

Since these activation patterns are comprised of a network of connections that are integrated by a concept node, a concept node can be taken as the core of a set of relationships with the component properties connecting to it forming a periphery, certain areas of which may not be active each time the core node is active. Where two concept nodes share properties of their peripheral network structure in common, the activation patterns of the sets of relationships they integrate have the potential to overlap. For two sets of relationships to actively overlap functionally, the core node and the shared part of the network must both be active. It is when two concept nodes have active overlapping structure that we notice similarities (commonalties) and make comparisons and/or metaphors. Figure 3.6. is a schematic representation of the shared properties of two concepts:
In cases where both concept nodes are activated simultaneously, or nearly simultaneously, by some combination of their separate components and their shared components, whatever the concepts correspond to in our experience will be seen as similar. The shared properties of the two concepts will receive feedback activation from both of the concept nodes and thus will be strongly activated. The heightened activation of the shared properties results in a high degree of saliency for the common properties of the two concepts. This is perceived similarity. An example of perceived similarity would be looking at an apple and an orange, seeing that they are both round, noting that they are roughly of the same size, and knowing that they are both fruit. In these ways, they are similar.

Perceived similarity is important for comparison and analogy, but it seems to me a poor source of metaphor. What would a metaphor such as **AN APPLE IS AN ORANGE**
tell us. What would be its purpose? Without some context in which it would be important (i.e. informative) to use apple to metaphorically refer to orange, there seems to be no reason to do so. In fact, it is hard to even imagine what a plausible context for such a metaphoric association might be. Of course, it is possible to use a simile and say, 'apples are like oranges', and then explain in what manner they are alike. However, this type of metaphor (taking simile as a type of metaphoric expression) would build little to no structure in the network, and what little structure it did build would be of the guided type (see section 3.3.4. above).

Since perceived similarity does not seem to be a good source of metaphor, let's turn our attention to evoked similarity. Whereas perceived similarity (at least in the case presented above) is based on strong activation of two different concepts simultaneously, with activation coming both from shared properties of the two concepts and from the non-shared properties of each, evoked similarity results from one concept node becoming activated via activation spread from the properties it shares with another concept node. However, unless two concepts are quite closely related (i.e. they share a great number of properties in common) it is unlikely that enough activation will be sent from the shared properties to excite the second concept. For the second concept to be activated, and the similarities to be noticed, there has to be activation from some source other than the first concept. This other source of activation is context. For the second concept to become active, and thus be associated with the first (already active) concept, there has to be something in the context (with context here pertaining to linguistic context, spatial context and/or experiential context) which contributes enough additional activation, combined with the activation from the shared properties with the first concept, to satisfy the threshold of the second concept node. In other words, the context evokes the recognition of the similarities.
Evoked similarities, i.e. those that are noticed in a given context, appear to be a good source for metaphoric associations. Consider a situation where an abstract concept is active in one’s network. Let’s say this person is either trying to understand the abstract concept or express his or her understanding to someone else. This abstract concept has many shared properties with other concepts, some of them less abstract, and no doubt activation has spread from the active concept node to other nodes which share some of the same properties (through feedback activation), but there is not enough activation spread for any of those nodes to have their thresholds met. The need to explain/understand the concept keeps it active and thus keeps weak activation going to all the concepts that share its properties, thus ‘priming’ them. When something from the environment the speaker is operating in (i.e. what the speaker knows, what he or she thinks the hearer knows, and what is going on around them) sends enough additional activation to one of those connected concepts (usually a more concrete one), then it too becomes active and then feedback activation from both active concepts heightens the saliency of the similarities (the shared properties) which may have been heretofore unnoticed. This allows the speaker to produce a metaphor in order to help herself/himself or someone else (or both of them) understand the abstract concept. This is a nonce metaphor.

Nonce metaphors are rather difficult things for an investigator to nail down and study. Either they have to be made up on the spot for the purpose of study, or the researcher has to be lucky enough to hear one, record one or happen to remember one that he uttered himself. For my purposes here, I am using data from the last source. A few years ago, shortly after I began to become heavily involved with the cognitive study of metaphor, I commented to some colleagues that “Once you study Lakoff’s theory too much you start to see metaphors hiding behind every bush and tree waiting to leap out and attack you.” By this, I meant two things. One, I meant that I was finding metaphors in places which surprised me, where I would not have looked before, and two, I was trying
to convey the feeling I had that sometimes I was seeing a metaphor only because the theory caused me to expect to see one, much as when I walk through the woods at night I might see shadows as animals because I am wondering if there are any animals out there in the dark who might decide on some whim to leap out and attack me. It is through my reactions to metaphor and wild animals, or imagined reactions to wild animals, that there is a similarity. That is, my reaction to both is similar in this context. The discovery, or imagined discovery, of conceptual metaphors or wild animals causes me apprehension because it is unexpected and I am not sure how they will behave. Furthermore, I am expecting to discover them, so I have a heightened awareness and see them perhaps where they are not because I am apprehensive about discovering them. Of course, I did not think this all through when I created this metaphor. I just needed a way to express my concerns with the effect Lakoff's theory was having on me and my perception of what was and was not a conventional metaphor. The way I was feeling was similar to experiences I had walking in dark, shadowy wooded areas, so those feelings, being properties of both my METAPHOR and WILD ANIMALS concepts, evoked a similarity between those two concepts.

Metaphoric associations that stem from evoked similarities are creative. A connection is built (albeit a relatively weak one at first), via the metaphor, between the two concepts, the abstract concept (the target) and the concept evoked to understand it (the source), based on previously unnoticed shared properties. The connections among those shared properties are also strengthened. Additional instances of the metaphor will serve to further strengthen the connections and perhaps serve as the basis for new associations between the two concepts based on that metaphor. In other words, as the connections are strengthened, a mental model based on the metaphor emerges in the conceptual system, one which allows us to form new ideas about, or a new understanding of, the target subject of the metaphor based on what we know about the source subject.
From the above examples, we see that perceived similarities appear to be a good source for simple comparison between two closely related concepts whereas evoked similarities appear to be a good source for nonce metaphors. Of course, these are just the two poles of a continuum. Apples and oranges are very closely related concepts with a lot of shared properties. Metaphors and wild animals share only a few properties between the two of them - namely my reaction, or imagined reaction, to them - and contextual input is needed to notice these similarities. These two cases represent the extremes: on one end superficial perceived similarity, and on the other, a nonce metaphor constructed by an evoked similarity.

For my current purpose, it is not important to see where any particular metaphoric association falls on the similarity cline. What is important is to realize that, contrary to what the Lakoffian theory of metaphor claims, similarity is important to metaphor. The similarity we perceive is the recognition of the shared properties between two concepts, and it is through shared properties that metaphoric associations between two concepts are constructed in our mental systems. Figure 3.7. is a slight revision of Figure 3.6.

![Diagram showing shared properties between two concepts, SC and TC.]

Figure 3.7. Shared Properties between Source and Target Concepts
C1 and C2 have been relabeled 'SC' for source concept and 'TC' for target concept. If TC is active, all of its properties receive feedback activation. When the properties of TC receive this feedback activation, they spread activation to all of the other nodes to which they are connected, including SC. If SC's threshold is met, it becomes active and sends feedback activation to its properties. Linguistic expressions that are connected to the source concept also then become available for the target concept. It is through these shared properties and feedback activation and spreading activation in the network that metaphoric associations are possible.

To this point, I have concentrated on setting up the background for a neurocognitive theory of metaphor and have not concentrated on one of the most important aspect of the problem at hand, namely the issue of conceptual metaphors. Using the theoretical claims from above - that metaphor is based on similarities between concepts, that it is both a cognitive and a linguistic phenomenon, not just one or the other, and that it is creative - I will now examine a specific case of a conceptual metaphor in English, the LOVE IS A JOURNEY metaphor proposed by Lakoff and Johnson (1980).

3.4.2. Conceptual Metaphor in a Neurocognitive Framework: The Case of the LOVE IS A JOURNEY Metaphor

According to George Lakoff, "The LOVE-AS-JOURNEY metaphor and Reddy's Conduit Metaphor were the two examples that first convinced me that metaphor was not a figure of speech, but a mode of thought" (1993, 8). Since this particular metaphor has been so important in the development of the field, and is generally accepted, it seems appropriate to use it here to examine conceptual metaphor in a neurocognitive framework. In the above discussion of similarity arising through the shared properties of concepts, I was more concerned with the role of similarity in the construction of metaphoric associations than I
was with the actual structure of conceptual metaphors in the network. It is now time to explore this structure.

First, let's look at some linguistic expressions that are presented by Lakoff and Johnson (1980) and Lakoff (1993) as examples of uses of the LOVE IS A JOURNEY metaphor:

<table>
<thead>
<tr>
<th>Table 3.1. Examples of the LOVE IS A JOURNEY Metaphor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Look how far we've come.</td>
</tr>
<tr>
<td>2) We're at a cross roads.</td>
</tr>
<tr>
<td>3) We'll just have to go our separate ways.</td>
</tr>
<tr>
<td>4) We can't turn back now.</td>
</tr>
<tr>
<td>5) I don't think this relationship is going anywhere.</td>
</tr>
<tr>
<td>6) Where are we?</td>
</tr>
<tr>
<td>7) We're stuck.</td>
</tr>
<tr>
<td>8) It's been a long, bumpy ride.</td>
</tr>
<tr>
<td>9) This relationship is a dead-end street.</td>
</tr>
<tr>
<td>10) We've gotten off the track.</td>
</tr>
<tr>
<td>11) We have to bail out of this relationship.</td>
</tr>
<tr>
<td>12) Our marriage is on the rocks.</td>
</tr>
<tr>
<td>13) We're just spinning our wheels.</td>
</tr>
</tbody>
</table>

In all of these examples in Table 3.1., some facet of the domain of LOVE is being expressed by language associated with the domain of JOURNEY. As Lakoff (1993) points out, there seems to be a general principle governing the use of journey related terminology when talking about romantic relationship. These expressions all follow the pattern of associating travel and a romantic relationship metaphorically. In other words, there seems to be an underlying system which governs all of these expressions.

As we have seen above in chapter 2, Lakoff's analysis of this data leads to the positing of a metaphorical mapping LOVE IS A JOURNEY (Figure 2.1) which governs all metaphoric expressions, both idiomatic (i.e. learned) and novel extensions (i.e. creative). Such mappings account for the systematicity of metaphoric expressions. However, as discussed in the above section, such mappings label and describe the metaphoric
associations between two concepts, but they do not explain the nature of the shared properties of the two concepts that are involved in the metaphor, and as the shared properties are the focus of interest from the neurocognitive perspective, it is necessary to develop a different way of explaining conceptual metaphor that does not rely on mappings between domains.

The first thing to do in this regard is to figure out some of the shared properties between LOVE and JOURNEY. What comes immediately to my mind is the fact that both involve people. With LOVE there are lovers and in TRAVEL there are travelers. This is likely the most important similarity, and perhaps the one which evoked the others, but it will not do to posit just this one shared property as the only commonality for the conceptual metaphor. As Lakoff has shown from the abundance of data he has catalogued along with his fellow authors (Lakoff and Johnson 1980; Lakoff and Turner 1989; Lakoff 1993), the systematic relationships that exist between a source and a target are extensive and are not very likely due to just one commonality, even if it is a property as salient as people being actors in both domains. The other shared properties, however, are not as immediately obvious. I think one of the reasons for this is the selection of the concept of LOVE as the target. When using the abstract notion of domain, this is not so much a problem since many different concepts related to the concept of romantic love are included in the domain. However, without the notion of domain, or at least without it as a structural unit, I do not have that luxury here. Rather, I need to look at the examples and elucidate which concept in the domain of LOVE is the important one for the metaphor at hand.

Looking at the examples in Table 3.1., it is clear that they are all focusing on romantic relationships, which of course are closely associated with our concept LOVE (LOVE would likely be a property of the concept ROMANTIC RELATIONSHIP in the relational network). In three of the sentences, the word relationship appears (5,9, and 11) and in another (12) the term marriage, which we know to be a type of romantic
relationship. In the other examples, in all but one (8), the first person nominative pronoun we appears. It seems to me that the focus of this conceptual metaphor is not the abstract domain of love as it is in the Lakoffian account, but rather the focus is on the concept ROMANTIC RELATIONSHIP as the target. The use of the term love is a metonymy, with one property of a romantic relationship being used to designate the whole relationship³.

Once we recognize that ROMANTIC RELATIONSHIP is the target⁴ of the metaphoric association, two additional important shared properties become apparent: both the concept ROMANTIC RELATIONSHIP and the concept JOURNEY have the properties of progression through time and progression through space, as seen in Figure 3.8:

![Diagram of the metaphor A ROMANTIC RELATIONSHIP IS A JOURNEY](image)

Figure 3.8. Diagram of the metaphor A ROMANTIC RELATIONSHIP IS A JOURNEY

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³ I am not claiming that Lakoff would not recognize the use of the term love as a metonymy. As he himself says, the names for mappings, such as LOVE IS A JOURNEY, should only be taken as "...mnemonic for a set of ontological correspondences that characterize a mapping (1993, 5). Rather, I am pointing out that his method of regarding the sources and targets of metaphors as abstract domains is not always sufficient for understanding conceptual metaphors from a neurocognitive perspective.

⁴ Target is a somewhat problematic term once the idea that objects from one domain are transferred or projected onto another domain, but I will retain it for the member of the metaphoric relationship that is profiled by the metaphor for practical reasons since it is the accepted terminology.
Note: The figure utilizes a rough version of Lamb's relational network diagram notation. The larger open circles are concepts not shared by the source and the target (including the source and the target themselves). The smaller circles are the shared properties. The size is just a way of noting that they are the shared properties involved in the metaphor and is not meant to convey any information about their individual properties. The lines between the conceptions indicate connections in the network. It should be recognized that the lines are representative not exhaustive. This is just a small portion of the system. There are a lot of connections that are not explicitly manifest in this diagram.

In the Lakoffian approach to metaphor, this would be a contentious claim since these properties would be categorized as metaphorically structured themselves, both of them being entailments of the LOVE IS A JOURNEY mapping with the temporal progression being further structured by metaphors involving time (TIME IS A LANDSCAPE and TIME IS A MOVING OBJECT (Lakoff and Johnson 1980)). However, in a neurocognitive framework such as Lamb’s, I see no contradiction in proposing that the shared properties that constitute the conceptual metaphor are themselves metaphorically construed. This is because, whether the properties are ‘metaphorical’ or ‘literal’, they all emanate from our experience. The gist of the metaphor is that we know from our experience that people in relationships move through space and time concurrently, and if they do not, it may be because of a problem with the relationship. This knowledge is captured in and modeled by the metaphor ROMANTIC RELATIONSHIPS ARE JOURNEYS, which emerges from our experience, i.e. the metaphor is an emergent property of the network (the relational network being the ‘source’ of experience in Lamb’s model).

We have experience in which relationships stretch on over time, with the participants sharing time together. Whether or not TIME is literally or metaphorically ‘progressive’ is of little importance to understanding that TEMPORAL PROGRESSION is a shared property of JOURNEY and ROMANTIC RELATIONSHIP. The fact that we conceptualize time as progressive is enough to allow TEMPORAL PROGRESSION to be a shared property of ROMANTIC RELATIONSHIP and of JOURNEY and it does not matter that
the nature of that conceptualization is metaphorical, at least as far as understanding the
structure of the metaphor A ROMANTIC RELATIONSHIP IS A JOURNEY is concerned.

The same can be said of SPATIAL PROGRESSION as a property of the concept
ROMANTIC RELATIONSHIP, although it is further complicated on account of spatial
movement as a property of romantic relationships being an entailment of the metaphor as
well as a shared property. It is not contentious that SPATIAL PROGRESSION is a property of
JOURNEY, and in our experience, in this culture, it is quite common for people involved in
romantic relationships to travel together, whether it be for pleasure (a vacation) or necessity
(domicile relocation, business trip). This knowledge is a property of the concept
ROMANTIC RELATIONSHIP. That SPATIAL PROGRESSION is a property of the concept
ROMANTIC RELATIONSHIP is based on the evoked similarity between ROMANTIC
RELATIONSHIP and JOURNEY through the knowledge that people in a relationship take
journeys together. Thus, SPATIAL PROGRESSION is both a shared property of ROMANTIC
RELATIONSHIP and JOURNEY, and it is also an entailment of the conceptual metaphor that
associates the two concepts in our mental system.

The question before us now is “How is it that SPATIAL PROGRESSION can be a
property of ROMANTIC RELATIONSHIP if it is an entailment of the metaphor ROMANTIC
RELATIONSHIPS ARE JOURNEYS?” At least in the case of the temporal aspect of the
metaphor in question, the metaphoric conceptualization of time is the result of a separate
metaphorical structure. The same can not be said for the spatial dimension. For people who
wish to eliminate circularity in theory, there is clearly a problem with the idea that a
property of the metaphoric relationship is also an entailment of that relationship. However,
I think, at least in this case, the problem is illusory. It is only a problem for someone either
proposing that metaphoric mappings are static cognitive entities or ignoring the role of
language in the acquisition of conceptual metaphors, or both. If one acknowledges that
metaphoric associations, as an aspect of our mental system, are dynamic, as Lamb’s model
does, and that much of our mental system is learned not only through direct physical experience but also through linguistic interaction with others as well, it becomes clear that conceptual metaphors emerge out of the relational network over time and from both linguistic and non-linguistic experience.

The problem of static metaphorical mappings is a problem of relativity. By positing static metaphorical mappings, the researcher removes metaphor from the here-and-now and places it in some atemporal zone in which learning is suspended and 'experience' is complete relative to their frame of reference. Intuitively, we know that this is a fiction. People continue to have experiences and learn through time, so there is a serious problem with a strict reading of the position that mappings are static.

I don't believe that the strict reading is what Lakoff intends when he writes that each mapping is "... a fixed pattern of conceptual correspondences across inference patterns" (1995, 9). The problem is, it is not clear that he does not intend a strict interpretation of this. The most important reasons for positing static metaphorical mappings in the Lakoffian system appear to be to account for the observed stability of conventional metaphors and to make it clear that metaphoric mappings are not computational (Lakoff 1993, 1995). In emphasizing that the mappings are not computational, Lakoff is reacting to generative theories in which some hypothetical 'computational time' is needed to compute linguistic expressions (1995). Like Lamb (1998a), he concludes that this idea is cognitively unrealistic and therefore rejects it as a part of his theory. However, in rejecting dynamicity for the sake of not having to propose 'computational time' as part of the model, Lakoff fails to take into account learning and modification of the conceptual system and thus is in opposition to Lamb on this point. He is in the unfortunate position of basing his theory on static metaphorical mappings in adult speakers, a kind of end product of experience, even though I doubt this is really what he believes. Nonetheless, whether he believes it or not, the contention that metaphoric
mappings are static informs the rest of his theory in such a way that, when evaluated from a
neurocognitive perspective with regard to the development of the mappings, it appears to be
essentially a descriptive analysis of the system at one point in time, a hypothetical state of
maturity, at which the system is fixed.

Since the Lakoffian theory focuses on mainly one developmental stage, it misses
the interplay between the entailments of the metaphor and the development of the target
concept of the metaphor. However, this interplay is very important in the relational network
model. Recall that learning is a matter of the recruitment of connections in the relational
network and that a node is an integrating point for all the component properties that
constitute a concept. Such learning takes into account all categorization, all instances of
noticed shared properties, whether metaphorical or not. In fact, as stated above, Lamb
believes that all learning can be viewed as metaphorical since it is all a matter of
categorization based on shared properties. In this way, it does not matter if a property of
a concept is the result of a perception or a metaphorical association - it is still a property of
that concept, not an alien element imposed on that concept. Thus, in the case at issue here,
**SPATIAL PROGRESSION** is a component of **ROMANTIC RELATIONSHIP** as well as an
entailment of the metaphorical association of **ROMANTIC RELATIONSHIP** with **JOURNEY**
because the understanding of what a journey is is instrumental, through metaphor
association, of categorizing what a romantic relationship is. Thus, each experience with an
instantiation of the metaphor A **ROMANTIC RELATIONSHIP IS A JOURNEY**
strengthens the connections from **SPATIAL PROGRESSION to ROMANTIC RELATIONSHIP**
and each activation of the **ROMANTIC RELATIONSHIP** node activates the **SPATIAL
PROGRESSION** node via feedback activation in the network, since **SPATIAL PROGRESSION**
is a component property of the concept **ROMANTIC RELATIONSHIP**.

As stated in the preceding paragraph, each instantiation of a conceptual metaphor
strengthens the metaphorical association between the source and target concepts. The
question that remains is where these connections come from to begin with. The simple answer is that they come from our experience with the pertinent concepts. In the Lakoffian approach to metaphor, they come from physical experience and/or other metaphors. That is, the theory claims that all metaphors are either based on direct physical experience or on other metaphors that are. Language (i.e. linguistic metaphoric expression) is of secondary importance in the Lakoffian theory in general and also seems secondary in the building of metaphorical structure. According to Lakoff, "...metaphor is not just a matter of language, but of thought and reason. The language is secondary. The mapping is primary ..." (1993, 7). He goes on to say that the mappings are conventional and that such mappings are fixed parts of our conceptual systems and "...one of our conventional ways of conceptualizing love relationships". However, aside from saying that conventional metaphors like LOVE IS A JOURNEY are experientially motivated, mainstream conceptual metaphor theory does not address how the metaphors arise or stay conventional. Lakoff and Johnson (1980), Lakoff and Turner (1989), Sweetser (1990); Lakoff (1993) and Grady (1995) all attempt to show what aspects of our experience different metaphors are grounded in, but none of them really takes into account that one of the most important means of transmitting conceptual material, including conceptual metaphor, is via language. As Lamb points out, much of what we know, that is, a large part of our conceptual system, is received from those around us (1998a). The primary way in which this happens is through the use of language. This is not to say through direct instruction, though that is no doubt a source as well, but through the linguistic interaction which is part of everyday life. Thus, within Lamb's model, it makes sense to consider that much of the metaphorically based knowledge we have is also learned by virtue of linguistic behavior.

From the Lakoffian perspective, this position may appear to be a challenge to the claim that metaphor is a cognitive phenomenon, not a linguistic one. However, I do not perceive the position in Lamb's model in regard to linguistic behavior and the acquisition of
conventional metaphor to be a challenge at all to the notion of conceptual metaphor or the hypothesis that metaphor is a major component of our conceptual reality. It only appears to be a challenge because Lakoff and those working in his model have pushed linguistic aspects of metaphor to the background in favor of the cognitive aspect (as a reaction to previous models that treated metaphor as only or mainly an aspect of language), thus separating the two when they are likely not so separable in reality. Lamb's model provides a method for the transference of conventional metaphor based on the most proficient means we have of the transmission of cultural knowledge - language. In no way does it counter the experientialist position of Lakoff and Johnson, it just adds a dimension of experience their theory seems to be lacking. Language is, after all, a facet of our experience.

Returning to the A ROMANTIC RELATIONSHIP IS A JOURNEY metaphor, we can examine what the role of language might have been in the acquisition of this metaphor. The first step in this endeavor is to revisit table 3.1. In the examples listed in the table, the majority of the words in italics (e.g. *spinning our wheels*, *at a cross roads*, *on the rocks*, *off the track*, *bail out*, etc.) are what Lamb's model would call complex lexemes. Some of them, like *on the rocks* and *bail out* for example, might be more idiomatized than others (e.g. *spinning our wheels* and *at a cross roads*) in that their meaning as units is not as easily deducible from their component parts as it is for the less idiomatized expressions, but to some degree all of them are transparent enough for the metaphor to be apparent upon analysis. Lakoff agrees with this assessment of the expressions as idiomatic, but he claims that idiomatic expressions like these are motivated by underlying conceptual metaphors, and that is only by virtue of the conceptual metaphor that their idiomatic interpretation is possible (Lakoff 1993). This position seems to stand in opposition to Lamb since Lamb's theory holds that multi-word lexemes are learned as units that have a direct connection to the concept to which they refer (as well as having connections of
varying strength to the concepts to which the individual elements of the complex expression occur). However, I think the problem here is one of perspective.

The Lakoffian position is based on the need to counter arguments that claim that conventional metaphors are learned as units and are just linguistic expressions. As Lakoff points out, if this were true, in the strict sense, then every metaphoric expression would represent a different conceptual relationship, i.e. a different metaphor.

...'We've hit a dead-end street' would constitute one metaphor... 'We can't turn back now' would constitute another, entirely different metaphor. Their marriage is on the rocks' would involve still a different metaphor. And so on for dozens of examples. [Lakoff 1995, 7]

The systematic relationships described by Lakoff, Johnson, Turner, Sweetser, etc. surely indicate that this is not the case. We don't have dozens of individual metaphors, but rather we have many metaphoric expressions that are linked systematically to the same conceptual structure. However, in the attempt to counter one extreme, the Lakoffian theory slips into the other extreme in this respect. Instead of saying that there is a different metaphor for each individual metaphoric expression, they claim that there are a very few (relatively speaking) conceptual metaphors that structure and generate metaphoric expressions. A neurocognitive approach such as Lamb's does not embrace either extreme, but rather acknowledges that metaphoric expressions and conceptual metaphors both emerge from the structure of the network. (I will return to this issue of the Lakoffian top-down approach to metaphor in chapter 5, but for the moment I will put it aside in favor of examining the neurocognitive approach).

The problem with both the position that metaphor is all in the expressions, that is it is just a figure of speech, and the position that it is all a result of generic metaphors generating specific expressions is that each, by ignoring the other position, only gets part of the whole picture. Let's consider the expression spinning our wheels for a moment. What do we know about this expression? First off, We know that there is a literal meaning
- the wheels\textsuperscript{5} of a car (or similar powered vehicle) are not getting traction and thus the automobile is not moving in the intended direction although expending a great deal of energy in the process. We also know that, as a unit, it means something like 'unable to move forward', or perhaps better, 'unable to progress even though expending tremendous energy'. Further, we know upon a little reflection that this expression can be used to indicate a lack of progress in many different situations (e.g. romantic relationship, friendship, business relationship, career, education, etc.) The question is, how do we know all of this? It does not seem probable that we learned a different meaning for each of the ways that the complex lexeme can be used. In other words, there is not one spinning our wheels that applies to romantic relationships and another that applies to education.

Lakoff's reaction to this is to propose that there is one idiom (or complex lexeme) spinning X's wheels, which is an instantiation of conventional metaphors like LOVE IS A JOURNEY, EDUCATION IS A JOURNEY, LIFE IS A JOURNEY, etc. In this system, the idiom is available to a range of similar metaphors, those whose mappings include the domain of JOURNEY, but there does not seem to be any meaning attributed to the idiom (in the way that Lamb's model links the complex lexeme to a concept in the network) but rather an image of what spinning wheels as a process entails. An independently motivated metaphor (i.e. one not based on the idiom) is needed to map the knowledge that the image associated with the idiom contains of the source domain to the target domain (1995).

Basically, I agree with Lakoff's assessment of the problem save for his qualification that the metaphor is independently motivated. The conceptual metaphor A ROMANTIC RELATIONSHIP IS A JOURNEY certainly involves more knowledge of the source concept, JOURNEY, than is entailed from the idiom. However, that is not the same as claiming that the metaphor is independently motivated. If we take the neurocognitve perspective that metaphor is based on the shared properties of concepts and that concepts

\textsuperscript{5} wheel here is likely a metonymy refering to the wheel and tire together for most people.
are constituted by their properties from the bottom up, we can see that expressions that are learned as units contribute to the motivation of conceptual metaphors through the secondary activation of their individual elements when the complex lexeme is used in a given situation.

Consider the following scenario. A child learns that when people around him or her say *spinning our wheels*, they do not mean literally that wheels are spinning, but rather that something is not going right. In fact, I would suspect that in the early stages, there is no sense of progression in the meaning of the expression. It is likely that only after there is more knowledge in the child's mental system of how vehicles move is the idea of progression, or rather failed progression, incorporated into the meaning that 'something is not right' when people say *spinning our wheels*. At this point, though, the child has likely already heard the expression with the unitary meaning associated with a variety of concepts. In other words, there is already a range of concepts in the child's network to which the complex lexeme has connections, at least in so far as the complex lexeme has been used with those concepts. As knowledge about the componential meaning of the expression increases (i.e. knowledge of how automobiles work) the connections from the individual components of the expression to the concepts they are linked to individually are strongly activated in conjunction with the expression, but the meaning of the expression as a unit is already entrenched in the network, so that the unitary meaning is not over-ridden by the meaning of the elements combined. However, the increased activation to the concepts represented by the individual elements of *spinning our wheels* does not just escape into a vacuum. These activated concepts (e.g. WHEELS, CAR, AUTOMOTIVE TRAVEL, TRAVEL, JOURNEY, etc.) through the use of the complex lexeme with its unit meaning ('making no progress') in conjunction with different concepts (e.g. ROMANTIC RELATIONSHIP, EDUCATION, LIFE, etc.), build connections to those concepts based on
whatever components they might share with them, both through perceived similarities and through similarities evoked by the expression.

Figure 3.9.

Figure 3.9. is a modified version of Figure 3.8. which shows a simplified version of the above scenario in rough network notation. In the figure, the expression *spinning our wheels* is connected to both the concept *MAKING NO PROGRESS* and the concept *AUTOMOTIVE TRAVEL*. This represents the two meanings of the expression, the one unitary meaning of the complex lexeme (the link of the expression only to *MAKING NO PROGRESS*) and the componential meaning of the individual elements of the expression (both links). Through spreading activation, when the expression is used with its meaning as a unit, activation is sent to both concepts. Feedback activation then travels from *AUTOMOTIVE TRAVEL*, which was activated by the spreading activation, to the concept *JOURNEY*. In the case represented in the diagram, since *spinning our wheels* is being used to express something about a romantic relationship, the concept *ROMANTIC RELATIONSHIP*
is already active. Thus, its properties, including those shared with the concept JOURNEY, are active. When JOURNEY receives activation from AUTOMOTIVE TRAVEL, its properties, through spreading activation, become active, including those shared with ROMANTIC RELATIONSHIP. Since the shared properties receive activation from both concepts, they are strengthened and the metaphorical association becomes stronger. The conceptual metaphor A ROMANTIC RELATIONSHIP IS A JOURNEY emerges out of the use of the linguistic expression, spinning our wheels, and the shared properties of the concepts ROMANTIC RELATIONSHIP and JOURNEY. It is not just the result of figurative language and comparison, but neither is it a high level mapping composed without regard to the use of metaphoric expressions. The reality is much more complex.

As should be obvious from even the highly simplified case above, the complexity involved in metaphoric associations, and in categorization in general, is enormous in the relational network. It is not possible to either diagram or verbally describe the complexity from which conceptual metaphors emerge without omitting much of the detail. Therefore, it should be remembered that the above scenario involving the expression spinning our wheels and the metaphor A ROMANTIC RELATIONSHIP IS A JOURNEY is just one part of a greater network that contributed to the emergence of the metaphor, and of other JOURNEY related metaphors that would use the same expressions. For one thing, there would be many complex lexemes that would also be evoking the same similarities between the source and target domains. Similarly, the same expressions would apply to more than one source and target combination, thus connecting different metaphoric relationships to each other.

To further add to the complexity of the situation, the history of the complex lexemes involved in building metaphoric expressions must be considered. An expression like spinning our wheels works to evoke similarity, and thus contribute to the creation of metaphor, because at one time in its history it was a nonce metaphor (although likely one
with multiple points of origins). Over time, it became conventionalized in the culture and this gained unit status. In other words, the expression *spinning our wheels* is a conventionalized figure of speech - a fixed metaphoric expression. It is both the instantiation of conceptual metaphors involving the concept of *JOURNEY* and contributes to the creation of those conceptual metaphors as they emerge from our experience, both physical and linguistic.

3.5. Metaphoric Expressions and Emergent Conceptual Metaphors

From the preceding treatment of the A ROMANTIC RELATIONSHIP IS A JOURNEY metaphor, it is apparent that a neurocognitive theory of metaphor, at least one constructed in regard to Lamb's neurocognitive model of language, has to take both metaphoric expressions and conceptual metaphors into account as essential aspects of metaphor as a cognitive phenomenon. It is not sufficient to base such a theory on just the expression side or just the conceptual side. In fact, the distinction itself becomes problematic in a neurocognitive context. Both of these aspects of metaphor must be accounted for by the theory because, in the relational network model of language, both are involved in structure building in the network and are therefore both 'conceptual' in regard to the construction of our mental systems. Thus, it is consistent with Lamb's network model to propose a theory of metaphor which posits conceptual metaphors as emergent properties of experience via the shared properties of concepts, with metaphoric linguistic expressions being a pertinent part of that experience as well as a source for the heightened awareness of the similarity between the concepts that are the basis for metaphoric associations in the conceptual system.
3.5.1. Metaphor in Language

As discussed above, the trend in the contemporary cognitive study of metaphor is to pay little heed to expression side of metaphor save for using linguistic expressions as data for and examples of conventional conceptual metaphors. However, in terms of understanding how our mental system forms and interprets metaphor, the role of language is of significant importance, for it is largely through linguistic expressions that conventional metaphors are transmitted and nonce metaphors, the potential conceptual metaphors of the future, are formed. However, not all metaphoric expressions are created equal. There are roughly three types of metaphoric expression to account for in the AWG model - nonce metaphoric expressions, fixed metaphoric expressions, and crystallized metaphoric expressions. Nonce metaphoric expressions build structure in the network since they themselves constitute the first instantiation of a creative metaphor. Fixed metaphoric expression build less structure directly through their use, but they are very important for the development of conventional metaphor, and crystallized metaphors build very little metaphoric structure and represent the nearing end of the life-span for a metaphor.

3.5.1.1. Nonce Metaphors

The most immediate thing to notice about nonce metaphoric expressions is that they are the only metaphoric expressions that are creative metaphors in the sense that they build a great deal of new network structure. A metaphor, in the creative sense, is a conceptual relationship that comes about through the interplay of language and evoked similarity based on the shared properties of two concepts. Nonce metaphors use a lexeme, or lexemes, associated with one concept, usually a more concrete concept (the source) to refer to another concept, usually a more abstract one (the target). This is done mainly through evoked similarities between two concepts (although there is no reason there could not be some perceived similarity as well as the evoked in situations of nonce metaphor, just not
enough perceived similarities between the target and the source to activate the source) and thus requires input from context for the similarities to be noticed. Recall the nonce metaphor "Once you study Lakoff's theory too much you start to see metaphors hiding behind every bush and tree waiting to leap out and attack you" I presented in section 3.4.1. In this case, the evoked similarity between the concepts came from my similar reaction to them in a given context.

Both on the production side and on the interpretation side, nonce metaphors build structure in the relational network since they create new associations. The latter is the 'unguided' type of learning discussed above (3.3.4.) and the most creative type of learning according to Lamb (1998a). Such metaphors are reflexes of conceptual structure in the relational network in that they are based on the similarities (shared properties) of two concepts, but they also build new structure through novel associations based on evoked (and perceived) similarities highlighted between two concepts in a given context. Unfortunately, it is hard to discuss the notion of context, and its necessity for the formation and interpretation of nonce metaphors, since it is such a large, amorphous grey area which does not lend itself well to explicit discussion or accurate diagramming. At the present time, all I can say in this regard is that it seems clear to me that activation in the network from the context is needed to highlight the evoked similarities that are essential for a nonce metaphor.

3.5.1.2. Multiple Word Lexemes and Idioms: Fixed Metaphoric Expressions

Unlike nonce metaphors, fixed metaphoric expressions don't normally create much new structure in the network when they are used. These types of expressions, which likely started out as nonce metaphors at a previous point in time, are still metaphoric in the sense that they excite network structure associated with both a source and a target domain when
they are used. Such metaphoric expressions are learned as units comprised of multiple words. Since the expressions have unit status, little to no structure is built in the network with their use. However, fixed metaphoric expressions are not dead metaphors. There is still vitality left in them.

Even though fixed metaphoric expressions, which range from being complex lexemes whose aggregate meaning is almost fully transparent from the meanings of the individual terms (e.g. e.g. spinning X's wheels), given sufficient knowledge of the source concept, to less clear idioms, like on the rocks, are directly connected to the concept (or concepts) to which they refer as a unit, they also weakly activate the source concept involved in the earlier metaphorical creation of the expression. From the weak activation of the source concept(s) and the use of the fixed expression with a 'target' concept, based on properties shared by the two concepts, novel elaborations of the metaphoric sense of the expression can be created. Novel elaborations of metaphoric expressions build some structure, but it is of the less creative, 'guided' type of structure building.

Context does not seem as important for fixed metaphoric expressions as it is for nonce metaphors. Whereas nonce metaphors require a context that evokes the similarities between two concepts in order for a metaphoric interpretation to be valid, the metaphoric interpretation of the fixed expressions is the most common meaning to which the unit is connected and it would take a specific context, i.e. one evoking the literal interpretation of the expression, to get a non-metaphoric interpretation. For example, a fixed metaphoric expression like shed some light on, meaning something like 'facilitating knowing' is likely more often used in the metaphoric sense than the literal, and it would only be in the context where a source of illumination was needed that shed some light on would be interpreted as literally providing illumination.
3.5.1.3. Crystallized and Dead Metaphors

The notion of ‘dead metaphors’ is contentious in cognitive metaphor research, and it is common to use the term only to designate the most lexicalized forms. The reason for this is that, in the contemporary cognitive theories of metaphor, it is common to stress that all metaphors, and indeed all ‘figurative’ speech, is motivated by our experience, usually meaning some kind of physical experience. (Lakoff and Turner 1989; Lakoff 1993; Ungerer and Schmid 1996). While I largely agree with this position, in the neurocognitive framework I am employing here, I must also take into account another source of motivation for the use of linguistic expressions - the learning of them as linguistic units.

Take the expression out in left field for example. For a person who grew up in American culture and is well versed in baseball, the motivation for this idiom seems quite visible. However, it is not necessary to know anything about baseball to understand out in left field as a unit. Two of my colleagues, who are not native English speakers, had no problem understanding what the conventional meaning of out in left field is, even though they have zero to little knowledge of baseball, whereas they both had much greater difficulty understanding a metaphor employed by Lamb (1998a) in his book in which he uses the layout of a baseball diamond, specifically the four bases, to characterize different types of linguistics. Lamb’s metaphor requires at least passing familiarity with the game of baseball and the goals of the game; the expression out in left field does not require that knowledge. Admittedly, this is a rather unscientific study on my part, and it would be good to follow it up with something more rigorous, but it is nonetheless indicative of the problem with motivation. Namely, there seem to be several cases of highly lexicalized expressions in English which used to be metaphoric and have enough of a resonance of their motivation to tease a little life out of an otherwise moribund existence. Out in left field is one of these. For a person who is familiar with the right area of the culture, baseball, there is still an apparent motivation for the idiom. Thus, since the motivation is still visible,
and therefore probably mildly active, I prefer to call such expressions ‘crystallized metaphors’. The shape of the metaphor is still there, and is visible to the observer familiar with the source of the expression, but for the most part the flexibility of it is greatly reduced from that of more vital metaphoric expressions in regard to elaboration.

Another example of a crystallized metaphor is the expression ran out of steam. For someone with a knowledge of steam engines, the source of this expression is obvious. However, in modern American culture, the vast majority of people have no experience with steam engines. The expression survives as an idiom and is passed on to succeeding generations, but its motivation is not in any knowledge about the source domain of a steam engine, but rather in the fact that it is a learned expression that means what the metaphor once did.

There are other cases where even a crystallized motivation is not apparent, and these I will call dead metaphors, or opaque idioms. Examples of opaque idioms to which there seems to be no apparent motivation include off the wall, buy the farm, and the oft cited kick the bucket. Both buy the farm and kick the bucket are wont to incite wild speculation over their origins, but they remain opaque to modern speakers. In addition to opaque idioms, there are also dead metaphors which are no longer even comprised of separate elements but have become fully lexicalized. The Latin borrowing comprehend (‘to grasp with’) and the French borrowing pedigree (‘foot of crane’) are often cited as examples of dead, lexicalized metaphors, but as they are borrowings, they are probably not great examples of this phenomenon for English speakers. A better example is given by Lamb (1998a). As he points out, Modern English understand is a lexicalized form that was likely once metaphorical, but it is so lexicalized now that we can’t even deduce what the metaphor would have been when it was vital.
3.5.1.4. The Metaphor Cline: From Nonce to Dead

The linguistic expression of metaphor can be organized on a cline from nonce metaphors to dead metaphors. At one end of the cline we find the creative aspect of metaphor - nonce metaphors that build structure in the network. At the other end we find the death of metaphor, simple lexemes that were once metaphorical expressions that have become fully lexicalized. Transparent, metaphorical complex lexemes, those whose metaphorical meaning is recoverable from the independent parts of the expression would be more toward the creative end of the cline and idioms whose metaphorically based meaning is not as transparent from the component parts of the expression would be more toward the dead metaphor, non-creative end of the cline. Thus, metaphoric expressions that require more contextual information to be interpreted as metaphorical are more toward the creative pole and those that need less context are more toward the non-creative pole. Those metaphoric expressions that are more toward the middle of the cline should figure prominently in regard to conventional metaphors because the expressions at the center will be relatively entrenched and conventional as well as retain much of the metaphoric associations of the more creative end of the cline, thus making them ideal to be learned as units while still retaining some portion of the metaphorical force they had as nonce metaphors at an earlier time.

3.5.2. Emergent Conceptual Metaphors: Metaphor in the Mental System

In addition to the conceptual structure built in the case of nonce metaphors, there is another aspect of metaphor in the AWG model that is conceptual in nature - emergent conceptual metaphors. To some degree, all metaphors are emergent from the relational network in the same way that information is emergent from the network. There is no one place in the network that we can point to and say 'metaphors are here'. They emerge from the complexity of the connectivity of the network. It is not the case, though, that individual
metaphors emerge in an ad hoc manner from the network - there is a systematicity that emerges as well. Metaphors and metaphoric expressions tend to clump together systematically, with certain types of source concepts tending to coincide with certain types of target concepts. However, conceptual metaphors are probably not coded directly in the network as metaphorical mappings, nor does each conceptual metaphor that emerges from the network have its own node in the network. Rather, they emerge as global properties from the complex adaptive system that is the relational network, and the systematicity they exhibit is a reflex of the structure of the network - namely the shared properties of concepts.

Before going further, it is necessary to make clear what I mean by proposing that conceptual metaphors are emergent global properties of the network, and for that I must explain what I mean by emergent properties in general. In the last decade and a half, a multi-disciplinary field called Complexity Science (or the Science of Complexity) has come into existence. Complexity Science is built around Complexity Theory, which holds that global properties emerge from the interaction of individual components. The emergent global order from the complex interactions of the individual components is not something that would have been predicted from what is known about the component parts independently; it only comes about through their interactions as a system. In turn, the emergent properties feed back into the complex system and influence the 'behavior' of the individual components that produced it. Thus, complexity theory proposes a complex dynamic system in which global properties emerge from the interaction of individual elements and then feed back into the system of individual elements to affect their future interactions (Lewin 1992). Figure 3.10. is a diagram of a schematic representation of such a system.
Figure 3.10. Emergent Properties Diagram (Adapted from Lewin 1992)

The relational network in Lamb's theory is a dynamic, adaptive complex system. It is dynamic and adaptive in that it changes through time as the individual learns about and interacts with the world around her or him. As a system of integrating nodes and connections, its complexity is self-evident. However, as stated earlier, the informational content of the system does not rest in any of the nodes or connections, it is emergent from the complexity connectivity. In this way, Lamb's relational network model is commensurate with complexity theory.

In the same way information is emergent from the relational network, our mental system is also emergent from the complexity of the relational network. Thus, the models we make to understand the world, the schemas we use to interpret reality, the metaphors with which we structure our lives, or whatever it is we wish to call these things emerge from interactions within the relational network and the interface of the network with the world. It is important to remember, however, that the emergence of global properties in complexity theory is not a one-way process. The system is interactive. Therefore, the global properties that emerge from the network feedback into the network. In this way, complexity theory accounts for our ability to make adaptive cognitive models for understanding the world. In the case of my interest here, conceptual metaphors, complexity
theory allows us to account for how conceptual metaphors both arise out of our experience, including our linguistic experience, and structure those selfsame experiences. To understand this, let's look at a specific example of an emergent conceptual metaphor, KNOWING IS SEEING, and work our way through it.

The use of words associated with visual perception to designate intellect is very common in English and represents a strong conceptual metaphor which we can call INTELLECTION IS VISION or KNOWING IS SEEING, or something like that (cf. Lakoff and Johnson 1980 UNDERSTANDING IS SEEING). According to Sweetser, "in modern English, much of the detailed vocabulary of our visual domain can be used to structure the description of our intellectual process" (1990, 40). Examples of this metaphor appear in table 3.2. below (from Sweetser 1990):

<table>
<thead>
<tr>
<th>3.2. Examples for INTELLECTION IS VISION metaphor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) (crystal)- clear</td>
</tr>
<tr>
<td>2) opaque</td>
</tr>
<tr>
<td>3) transparent</td>
</tr>
<tr>
<td>4) muddy</td>
</tr>
<tr>
<td>5) bright</td>
</tr>
<tr>
<td>6) brilliant</td>
</tr>
<tr>
<td>7) illuminate</td>
</tr>
<tr>
<td>8) shed light on</td>
</tr>
</tbody>
</table>

In all the examples in table 3.2., except for 8, there is only one word that constitutes the metaphoric expression. This is different than the case of the LOVE IS A JOURNEY metaphor we looked at earlier, in which most of the examples of metaphoric expression were comprised of multiple words. Whereas LOVE IS A JOURNEY has several fixed metaphoric expressions that facilitated the development of the conceptual metaphor, the INTELLECTION IS VISION metaphor does not seem to have a large inventory of set metaphoric expressions to apply to the metaphoric relationship, at least not in comparison
to LOVE IS A JOURNEY. Rather, the metaphoric expression is often in the use of the vision term itself in a specific context with an intellection context. This makes INTELLECIION IS VISION a good example for understanding emergent conceptual metaphors since the metaphor is not as apparent on the surface as one like LOVE IS A JOURNEY.

Unlike the ROMANTIC RELATIONSHIP IS A JOURNEY metaphor in section 3.4.2., the shared properties of visual perception and intellection are not that obvious. The main link sight has to knowing is that, as primates, we are a visually oriented species and it is through our sight that we learn most of what we know about the world (Fleagle 1988). As Sweetser notes, "[vision] is our primary source of objective data about the world" (1990, 39). In this way, seeing is literally knowing. In terms of intellectual knowledge, though, seeing is not literally knowing. However, since a great deal of our knowledge does come through vision, the proximity principle predicts that other types of knowledge, or rather, the nodes that integrate other types of knowledge, should be near the nodes that integrate visual knowledge. Furthermore, since most of the experience we have for knowing things is visually based, our models for knowing things will be visually biased.

Add our visual bias for knowing to the fact that we have heard visual terms used to refer to intellection for most of our life, it becomes apparent where the metaphor INTELLECIION IS VISION comes from. It emerges from our biological and intellectual experience through linguistic experience. As we hear others around us refer to non-visual knowledge in terms of vision, we learn that as one possible meaning of these terms. If we just learned one visual term which also meant intellection, it would likely not motivate a conventional metaphor. However, there are many terms that are used in both of these respects, to know and to see. This shows that there is a systematicity to the use of vision terms to talk about knowledge. This systematicity emerges from the use of linguistic terminology associated with vision to express knowledge in conjunction with our biological
and experiential bias toward vision as the primary source of knowledge in our world. In turn, the emergent systematicity further strengthens the importance of vision for knowing and allows for future creative elaborations to emerge from the system. Thus, we see it is through the interplay of our biology (i.e. our visual orientation), our experience, and our linguistic system that the metaphor INTELLECTION IS VISION emerges.

3.6. Conclusion

As discussed in chapter two, to account for the systematicity found in metaphoric expressions, Lakoff and Johnson posit the existence of conceptual metaphors which structure aspects of the conceptual system. Generic conceptual metaphors on the highest level motivate more specific conceptual metaphors which in turn motivate linguistic expressions. In this model, the systematicity is top down. The higher levels generate the lower levels. This is the accepted way of understanding conceptual metaphor.

In the AWG model of metaphor I am proposing here, the systematicity is not just a result of higher levels generating lower, more specific levels, but rather a general metaphorical patterns emerging from the shared properties of concepts in the network and linguistic behavior, and then feeding back into the network as metaphorical models. The systematicity evident in metaphoric expressions arises as a consequence of a more general property of the relational network - the building of new structure, or elaboration of existing structure, based on connections that are already active in the network.

Metaphor can be seen as having three different aspects in the AWG based theory of metaphor. The first aspect is the creative aspect, which involves the creation of a nonce metaphor. Nonce metaphors are expressed linguistically but are reflexes of the conceptual system, i.e. they are created based on the shared properties of two concepts in a given context. Context is very important for creative metaphors as it is through context that the metaphoric associations are evoked. The second aspect of metaphor in the AWG model is
the historic aspect. Fixed metaphoric expressions are learned, entrenched expressions that were historically metaphors, and have some degree of metaphoric force, but whose use is not creative. Over time, metaphoric expressions become lexicalized and lose their metaphoric force. Context is of decreasing importance for the interpretation of a metaphoric expression as it becomes more lexicalized. The third aspect is the emergent/systematic aspect. Emergent metaphors are the more general systems of metaphoric association - conventional conceptual metaphors - which emerge from the network structure and linguistic behavior and then feed back into the network structure as a means of organizing our mental systems.
4.1. Metaphors in the Brain: Predictions of the AWG Theory of Language Concerning Brain Function and Neuro-anatomy as They Relate to Metaphor

Since the theory of metaphor proposed in Chapter 3, the emergent metaphor theory, is based in a neurocognitive framework, it should allow one to predict what parts of the brain are important for the production and interpretation of metaphor. And, to a somewhat limited extent, the theory, in conjunction with Lamb's AWG model of language, does predict roughly where metaphoric associations may take place in the human brain. Most importantly, it predicts that metaphoric processing likely takes place in posterior association areas of the cerebral cortex, at least as far as metaphors involving object categories are concerned.

As shown above, the notion of shared properties is essential to a theory of metaphor in the AWG model. Thus, it is reasonable to predict that areas of the cortex used for association of information from different modalities would be utilized since the shared properties of the concepts involved in the metaphor would come from different modalities. Based on the proximity principle, a posterior location would be most likely for metaphors based on object categories since the posterior areas of the cortex primarily deal with input from the sense modalities whereas the anterior areas deal with output (Lamb 1998a). It is harder to suggest what areas of the brain might be used for metaphoric associations between processes, since they involve input and output, so I will here focus on metaphoric associations of object categories. In summary, the theory predicts that the area(s) of the brain used in metaphoric associations of object categories would be in a posterior heteromodal association area. This prediction is supported by Deacon:

Producing a metaphoric association requires selecting words with common semantic features... [t]his is why there may be a posterior cortical bias to metaphoric operations... Associations cued by attention to common
perceptual features are analogous to perceptual recognition processes and so should recruit the function of corresponding posterior cortical regions. [1997: 306].

Although the theory predicts that metaphors would be handled by posterior regions of the cortex, it does not indicate which hemisphere would be used in processing metaphoric associations. In other words, lateralization does not seem to follow from the implications of a theory of metaphor in the AWG model as presented so far. However, it is well documented that the right hemisphere is important to contextual inferences and interpretations (Cytowic 1996; Gardner et al. 1983; Wapner et al. 1982; Paradis 1997) as well as aesthetic appreciation (Cytowic 1996; Winner and Gardner 1977). Since metaphors rely on contextual information and make associations between different concepts, especially in the case of nonce metaphors, it is reasonable to hypothesize within the AWG model that the right hemisphere may be used in metaphoric associations.

4.1.1. Language and the Left Hemisphere

The left cerebral hemisphere is the home of language, or at least the language areas in the brain, for most people. Broca demonstrated in 1865 that aphasia is associated with the left hemisphere, and Wernicke demonstrated that there were different areas in the left hemisphere that carried out different language functions. Over the years of neurophysiological research and clinical research of aphasia, the dominant role of the left hemisphere for language, at least in most people, has been solidly established (Benson and Ardila 1996). Recent work in Lamb’s AWG model indicates that lexical categories are also likely in the left hemisphere for most individuals (Rohde 1997b).

4.1.2. Language and the Right Hemisphere

While the left hemisphere’s dominance in regard to language in humans has been long documented, there is still some debate concerning the role of the right hemisphere in
producing and understanding language as well as what exactly the functions of the right hemisphere are. There seems to be general acceptance that the right hemisphere is involved in visuospatial perception (Ardila and Ostrosky-Solis 1984; Cytowic 1996; Perecman 1983) and there is evidence that prosody is at least in part a function of the right hemisphere (Blumstein and Cooper 1974). More important for the purpose of this paper, there is a good deal of evidence that the right hemisphere is heavily involved in inferences, interpreting context, figurative language, connotative meaning, indirect speech, (Cytowic 1997, Gardner et al. 1983; Paradis 1997), understanding narrative structure (Brownell et al. 1990; Gardner et al. 1983) and the ability to understand complex linguistic material (Wapner et al. 1981).

Metaphors, as viewed in the AWG model outlined above, are associative and dependent on the appropriate comprehension of context. They depend upon the same activities and processes listed above which involve the right hemisphere. Thus, from looking at the type of processes in which the right hemisphere seems to be involved, it is plausible that the right hemisphere is involved in metaphoric associations. Although the AWG theory of metaphor theory as described above does not directly indicate whether metaphor should be located in one hemisphere over the other, after reviewing what it is that the right hemisphere seems to be responsible for, there is good reason for thinking that the right hemisphere likely plays a large role in processing metaphors.

Since the types of activity and processes associated with the right hemisphere are implicated in the processing of metaphors in the AWG model, it is reasonable to make some predictions based on the AWG model of metaphor in regard to the involvement of the right hemisphere in the processing of metaphors. First, the cline from nonce metaphor to idiom should ‘stretch across’ the hemispheres. That is, all metaphoric expressions except for completely opaque idioms would be mediated through the right hemisphere in regard to context, although not to the same extent. Nonce metaphors, which are highly dependent on
context if they are to be understood, would likely involve the right hemisphere more. Second, patients with right hemisphere damage (RHD) should have more problems with nonce metaphors than with more conventionalized metaphors. Dead, lexicalized metaphors should be mainly represented as lexical concepts, likely in the left hemisphere, and RHD patients should not have as much difficulty with them as with metaphors that are not lexicalized. Third, patients who have undergone commissurotomy should have difficulties with metaphors.

In order to determine if these predictions are valid, it is necessary to look at the studies done on the linguistic abilities of RHD patients. There has been a fair amount of work done in the past twenty years on trying to determine what linguistic abilities the right hemisphere might have. Several of these deal with metaphors, metaphoric associations, or similar uses of figurative language. Below I will briefly present a few of these studies, evaluate their conclusions and then discuss how they affect the above predictions from the AWG model of metaphor.

4.2. Some Relevant Studies of Patients with RHD

All of the studies below involved the testing of RHD and LHD patients to determine what role, if any, the right hemisphere might have in language production and comprehension. Two of the studies involved picture identification tasks where the subjects were asked to pick the appropriate picture given a certain linguistic expression. One of the studies required a semantic judgment. The subjects were asked to say which two words of a three word set were more closely related. The last two studies involved priming and reaction time testing.
4.2.1. Winner and Gardner (1977)

One of the earliest studies done involving metaphors and RHD patients is Winner and Gardner's 1977 paper, *The Comprehension of Metaphors in Brain-Damaged Patients*. Winner and Gardner introduce their paper by citing the well known dominance of the left hemisphere in language production and understanding but point out that most of the studies involving language localization in the brain deal with literal, denotative aspects of language. They go on to state that studies prior to theirs did not serve to establish whether or not the left hemisphere dominance for language extends to more figurative uses.

Predating Lakoff and Johnson (1980) by three years, Winner and Gardner in this paper present as a given one of the major tenets of Lakoffian metaphor theory, namely the common occurrence of metaphor in everyday speech. They write, "[t]he ability to transcend literal meaning proves essential in normal language uses" and that "...metaphoric expressions... constitute a common part of our language" (Winner and Gardner 1977, 717). They further point out that the appreciation of figurative expressions "...involves a number of discrete cognitive operations, such as the ability to go beyond the literal and to perceive the similarity between alien domains" (Winner and Gardner 1977, 717). Based on this assertion, they hypothesize that the examination of "metaphoric operations" as performed by brain damaged individuals might indicate how and where in the brain such figurative aspects of language is normally processed.

The goal of their study is to determine whether metaphoric appreciation is more aesthetic, and thus located in the right hemisphere, or whether it is more linguistic and is located in the left hemisphere. To test this, they developed an experiment in which they asked 74 right handed subjects, of which 35 were aphasic and had left hemisphere lesions, 22 had lesions confined to the right hemisphere, and 7 had pre-senile dementia, to identify
which picture of a set of four corresponded to a metaphoric sentence.\textsuperscript{1} A second task, a verbal explication task in which the subjects were instructed to describe the meaning of the metaphor, was also part of the experiment. Of the 22 patients with RHD, no information is given as to the specific location of the lesion. General location is given for the aphasic patients (13 with posterior lesions, 14 with anterior lesions) but the data is not considered significant for the results of the study. In addition to the 74 patients with brain damage, 10 normal control subjects also participated in the test.

Briefly, Winner and Gardner found that patients with left hemisphere damage, regardless of the location of the lesion, were competent in matching the metaphoric expression with the appropriate visual representation whereas patients with right hemisphere damage chose literal interpretations as often as metaphoric in the picture selection task. However, they found a double dissociation between right hemisphere damaged patients and left hemisphere damaged patients in that the patients with left hemisphere lesions performed significantly worse than the control subjects on the verbal explication task whereas patients with right hemisphere damage performed as well as the controls on the verbal explication task. The patients with pre-senile dementia performed poorly in comparison to the controls on both tasks. From these results, they conclude that both the right and left hemispheres are involved in metaphoric interpretation and that the results of their study challenge “...both the ‘linguistic’ and the ‘aesthetic’ characterizations of cerebral lateralization” (Winner and Gardner 1977, 727). In other words, both hemispheres, in their opinion, contribute to metaphoric competence and to “linguistic and aesthetic sensitivity.”

\textsuperscript{1} In the study, Winner and Gardner used two different types of metaphoric sentences, one set with \textit{psychological-physical} metaphors in which a physical adjective described a psychological state, and \textit{cross-sensory} metaphors in which an adjective drawn from one sensory modality modified an element for a different sensory domain. However, they found no difference between these two categories and thus deemed there to be no significance in these categories as far as the experiment was concerned.
Based on the AWG model of language, there is another interpretation of their data that does not support the more global attitude toward localization they adopt in their conclusion. Essentially, their argument in favor of a more global view of neural organization hinges on the ‘surprising’ double dissociation found in regards to competence on verbal explication task vs. the picture identification task relative to which hemisphere the lesion was in. Because patients with RHD performed well on the verbal explication task but not well on the picture identification, and LHD patients performed inversely, they conclude that RHD patients have some sensitivity to metaphor and LHD patients have some insensitivity. Also, to a lesser extent, they take the poor performance of the pre-senile dementia patients on both tasks to be evidence for a more global organization of the brain.

However, it is significant that RHD patients and LHD patients had the particular difficulties they did. RHD patients had difficulty choosing the appropriate picture depicting a metaphoric expression. To do this task they would need to rely on contextual information and the ability to make associations between ‘alien domains’, to use Winner and Gardner’s term. On the verbal explication, however, RHD patients would not be presented with a choice of contexts, but rather given a context in the form of the metaphor that was to be explained. Since the context was supplied, they had no difficulty selecting the appropriate one (as it was given) and thus had no problem explaining the metaphor. This agrees with the assertion of Gardner et al. (1983) that RHD patients do not have a problem with “routines for inference” but rather a problem with invoking these routines appropriately. When asked to identify which picture represented a verbal expression, they had problems with making the appropriate inferences but when given only one context in the picture explication task, they had no problem making inferences on that particular context.

Conversely, LHD patients had few problems with the picture identification task because they were able to choose the appropriate context. They had problems on the verbal explication of the metaphors not because of a problem with sensitivity to metaphor, but
because they are aphasics. Their problems on the task were likely verbal, not explanatory. The pre-senile dementia patients had problems with both because they likely had compromised functioning in both hemispheres.

This interpretation of the data supports the theory of metaphor proposed above. RHD patients had difficulty making metaphoric associations in the picture identification task due to an inability to determine the appropriate context and make inferences based on that context. They had no problems with the verbal explication task because there was no need to make a choice of contexts since it was given by the particular metaphor they had to explain. Thus, they had no problems in ‘choosing’ the right context. LHD patients have inverse difficulties because they have problems with verbal tasks, being aphasic, but no problems choosing the appropriate context for making inferences. Metaphoric sensitivity, in regard to interpretation and inferences drawn from context, is mediated through the right hemisphere. In other words, the right hemisphere is necessary for recognizing the right context for interpreting a metaphoric expression, as is predicted by the model of metaphor given above.

4.2.2. Brownell et al. (1989)

Like Winner and Gardner, Brownell et al. (1989) are interested in the role of the right hemisphere in the appreciation of metaphor. However, their study is not done based on metaphoric expressions as is Winner and Gardner’s, but rather on single words and concepts. Their main focus is the role of each hemisphere in regard to lexical-semantics, particularly in the domain of the appreciation of metaphoric meanings of polysemous adjectives. As they point out, “[m]ost neuropsychological work on metaphor appreciation has focused on familiar phrases that can be interpreted either literally or figuratively...” (Brownell et al. 1989, 375) and in such studies RHD patients generally “...seem drawn to the literal meaning of stimuli and fail to appreciate the alternative, metaphoric
interpretations" (Brownell et al. 1989, 376). In other words, in general, RHD patients
draw literal interpretations on semantic judgment tasks and don’t appreciate secondary
meanings. However, as Brownell et al. indicate, most of the data to support this hypothesis
comes from studies that use complex, familiar expressions. Brownell et al. want to know if
it holds true at the single word level.

Their test involves 16 metaphoric adjective triads and 16 polysemous noun (non-
metaphoric) triads. Each triad consists of a target with at least two meanings, a synonym of
the target’s secondary, less frequent meaning and a foil related to the target’s primary,
more frequent meaning. See figure 4.1. for a list of the triads used in the study. The
subjects were instructed to pick the two words most similar in meaning.
### APPENDIX: STIMULUS TRIADS

<table>
<thead>
<tr>
<th>Target</th>
<th>Perfetti et al. frequency</th>
<th>Pilot frequency</th>
<th>Pilot relatedness</th>
<th>Synonym</th>
<th>Foil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep</td>
<td>1.2</td>
<td>4.2</td>
<td>Wise</td>
<td>Lake</td>
<td></td>
</tr>
<tr>
<td>Shallow</td>
<td>1.0</td>
<td>3.8</td>
<td>Foolish</td>
<td>Puddle</td>
<td></td>
</tr>
<tr>
<td>Straight</td>
<td>3.1</td>
<td>4.4</td>
<td>Honest</td>
<td>Ruler</td>
<td></td>
</tr>
<tr>
<td>Crooked</td>
<td>1.0</td>
<td>4.2</td>
<td>Deceitful</td>
<td>Path</td>
<td></td>
</tr>
<tr>
<td>Bright</td>
<td>0.1</td>
<td>5.1</td>
<td>Smart</td>
<td>Light</td>
<td></td>
</tr>
<tr>
<td>Dull</td>
<td>1.7</td>
<td>3.2</td>
<td>Stupid</td>
<td>Butter knife</td>
<td></td>
</tr>
<tr>
<td>Quick</td>
<td>1.7</td>
<td>3.4</td>
<td>Smart</td>
<td>Horse</td>
<td></td>
</tr>
<tr>
<td>Slow</td>
<td>1.7</td>
<td>3.5</td>
<td>Stupid</td>
<td>Barge</td>
<td></td>
</tr>
<tr>
<td>Warm</td>
<td>2.1</td>
<td>4.9</td>
<td>Loving</td>
<td>Summer</td>
<td></td>
</tr>
<tr>
<td>Cold</td>
<td>1.2</td>
<td>4.3</td>
<td>Hateful</td>
<td>Winter</td>
<td></td>
</tr>
<tr>
<td>Up</td>
<td>2.0</td>
<td>4.9</td>
<td>Happy</td>
<td>Arrow</td>
<td></td>
</tr>
<tr>
<td>Down</td>
<td>1.8</td>
<td>5.7</td>
<td>Sad</td>
<td>Elevator</td>
<td></td>
</tr>
<tr>
<td>Sweet</td>
<td>0.8</td>
<td>4.4</td>
<td>Nice</td>
<td>Candy</td>
<td></td>
</tr>
<tr>
<td>Sour</td>
<td>2.2</td>
<td>4.1</td>
<td>Mean</td>
<td>Lemon</td>
<td></td>
</tr>
<tr>
<td>Warm</td>
<td>1.8</td>
<td>4.9</td>
<td>Affectionate</td>
<td>Blanket</td>
<td></td>
</tr>
<tr>
<td>Cool</td>
<td>2.4</td>
<td>4.9</td>
<td>Unfriendly</td>
<td>Breeze</td>
<td></td>
</tr>
</tbody>
</table>

Non-metaphoric nouns:

<table>
<thead>
<tr>
<th>Target</th>
<th>Pilot frequency</th>
<th>Pilot relatedness</th>
<th>Synonym</th>
<th>Foil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suit</td>
<td>9</td>
<td>7.0</td>
<td>Trial</td>
<td>Tailor</td>
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<tr>
<td>Decel</td>
<td>46</td>
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<td>Act</td>
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<td>4.1</td>
<td>Explanation</td>
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<td>29</td>
<td>6.2</td>
<td>Carriage</td>
<td>Athletes</td>
</tr>
<tr>
<td>Beard</td>
<td>9</td>
<td>6.7</td>
<td>Committee</td>
<td>Sandpaper</td>
</tr>
<tr>
<td>Volume</td>
<td>34</td>
<td>6.5</td>
<td>Book</td>
<td>Stereo</td>
</tr>
<tr>
<td>Kid</td>
<td>36</td>
<td>5.6</td>
<td>Goat</td>
<td>Schoolhouse</td>
</tr>
<tr>
<td>Tip</td>
<td>42</td>
<td>5.2</td>
<td>Edge</td>
<td>Waitress</td>
</tr>
<tr>
<td>Pupil</td>
<td>39</td>
<td>6.9</td>
<td>Student</td>
<td>Eye</td>
</tr>
<tr>
<td>Pen</td>
<td>12</td>
<td>7.0</td>
<td>Cage</td>
<td>Eraser</td>
</tr>
<tr>
<td>Page</td>
<td>45</td>
<td>6.8</td>
<td>Attendant</td>
<td>Typewriter</td>
</tr>
<tr>
<td>Arms</td>
<td>28</td>
<td>6.8</td>
<td>Weapons</td>
<td>Sleeves</td>
</tr>
<tr>
<td>Club</td>
<td>45</td>
<td>6.9</td>
<td>Instrument</td>
<td>Caveman</td>
</tr>
<tr>
<td>cabinet</td>
<td>21</td>
<td>6.7</td>
<td>Advisor</td>
<td>Dishes</td>
</tr>
<tr>
<td>Letter</td>
<td>8</td>
<td>6.0</td>
<td>Symbol</td>
<td>Signature</td>
</tr>
<tr>
<td>Case</td>
<td>44</td>
<td>6.8</td>
<td>Container</td>
<td>Lawyer</td>
</tr>
</tbody>
</table>

Figure 4.1. List of Stimulus Triads from Brownell et al. (1989)

The subjects for this study consisted of 34 patients who had unilateral damage as the result of strokes. There were 14 RHD patients, two who had anterior lesions, four who had posterior lesions, and the rest having mixed lesions. Of the nineteen LHD patients, all diagnosed aphasics, six had anterior damage, eight had posterior damage, and the rest had mixed damage. While this study is unusual for including localization information for RHD
patients, the location of the lesion in RHD individuals was not significant in the results of the study.

The study found that both LHD and RHD patients fared worse on the task than the control group (10 individuals) and that RHD patients have "...a general deficit in the appreciation of alternative meanings" (Brownell et al. 1989, 378). LHD patients performed better on the adjective triads which were metaphoric. RHD patients had significant problems with the metaphoric adjective triads and both groups performed poorly on the non-metaphoric noun triads.

From these results, the authors conclude that both hemispheres are involved in normal lexical-semantic processing, but that patients with right hemisphere damage have a more general impairment in interpretation of discourse/narrative which contributes to the poorer performance of RHD patients on the metaphoric adjective triads. The first conclusion they base on the difficulties both groups had with the noun triads. Since both RHD and LHD patients have difficulty with the non-metaphoric noun triads, they propose that both hemispheres are involved in lexical-semantics. The second conclusion, that the RHD patients have a more general deficit in interpretation of discourse/narratives, stems from the poor performance of RHD patients on both the metaphoric and the non-metaphoric task (Brownell et al. 1989).

This interpretation of the data, for the most part, agrees in general with the model of metaphor presented in this paper, albeit not in the same words. Where the authors see a general deficit with respect to discourse/narrative structure in the RHD patients, the model presented by this paper would interpret the data from the study as supporting the right hemisphere's role in choosing the appropriate context. RHD patients had difficulties choosing the synonym as opposed to the foil because they had problems determining the appropriate context for the given triad. This difficulty would exist in both the metaphoric adjective triads and the non-metaphoric noun triads since the appropriate context is
necessary in both cases for picking the synonym over the foil. Interestingly, the RHD patients did perform better on the non-metaphoric noun triads than the LHD subjects, but both groups performed quite a bit worse than the controls. As for LHD patients in this study, their difficulty with the noun triads is likely the result of their aphasia and problems with lexical access. The combination of the poor performance of the LHD patients on the noun triads and the relatively better performance of RHD patients on the same task leads to a tentative proposition that the left hemisphere is more involved in lexical-semantics than the right since the nouns triads did not require as much right hemisphere mediation (i.e. contextual interpretation) as the metaphoric adjectives, and the correct choice was then more dependent on the lexical-semantics of the specific nouns. The greater difficulty of RHD patients on this task seems likely be due to a greater role of the left hemisphere in lexical-semantics at the word level.

4.2.3. **Van Lancker and Kempler (1987)**

Van Lancker and Kempler, unlike the authors of the previous two studies mentioned, are not interested in metaphor directly. Rather, their study focuses on the problem of familiar phrases, or “automatic speech,” the retention of such automatic speech in aphasic patients, and the comprehension of these familiar phrases by LHD but not RHD patients. According to the authors, “automatic speech”, consisting of overlearnt, familiar phrases, is present in fluent aphasia, conduction aphasia, and non-fluent aphasia. They conclude that familiar phrases behave like single words formally but not semantically. Compared to novel phrases, which they claim are mainly referential and involve syntactic analysis, familiar phrases require inferential reasoning (Van Lancker and Kempler). According to the authors, “...familiar phrases do not have grammatical structure in the sense that novel expressions do... they are processed as unitary single elements... applying
standard grammatical process to a familiar phrase...will result in a wrong interpretation" (Van Lancker and Kempler 1987, 268).

To study the roles of the hemispheres in understanding novel vs. familiar phrases, Van Lancker and Kempler devised a picture identification experiment in which the subjects must pick the most appropriate picture that represents a spoken phrase from a group of four line drawings. The subjects, 39 in total, 28 with LHD (all aphasia types represented) and 11 with RHD (location of lesion not indicated), were given ten single words, 20 familiar phrases, and ten novel sentences and told to pick the most appropriate drawing from four choices. As an example, the four drawings for the familiar expression "He's turning over a new leaf." are depicted in figure 4.2.

Figure 4.2. (from Van Lancker and Kempler 1987)
The results of the study indicate that RHD patients have more difficulty with comprehending the familiar phrases than the novel utterances whereas the LHD patients have more difficulty comprehending novel utterance but no problems with the familiar phrases. Van Lancker and Kempler conclude from this that LHD patients can use and comprehend familiar phrases because they require no syntactic analysis and behave formally like single words. LHD patients have problems with novel utterances because they need to be analyzed syntactically. Conversely, RHD patients have no problems with novel utterances since they are able to comprehend them syntactically but have difficulties with the familiar phrases because the familiar phrases require inferential reasoning and the appreciation of an overall pattern. The authors' ultimate conclusion is that left hemisphere is important for syntactic processing and the right hemisphere is important for inferential processing.

In the bare essentials, this conclusion fits the model of metaphor presented above in this paper. The idea that familiar phrases behave like single words formally corresponds to complex lexemes in the AWG model. The problem of LHD patients with the novel utterances used in the study also correlates with problems the AWG model of language would predict for patients with left hemisphere lesions. However, there are problems in Van Lancker and Kempler's interpretation of the data despite the fact they are quite right in many ways. Specifically, their conclusions are too general. They do not take into account context and metaphor in their interpretation of the data.

Van Lancker and Kempler state that most of the familiar phrases they use are common idioms, such as "She has him eating out of her hand," "He is living high on the hog", "He's turning over a new leaf" (Van Lancker and Kempler 1987, 269, 272). The example they give of a novel utterance used in the test, "When the happy girl pushes, the angry boy swings" (Van Lancker and Kempler 1987, 269), is not metaphoric at all and
would require little contextual interpretation to pick the appropriate drawing. The idiomatic/metaphorical familiar phrases on the other hand would require choosing the appropriate context to respond correctly. Thus, while it is true that the RHD patients had problems with the inferences regarding the familiar phrases, it was due not to a rather vague problem of appreciating an overall pattern, or an inability to reason inferentially, but to a problem choosing the appropriate context. The problem with the RHD patients in the study was a problem of metaphoric interpretation, not a problem necessarily with familiar phrases.

I would predict that if a metaphoric novel utterance had been given in the test, the RHD patients would have problems with it. Conversely, if a familiar phrase (complex lexeme) of a non-metaphoric nature had been included in the test, the LHD patients would have problems. Thus, contrary to the conclusion of Van Lancker and Kempler, when viewed from the perspective of the model presented earlier in this paper, the data can be interpreted as showing not that LHD patients have problem with novel utterances and RHD patients with familiar phrases, but rather that RHD patients have difficulties with choosing appropriate contexts for metaphorical/inferential interpretations and LHD patients have more problems with non-metaphoric utterances whether they be novel or familiar.

4.2.4. Tompkins (1990) and Tompkins et al. (1992)

In the three studies presented above, the conclusions of the authors, although not completely the same as those of this essay, are all fairly close to the position presented herein that metaphoric interpretation is mediated through the right hemisphere and dependent on the ability to choose an appropriate context in which to draw inferences. The two articles that will be briefly summarized below do not agree with the above general position. Tompkins (1990), "Knowledge and Strategies for Processing Lexical Metaphor after Right or Left Hemisphere Damage", and Tompkins et al. (1992), "The Access and
Processing of Familiar Idioms by Brain-Damaged and Normally Aging Adults, take a different approach to the problem.

Both articles involve timing tests in which RHD patients and LHD patients were asked to perform an auditory lexical decision task. Both articles use very similar tests and reach very similar conclusions so they will be combined here. One of the major features of both articles is the position that there is a difference between “automatic spreading activation” and “effortful processing” Tompkins writes that there is

...a continuum of effort involved in information processing. At one end is a rapid spreading excitation process that occurs like a reflex in the brain, activating conceptual knowledge without the perceiver’s intention.... At the other end of the continuum is a slower mechanism that allocates limited attentional resources for performing further input processing (1990, 307).

In brief, the conclusion that results from both articles is that there is a difference between effortful processing and the automatic processing in regard to lexical metaphors and familiar idioms. Generally speaking, according to Tompkins (1990) and Tompkins et al. (1992) all brain damaged patients have problems with effortful processing, due to reduced attentional resources. RHD and LHD patients have different areas of reduced resources which seem to indicate that there are different problems associated with the two hemispheres, but the real problem is the loss of resources for effortful processing. There is not a significant difference in the primed automatic processing tasks between RHD patients and LHD patients.

The conclusion in Tompkins (1990) is explicitly counter to Brownell et al. (1989) presented above. Namely, RHD patients don’t have problems with single word metaphorical judgments. Tompkins finds that primed single word metaphoric associations are present in RHD patients. She proposes that the problems RHD patients have with metaphoric interpretation occur from instances of effortful processing as opposed to the automatic, spreading activation type processing, indicating there is a general problem of resource allocation for the effortful processing.
Tompkins et al. (1992) reach the same conclusion regarding familiar idioms. Primed timing experiments show no problem for RHD or LHD patients relative to normal subjects with regard to idiomatic expressions. However, when given a more elaborate task like defining an idiom rather than just recognizing the meaning of an idiom, patients with both RHD and LHD had difficulties. This led the authors to claim that there is a difference between automatic and effortful processing. The problems that are evident in understanding idioms is a result of reduced attentional resources needed for the elaborate effortful processing.

As stated above, these two articles run counter to the position of this essay and the general position of the three previous papers. However, that is not seen here as an indication of a problem with the theory of metaphor so far presented in this paper, or with the common position of the other papers discussed above. Rather, there are a few problems with the conclusions drawn by Tompkins (1990) and Tompkins et al. (1991). One problem evident in these two articles is that the position taken as a given in both papers, namely that there is a difference between effortful vs. automatic processing, informs the test design in such a way that the results will support the presupposition. The tests in both studies are geared to see if there is a difference between effortful and automatic processing. Thus, the items used to test the automatic processing condition are necessarily simple whereas the items used to test the effortful condition are necessarily complex. It therefore stands to reason that LHD damaged individuals would have more problems with the effortful than with the automatic conditions. As for RHD patients, since the tasks for testing the automatic processing condition need to be simple, they are likely less context dependent and less metaphorical than the tasks for the effortful processing condition.

The second problem with the tests has to do with priming and practice. In the studies the part of the experiments designed to test the automatic processing condition are primed. The priming effect has an impact on the timing tests that is not present in the non-
primed effortful processing tasks. Also, the tests as devised, by the authors’ admission, required enough practice time that the primed tests could have been biased whereas the tasks to test the more effortful processing condition weren’t as affected by practicing (Tompkins 1990).

A third potential problem needs to be taken into account in the second article (Tompkins et al. 1992). This is the problem of defining an idiom as opposed to recognizing one. With a prime, the subjects, even RHD patients, are more likely to recognize the meaning of an idiom when the definition is presented rather than having to define the idiom. With the definition task, it is necessary to consider all contexts that might be appropriate in order to give the definition whereas with the recognition task the subject only needed to pick the right context from those presented, which along with the prime, gives the subject a better chance to be correct than in the definition task. Also, the definition task would be difficult for a LHD patient because of his/her aphasia.

4.3. Conclusion: The Role of the Right Hemisphere in Formative and Interpretive Processing of Metaphors

As stated above, there are three predictions based on the AWG model of metaphor and the general properties attributed to the right hemisphere of the brain. One, the cline from nonce metaphor to idiom should ‘stretch across’ the hemispheres. All metaphoric expressions should be mediated through the right hemisphere in regard to context. Nonce metaphors, which are highly dependent on context if they are to be understood, would likely involve the right hemisphere more. Completely opaque idioms should not require mediation through the right hemisphere. Two, if the cline stretches across the hemispheres, RHD patients should have more problems with nonce metaphors than with more conventionalized metaphors. Lexicalized metaphors should be mainly represented as lexical concepts and RHD patients should not have as much difficulty with them as with
metaphors that are not lexicalized since context is not as important. However, LHD patients likely will have at least some problems with lexicalized metaphors. And three, patients who have undergone commissurotomy should have difficulties with metaphors. Taking the last prediction first, at the current time I have no data on this hypothesis. It is still a prediction I would expect to be true and need to pursue in the future.

The first prediction, that the metaphor cline should stretch across the two hemispheres, is supported by the evidence from the above articles. Specifically, in all the above articles there is evidence that both LHD and RHD patients have some degree of problems. When context is more important, such as in the Winner and Gardner (1977) article, in the adjective triads in Brownell et al. (1989), and in the familiar phrases from Van Lancker and Kempler (1987), RHD patients have significantly more difficulties. When context is less important, such as in the noun triads of Brownell et al. (1989) and the idiom definition from Tompkins et al. (1992), the difference between RHD and LHD patients is greatly diminished. The general trend in the studies is that as the context becomes less important for metaphoric interpretation, the difference between RHD patients, LHD patients and the controls in interpreting metaphors diminishes.

Part of the second prediction is not directly supported in the studies since none of them use nonce metaphors so that part of it can not be directly verified. However, Tompkins (1990) and Tompkins et al. (1992), when evaluated within the framework of this thesis, show that familiar idioms and lexical metaphors present problems to RHD and LHD patients when not primed. This, together with the evidence presented above that the metaphor cline stretches functionally across both hemispheres, supports the second prediction based on the AWG model.

The evidence presented above supports the AWG model of metaphor as it was developed in this paper. Not all the predictions of the AWG model have been addressed yet, but enough are supported in this paper to give strong support to the model at this point.
The metaphor cline from nonce metaphor to opaque idiom is supported both by evidence from RHD patients and by the entailments of the AWG model of language. The role of context in the perception, appreciation and production of metaphor as predicted in the AWG model of metaphor is supported by the evidence from patients with right hemisphere damage. As of yet, there is no direct evidence for the role of the shared properties of concepts as far as the clinical evidence from RHD subjects is concerned, and this needs to be addressed in future research, but even without direct evidence from RHD patients, the AWG neural network model strongly supports the importance of shared properties. As presented at this point, the model of metaphor in this thesis is supported by the Neurocognitive AWG model and by evidence from brain damage patients.
Chapter 5. Evaluating Lakoffian Metaphor Theory from a Neurocognitive Perspective

5.1. Assessing the Cognitive Reality of the Lakoffian Theory of Metaphor: Some Problem Areas

The three common criticisms examined in chapter two - 1) Lakoff is not really doing linguistics; 2) What he is calling metaphors are just collocations; and 3) That the metaphors he does see aren't really alive - all raise serious questions concerning Lakoff's theory of metaphor, but since they are all based to some extent on the 'classical' view of metaphor (the pre-cognitive science view that is) they do little to point out problems within Lakoff's theory and do more to show how it doesn't fit with the classical ideas of metaphor. To evaluate Lakoff's theory on its own terms, it is necessary to examine any problems or concerns with it from within a cognitive framework, since the Lakoffian theory has redefined metaphor as a cognitive phenomenon. The cognitive framework used here to examine Lakoff's theory is that of the relational network model and neurocognitive approach of Sydney Lamb (1998a). When viewed from a neurocognitive perspective like Lamb's, there are indeed problems with Lakoff's theory in its cognitive claims.

5.1.1. The Generative Approach to Understanding and Processing Metaphors

One problem with conceptual metaphor theory is that, despite Lakoff's break long ago from the formalist tradition, his metaphor theory still contains some aspects of formal theories. For instance, Lakoff's theory of metaphor retains the formalist idea that expressions are generated by underlying, more general forms and that because of the complexity needed to do this operation, there is a feeling of mystical awe that is placed on the act of language use. In formal theories, there is a common belief that there is something
special about the ease with which we use language and how its use is 'automatic' and unconscious. Lakoff has the same view of his system of conventional metaphor. He remarks more than once that we use metaphors automatically with no noticeable effort (1980; 1993). In formal theories of syntax, the wonder of this supposed property of language is based on the idea that there are many rules that have to be processed as we speak, and therefore it is amazing that we can so effortlessly speak while having to process a large number of rules. Lakoff's similar sense of wonder no doubt stems from his view of metaphors as heavily systematized, and also that, like grammatical and phonological rules, "[our system of metaphor] is constantly in use, automatically and below the level of consciousness" (Lakoff 1993, p. 42). The use of metaphor in an expression would require the selection of a particular mapping, and then the 'generation' of an appropriate expression from that mapping. The 'ease' with which a native speaker uses language, in a relational network approach, is not as mystical a phenomenon. Since there are no rules and no different forms for underlying and surface structures, indeed no underlying and surface structures at all, there is no need to perform a large number of operations on a base component to arrive at a surface form. Thus, there is no comparable sense of wonder at the ease language use since a neurocognitive model doesn't introduce an analysis that would make it seem difficult.

Another holdover in Lakoff's metaphor theory from his formalist beginnings is that learning is top down. Formal theories of child language acquisition tend to view learning as top down. In these views, children first work out rules and concepts before they start trying to combine words into utterances. In conventional metaphor theory, Lakoff seems to believe that we learn the concepts and the mappings, based on experiential data, and then start to form linguistic expressions based on the mappings we have worked out (Lakoff 1993; Lakoff 1995). Both of these are top down systems in that they propose that the more general, higher level units are learned before the lower level, specific units. In a relational
network model, and in the actual neurological structure of the brain, it appears that bottom
up learning is the norm, where the particulars are learned first and the higher level, more
general cases are learned later (Lamb 1998a). The theory of learning in a neurocognitive
approach is in opposition to the theory of learning presented by Lakoff in his treatment of
metaphors. This, along with the idea that metaphors are generated from a more general
underlying structure, are problematic in terms of the cognitive reality of Lakoff’s approach.

5.1.2. Creativity v. Ordinary Production Process

Another holdover from formal linguistics that Lakoff’s theory maintains is the
notion that languages are creative. This does not mean that a speaker is able to create fiction
using language, although this is possible. What creativity means, in the formal model, is
that a speaker of a language can generate novel sentences he or she has never before heard.
Since, according to formal theory, most of the sentences a person ever utters in novel in
some way, creativity is an common occurrence in everyday life. In formal circles, this
creativity is regarded as a big deal and a special property of language. George Lakoff not
only still supports the idea of creativity as used in formal theories of syntax, he applies a
similar notion of creativity to his theory of conceptual metaphors (1995). Thus, just as
every speaker can generate novel sentences he or she has never heard before, according to
Lakoff every speaker of a language can generate novel instantiations of a metaphorical
mapping that he or she has never heard before. Since the number of possible instantiations
of a specific metaphorical mapping is drastically smaller than the number of possible
sentences, and since there are often fixed expressions for expressing an instance of a
mapping, the cases in which this general creative ability is used in the expression of a
metaphorical mapping are not nearly as numerous as the cases of it use in sentence
formation. However, despite the quantitative difference, Lakoff claims that the creativity
process is qualitatively the same (1995). This everyday creativity component of conceptual
metaphors, as opposed to creative elaboration of metaphorical mappings in literary contexts, which is less common and much more specialized, is a major component of the idea that there is a systematicity to metaphorical mappings. It is the ability to create extensions of a mapping in everyday language that Lakoff sites as being an essential argument against the dead metaphor and the collocation criticisms discussed earlier (Lakoff 1993; Lakoff 1995).

The creativity in Lakoff's model is one of the important proofs that he presents to show that his theory is cognitively real. However, this turns out to be problematic when evaluating the cognitive reality of Lakoff's model in terms of Lamb's neurocognitive approach. This is because Lamb takes a much more narrow view of creativity. In Lamb's view, there is little to nothing creative about the generative notion of creativity, which is "...essentially just taking a sequence of categories and for each category selecting one of its members" (Lamb 1998a, Ch16 p. 2). True creativity involves things such as inventing new lexemes for a concept, inventing a story or a tune, figuring out a new concept, and "devise[ing] new metaphors in our attempts to understand the world" (Lamb 1998a, Ch16 p. 2). In a network, creativity builds new network structures. There are different levels of creativity that are involved in different types of structure building, the more creative something is, the more new structure it builds in the network.

Thus, according the Lamb's definition of creativity, most of what Lakoff considers creative extensions of a mapping would involve only slight structure building. For instance, using the 'spinning our wheels' example, a slight extension like 'we are spinning our wheels on a patch of ice and if we ever do get traction all hell will break loose.' This would build some structure in the network, but not much since there would already be connections between traction on ice and what happens when a car that doesn't have traction suddenly gets traction. The creative part is in the linking of the whole thing with some kind of relationship, whereas before probably only 'spinning our wheels' was linked with a
relationship. No structure at all would be built when established phrasal lexical items are used. The creative elaborations used in literary language would build much more structure, but these types of extensions are relatively rare - most of the extensions that Lakoff claimed were creative extensions are of the kind that only build a slight amount of structure. Still, Lakoff's notion of creativity, although diminished by Lamb's definition, is not entirely wiped out like the notion of creativity used by generative linguists. There might be at least a glimmer of cognitive reality in Lakoff's metaphorical system based on the ability to extend an instance of a metaphor creatively, albeit weakly.

5.1.3. Strict Adherence to the Physical Experiential Motivation Requirement

If the slight creativity (in Lamb's definition) found in Lakoff's system gives a glimmer of cognitive reality to the system, one might think the theory's focus on the experiential motivation of metaphor might give it a bigger boost. This might be expected because the experiential position is a clear departure from the Cartesian tenets of generative linguistics. In Lamb's neurocognitive approach, experience is an essential element of learning. As a person has new experiences, new connections are made or older connections are strengthened in the network. Lakoff and Johnson seem to have a very similar view. Learning, conceptualization, metaphorical mappings, etc. all have an experiential basis. To this extent, this part of Lakoff's theory is cognitively real. Metaphors are experientially motivated. As we have seen above, they emerge out of experience.

Unfortunately for Lakoffian metaphor theory, that is not the end of the story. At least as far back as 1987, Lakoff and Johnson began to believe that all metaphorical mappings had to be experientially motivated, by which they meant experientially motivated in terms of the body's experience interacting with the real world. They limited significant experience to the physical plane. This caused a few problems since several metaphors that had been worked
out either in *Metaphors We Live By*, or shortly there after, became problematic because they had no discernible, experiential basis. Many of these problems were solved by allowing for indirect experiential basis - if a metaphor is motivated by one or more other metaphors, it can use the experiential basis of those metaphors that motivate it as an indirect experiential basis.

Allowing one metaphor to be motivated by other metaphors solved many of the problems that came about after the extreme experientialist point of view rose to the fore. However, there were, and are, some rather glaring problems. The main one was that the mapping THEORIES ARE BUILDINGS, which is included in *Metaphors We Live By*, was considered to have no experiential basis. In order to solve this problem, one of Lakoff's students, Joe Grady (1995), proposed a complex mapping comprised of two lower-level metaphors, PERSISTING IS REMAINING ERECT and ABSTRACT STRUCTURE IS PHYSICAL STRUCTURE. The PERSISTING IS REMAINING ERECT mapping has its experiential basis in the body standing erect and persisting against some force. ABSTRACT STRUCTURE IS PHYSICAL STRUCTURE has a experiential basis in the we have experience with physical structures.

The above analysis works in that it finds a physical experiential basis for the THEORIES ARE BUILDINGS mapping. However, it leaves one question unanswered and suggests a new question that needs to be asked. The new question, which will be addressed again in 5.5. below, is whether or not this analysis is cognitively real. The answer is no. The reason is that this analysis is not capturing an actual pattern or structure of any type, but is instead showcasing the ingenuity of the linguist. In this case, because the rule that all metaphorical mappings must be motivated by a physical experiential basis, it was necessary to make a problem case, THEORIES ARE BUILDINGS, fit the pattern. The solution is neat, elegant and follows the constraints of the problem beautifully, it just doesn't seem cognitively real.
The question left unanswered by Grady's analysis is why it is necessary that the experiential basis must be physical? In learning, all experiences either make new connections or strengthen existing connections in a network (Lamb 1998a). Listening to a story about wolves makes new structure just as watching wolves in the wild would. Both would strengthen certain connections to the concept WOLF in a person's conceptual system. Why then would a metaphor in Lakoff's system only be based on physical experience with wolves and not the literary experiences? There is no reason it would be, and in fact the expressions in English dealing with wolves that Lakoff would say are metaphorically based, such as 'John wolfed down his food,' surely are motivated by literary and cultural learning, not physical, since the majority of people in this culture have NO direct experience with wolves and wolf behavior in the wild. The dogmatic insistence that all mappings be motivated physically is itself inadequately motivated by the data and is not cognitively real.

5.1.4. Theory Internal Patterning

Despite the problems with the holdover elements of formal linguistics and the problem of the tyranny of experiential motivation, Lakoff's system is a very appealing one. Most of the proposed mappings have an easy to identify experiential basis and many are easy to elaborate in truly creative ways once the mapping is made explicit, especially if the one doing the elaborating is the one who made the mapping explicit. One soon gets the impression that nearly everything is metaphoric, and those things that aren't are the few literal meanings Lakoff mentions in passing here and there. But there is a problem in this attraction. It is easy, in the Lakoffian metaphor theory, to see metaphors wherever one looks. After working with metaphors for awhile, just as at night in the woods the shadows will transform into all manner of creatures ready to pounce on an unsuspecting passerby, one starts to see metaphors hiding behind every bush and tree, ready to leap out and attack
the unwary researcher. Lakoff takes this condition to mean that he is right, and the metaphors really are prevalent in language and thought. However, there is another possibility. It is conceivable that what the researcher is taking to be metaphors could be idioms, historical relics (dead metaphors), collocations, and/or multi-word lexemes. In other words, to what extent are conceptual metaphors real with independent existence of an outside observer, and to what extent are they created by the very act of the observation?

A definitive answer, if such a thing is possible, to the above question will not be presented here. However, that is not to say that nothing can be put forth concerning possible everyday thinking disorders present in the Lakoffian theory of metaphor and there is at least one instance of an external source of patterning, as defined by Lamb (1998a). In 5.3. above, in the discussion of experiential basis, there is the instance of the complex solution for the mapping for THEORIES ARE BUILDINGS. The question was whether the pattern described by Grady was real or was a product of the ingenuity of the linguist. It appears as if the answer is the latter, since the analysis is based on the theory driven necessity of having a physical experiential basis for all mappings, and that necessity is not supported by experiential learning in a neurocognitive model. Further, the idea that an experience is either physical or non-physical, when all experiences have some physical component, is an instance of either-or thinking.

5.2. Conclusion

At this point it is time to assess whether or not Lakoff's theory seems cognitively real from the perspective of a neurocognitive framework. As stated at the start of this sections, there are some problems, quite large ones at that, when Lakoff's model is examined with respect to a neurocognitive theory of language. One problem is that the theory still seems to rely on principles of formal linguistics, such as underlying 'deep' structure and top-down learning that don't fit within a neurocognitive model. Lakoff's
claims of creativity, an essential argument to the position that metaphoric mappings are systematic, is also based largely on the formal model and does not hold up well when compared to the definition of creativity presented in Lamb’s neurocognitive framework. The claim that all metaphoric mappings are motivated by experience in the physical realm is problematic in that learning in a neurocognitive model does not seem to differentiate between physical experiences and cultural ones as far as how the learning takes place. There is no reason, from a neurocognitive point of view, that physical experience would motivate all metaphors and cultural/literary experience would motivate none. Finally, there is the problem of whether all the expressions considered metaphoric really are metaphoric, or if the theory conditions the researchers to interpret them as metaphors.

Based on the above evidence, the conclusion has to be that the conceptual metaphor theory of George Lakoff is not cognitively real when it is evaluated in a neurocognitive model. What does this mean in terms of Lakoff’s claim that he is doing cognitive linguistics? Essentially, from the prospective of Lamb’s neurocognitive model, Lakoff is doing analytical linguistics and drawing conclusions concerning the cognitive system without taking into account neurological data. That is, Lakoffian metaphor theory seems more to be an analytical theory which introjects a top down analysis of metaphor into the conceptual system rather than building an account of how metaphors might work in a neurologically plausible way. That is not to say that Lakoff’s model did not contribute to cognitive linguistics or the study of metaphor. As seen in Chapter 2, Lakoff has contributed heavily in the birth of the study of conceptual metaphor and thus the study of cognitive science.
Chapter 6. Conclusion and Closing Remarks

6.1. Complexity and the Problem of Metaphor

The problem with theories of metaphor, whether they are born of philosophy, linguistics, cognitive science, or some combination thereof, is that they cannot account satisfactorily for the complexity of metaphor as we use it in language and in thought. Is metaphor a matter of thought or is it a matter of language? Do we have metaphors that exist on the conceptual level that generate the metaphoric speech we use or are the metaphors that have been recognized in the conceptual system built from the use of metaphorical expressions? Or are metaphors a matter of similarity between two things or are they based on bodily experience, our knowledge of how we interact with the world? Was Aristotle, and hence the 'classical' definition of metaphor, right? Or was Aristotle wrong? By focusing on words as the important aspect of metaphor, did he only get part of the picture of metaphor? All of these questions are the type of questions that the cognitive science approach to metaphor has asked and attempted to answer. However, I am not sure if the questions are the right questions to ask.

The problem with the types of questions being asked, and with the answers being given to them in the Lakoffian approach to metaphor, is that they are 'either-or' questions which have little room for the complexity of the issue at hand. Thus, the answers that are provided to the questions are too often definite, limiting answers that do not take into account the full complexity of the problem of metaphor. Take for example the issue of similarity as a basis of metaphor. Lakoff and Johnson renounce it as a source for the conventional metaphors since perceived similarity does not provide motivation for the metaphors. Instead, they posit that each metaphor must have an experiential basis or be motivated by a another metaphor which has an experiential basis, and furthermore, the experiential basis most come from physical experience. I quite agree that metaphors are motivated by our experience as we interact with the world around us and with the other
inhabitants of that world, but that does not mean that similarity does not play a role in the creation of metaphor. As I pointed out in Chapter 3, there is more than one kind of similarity. Perceived similarity, the most simple case, is what Lakoff and Johnson claim can not be the basis of metaphor and it is in regard to this simple kind of similarity that they cast out all similarity. They do not take anything like evoked similarity into account even though without some kind of similarity there is no way to show what the experiential motivation is for any particular mapping. They don't take any kind of similarity into account partially because of the way in which they framed the question of whether or not similarity is a sufficient source of metaphors. There were only two possible answers to this question, a 'yes' or a 'no', and the complexity of the situation was lost in the binary distinction. In other words, the way in which they asked the question informed the answer they came up with.

It is not just with the problem of similarity as a source for metaphor that one finds this type of binary distinction between what is right and what is wrong in Lakoffian metaphor research. Their answers to the questions pertinent to understanding metaphor are consistently in opposition to the 'classical' definition of metaphor, a theory that was essentially a bottom up approach which placed all of the emphasis on words and on the 'literal' meaning of words versus the figurative use of words. As Lakoff and Johnson say, many of the ways of looking at metaphor that were consistent with the Aristotelian theory of metaphor did not take into account that metaphor was more than just a matter of language. Conversely, in attempting to take the cognitive aspect of metaphor into account, Lakoff and Johnson, first in *Metaphors We Live By*, and then in subsequent work, construct a top down model of metaphor that discounts the involvement of language and individual words in the formation and interpretation of metaphor. In this model, the impetus for metaphor is the mind and the experiences that the mind has through the body. Everything in the system flows from the top down to the bottom, from the most generic
metaphors in the conceptual system to the specific phrases that instantiate the metaphors that are in the mind. While this approach shows that metaphor is important as a cognitive phenomenon and it does much to identify and explicate the system of conventional metaphors we use, it abstracts metaphor away from the individual people and the way they use metaphor in interacting with others. Consequently, it fails to account for how conventional metaphors arise from nonce metaphors and how already existing conventional metaphors come to be acquired by a person growing up in a particular culture. The top down approach fails to capture the complexity that underlies the metaphors.

In Lamb's terminology, the Lakoffian theory of metaphor is an introjective theory in that it introjects analytical findings into the mental system, and consequently the brain, with little to no regard for what is known about neurophysiology. The top down model that the theory builds is taken to be the actual system that is in our heads. However, from the neurocognitive perspective, the top down model of metaphor does not work quite right. The relational network of Lamb's model, which he has shown to be largely compatible with the findings of neuroscience, is functionally a bottom up model. Learning and processing in the model is componential and mainly bottom up. General properties do not generate specific elements in the network - they emerge from the connectivity of elements in the network. Once they do emerge, the general properties, or models to use another term, feed back into the network by influencing how the network builds new structure or alters existing structure. Metaphor is like this. Metaphors emerge from the complexity of the network. They are based on the shared properties of concepts, i.e. on similarity, and in our experience of the world. An emergent metaphor is part of our mental system, part of our way of making sense of our experiences. As such, it is used to categorize and understand what we encounter in the world. Thus, an emergent metaphor is a model in our mental system which structures the way in which we construe some particular thing or event and therefore contributes to the way in which the network is structured. In this way, a
metaphor, which itself emerged from the network, feeds back into the network. Figure 6.1. shows this relationship.

![Emergent Metaphorical Model](image)

**Figure 6.1. Emergent Metaphor**

The small upward arrows represent the emergence of a metaphor from the individual components of the network. The connected points at the bottom represent the network. The large oval at the top is a metaphorical model that is part of our mental system. The two large arrows on the sides show the feedback from the emergent metaphorical model.

The Lakoffian theory of metaphor involves the high level metaphorical model and the downward arrows - the top down part of the system. The 'classical' definition of metaphor accounts only for the other direction in the diagram, taking the 'network' at the bottom to represent individual, but connected, 'words'. This is a system in which a global property, a metaphor, came out of the individual components of speech based on their combinational patterns. The neurocognitive approach adopted here takes both directions into account. As such, it does not limit metaphor to being either a part of language or a cognitive phenomenon. Rather, it recognizes the complexity of the system and shows that metaphor is a matter of both language and of thought, and that to abstract one part of it away from the other is to lose the complexity that is at the heart of metaphor.
6.2. A Comment on Neurological Research on Metaphor

Even though one of the earliest papers on metaphorical interpretation and the brain was published twenty years ago, it is clear from Chapter 5, and the fact that I could not find data to either support or contradict some of the predictions of the AWG model of language regarding metaphor, that this area of research is still wide open with much left to be done. At the present, what is known is sketchy and does little more than point to the importance of contextual interpretation in the right cerebral cortex in regard to the interpretation of metaphors.

On its own, this fact is interesting in that it shows that metaphorical associations are mediated through the right hemisphere in a way that lexical concepts are not. However, it is not clear what all that entails and to what degree metaphor is processed independently of normal conceptual structure. The AWG model and the neurocognitively oriented theory of metaphor proposed in this thesis claim that shared properties are an essential part of metaphor. This position implies that metaphor is at least partially 'processed' via the same structures as other types of categorization. However, there is strong evidence from aphasia that lexical categories are in the left hemisphere (Rohde 1997b) suggesting that at least metaphoric expression should be processed in the left hemisphere. The solution to this apparent contradiction is to look at the role of context in interpreting metaphoric expressions. Context is an essential part of metaphor as it is through mitigating context that evoked similarities are noticed. If the right hemisphere is really responsible for recognition and application of the appropriate context, what we see is a situation in which the right hemisphere is not so much processing metaphor as it is being used, on the interpretation side, to recognize the appropriate context that the expression needs to be interpreted as a metaphor. Since studies have not focused on the production of metaphor, it is hard to say how much the right hemisphere would be involved in the creation of a nonce metaphor or
use of a fixed metaphoric expression. Future research in this area will no doubt clear up some of these areas.

6.3. The Future of the Study of Metaphor

Even after nearly twenty years of study in the cognitive framework, there is still much that is not known about the complexity of metaphor. The contributions of the Lakoffian school have been vast and they are still growing. As cognitive metaphor research moves toward a neurocognitive basis, many new and interesting answers to the problem of metaphor will no doubt emerge. Concurrent research by neuroscience into metaphor and the brain will certainly inform neurocognitive theories of metaphor as they are developed. Hopefully, the merits of Lamb's neurocognitive theory of language for the study of metaphor will be recognized as metaphor research moves in the direction that he has been traveling for so long. It is also a hope of mine that the new science of complexity will contribute as well, and that future theories of metaphor will recognize the complexity of the system from which they come, and therefore will not treat metaphor as just a part of the mind or of speech, but realize that metaphors emerge from the complex interplay of our mental system and our linguistic system.
Bibliography


Rohde, Ada. 1997b. Lexical Representation within a Relational Network Model. MS.


