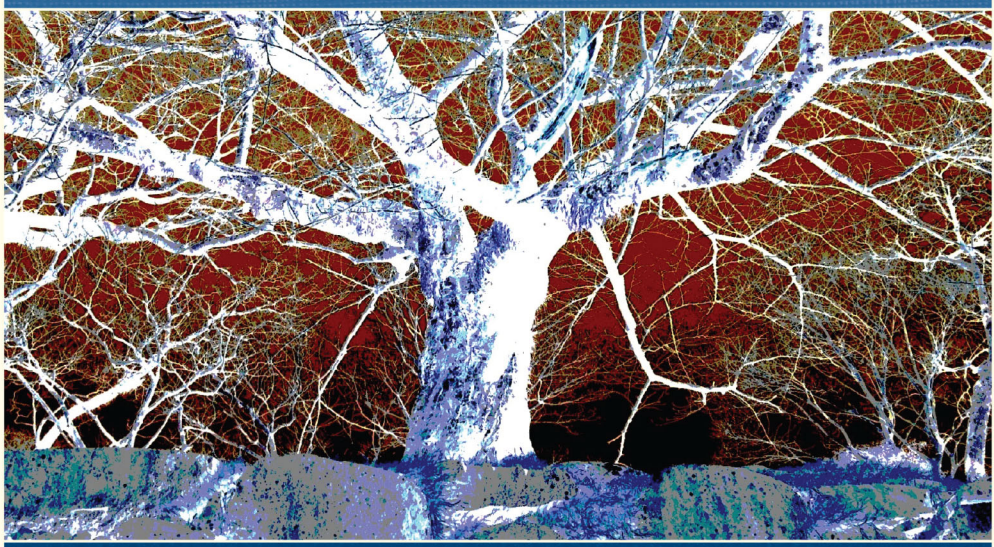
METAPHOR FROM THE GROUND UP



Understanding Figurative Language in Context

DANIEL C. STRACK

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LEXINGTON BOOKS
Lanham • Boulder • New York • London

Published by Lexington Books
An imprint of The Rowman & Littlefield Publishing Group, Inc.
4501 Forbes Boulevard, Suite 200, Lanham, Maryland 20706
www.rowman.com

6 Tinworth Street, London SE11 5AL, United Kingdom

British Library Cataloguing in Publication Information Available

Library of Congress Cataloging-in-Publication Data

Names: Strack, Daniel C., 1967– author.
Title: Metaphor from the ground up : understanding figurative language in context / Daniel C. Strack.
Description: Lanham, Md. : Lexington Books, [2019] | Includes bibliographical references and index.
Identifiers: LCCN 2018057820 (print) | LCCN 2018059585 (ebook) | ISBN 9781498547918 (electronic) | ISBN 9781498547901 (cloth : alk. paper)
Subjects: LCSH: Metaphor. | Metaphor—Psychological aspects. | Metonyms.
Classification: LCC P301.5.M48 (ebook) | LCC P301.5.M48 S735 2019 (print) | DDC 808/.032—dc23
LC record available at https://lccn.loc.gov/2018057820

The paper used in this publication meets the minimum requirements of American National Standard for Information Sciences—Permanence of Paper for Printed Library Materials, ANSI/NISO Z39.48-1992.

Printed in the United States of America

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Acknowledgments

When I began working on this book, I didn't have a clear idea where its starting premises would take me. In retrospect, though, I had a single goal in mind: being able to explain how the brain processes metaphor. As I pursued this rather unrealistic objective, I became increasingly aware that understanding metaphor is not simply a matter of linguistics. Because answering various figurative language–related questions necessitated attempts to unlock some of the inner workings of mind, I experienced both a momentary thrill at each new unexpected insight and mounting anxiety concerning where research findings might ultimately lead. In the end, however, my belief that "all truth is God's truth" convinced me that retracing God's handiwork in creation is a good thing and that gaining a clear understanding of the nature of human cognition may provide a valuable counterweight to increasingly artificial, algorithm-driven attempts to reverse-engineer 'intelligence.' Whatever the faults of this particular book, I am thankful to God for providing the life, liberty, and inspiration necessary to bring it to completion.

This publication would not have been possible without the help of a great many individuals, the foremost being my wife, Margaret, whose encouragement and support have been indispensable. Her understanding and thoughtfulness during the extended writing process, despite her own busy work schedule, cannot be exaggerated.

While the focus of my doctoral dissertation was very different from what I am attempting in this volume, I greatly benefited from the painstaking editorial efforts of my PhD advisor, Tsunehiko Matsumoto of Kyushu University. In particular, his skepticism concerning metaphor forced me to question certain starting assumptions and his advice on how to simplify a complex argument has benefitted all of my subsequent research.

I would also like to thank my colleague, Saeko Urushibara, for initially proposing the University of Kitakyushu undergraduate course, "Language and Cognition," and serving as its long-time coordinator. In retrospect, my yearly attempts to explain aspects of conceptualization, metaphor, and metonymy to non-linguist undergraduates (along with the consistently thought-provoking comments and questions from student participants) have turned out to be a major catalyst in the development of various metaphor-related ideas since the course's inception in 2007.

I have benefited from the encouragement and patience of a great many cognitive linguists, psychologists, and neuroscientists, too numerous to mention individually. In particular, thanks go out to Margaret Freeman and Ray Gibbs for their accessibility, professionalism, honest appraisals, and valuable advice. Jana Hodges-Kluck and Rachel Weydert at Rowman & Littlefield have been knowledgeable, thorough, and helpful throughout the writing and production process. Thanks especially to Jana for her key role in facilitating this book's publication. I would also like to extend my gratitude to the anonymous reviewer who offered many helpful comments on how to improve the style and content of this book.

Fukuoka, Japan
August 25, 2018

Introduction

Metaphor Theory at an Impasse

There is a curious if rarely mentioned dilemma brewing in cognitive linguistics . . . and metaphor[1] theory is at the heart of it. The dilemma is precisely this: for all of the earnest claims by cognitive linguists that their supposedly stable theoretical positions match up with what is known about human cognition, the majority of new research in the field of cognitive semantics seems aimed at buttressing a theory that has been abandoned by a number of the highly respected scholars who initially supported it. Even as the ranks of young researchers making valuable contributions to Conceptual Metaphor Theory (CMT) continue to swell, one of the theory's originators, George Lakoff, has moved on from CMT to advocate for his more ambitious Neural Theory of Metaphor/Neural Theory of Language (NTM/NTL[2]). Unfortunately for Lakoff and his many admirers, NTM/NTL has not caught on.

Given Lakoff's sterling reputation as a cognitive semantics theoretician and the recent high level of interest in neuroscience, this is a somewhat puzzling result. In fact, many metaphor scholars were initially hopeful that NTM/NTL and its related single-volume account, Feldman's *From Molecule to Metaphor*,[3] would succeed in addressing various longstanding criticisms of CMT and in so doing turn out to be just as influential as Lakoff and Johnson's *Metaphors We Live By* was in the decades after its own release. For a variety of reasons, only a few of which will be explored here, such turned out not to be the case.

From the point of view of an enthusiastic CMT practitioner, one major reason NTM/NTL proved difficult to acquiesce to was the theory's jettisoning of "unidirectional mapping"[4] in favor of so-called "two-way mapping"[5] in its explanation of how metaphors are processed. For many devoted CMT advocates, unidirectional mapping was not simply a matter of theoretical dogma

to be taken on faith; after decades of practical fieldwork based on the starting premises of CMT, a sizable cross-section of metaphor researchers had become convinced they had achieved results corroborating CMT's Invariance Hypothesis, a proposition that posits the stimulation order of constituent elements in a verbally expressed metaphor to crucially affect the meaning taken away from it. For this reason, NTM/NTL's bold decision to decertify its unidirectional mapping hypothesis did not so much update CMT as invalidate what many had considered to be its most valuable and distinctive tenet.

Of course, had there been sound neurobiological reasons for doing so, NTM/NTL's advocacy of "two-way mapping" might still have been justified. Unfortunately, while "two-way mapping" is occasionally mentioned in the study of computer-based networks,[6] the term is not used in biology and has no obvious relationship to non-connectionist cognitive neuroscience. As such, the suggestion that "two-way mapping"[7] applies to the human brain is highly speculative and does not meet Lakoff and Johnson's own standards for empirically responsible inquiry,[8] specifically falling short with respect to the Cognitive Reality Commitment which requires theories of "concepts and reason" to provide explanations of mind that are "cognitively and neurally realistic."[9] While NTM/NTL's basic premise that human mental processes must ultimately be explained in terms of the brain and its connections[10] is to be applauded, its decision to discredit the (partially corroborated) idea of "unidirectional mapping" without offering neurobiological rationale for doing so made the theory unattractive to CMT's most ardent supporters while simultaneously undercutting its claim to be at the forefront of empirically substantiated linguistic science.

Even before the unveiling of NTM/NTL, various attempts had been made to inconspicuously 'patch up' CMT's theoretical shortcomings so as to keep it viable.[11] While this was occurring, critics of CMT began to freely voice their reservations,[12] a situation which resulted in an extended period of constructive debate. In the end, however, no conclusions were forthcoming and, due to this lack of resolution, the fundamental doctrines of CMT have not been significantly elaborated upon since Lakoff and Johnson's *Philosophy in the Flesh* was published in 1999. *Metaphor from the Ground Up* aims to break through this theoretical impasse or, if accomplishing such a goal proves overambitious, at least raise awareness that there is a mostly unacknowledged problem in need of addressing.

The best way out of this theoretical cul-de-sac is to go back to the basic strategy that facilitated the development of CMT in the first place: focused interdisciplinary inquiry that attempts to show how linguistic theory links up with cognitive science. Because various fields including neuroscience and cognitive psychology have continued to generate a wealth of potentially

harmonizable research results in the intervening years since CMT was first conceived, the interdisciplinary cross-referencing of previously unrecognized findings may now be attempted; indeed, it seems to be an opportune time to test whether certain fundamental aspects of CMT are biologically plausible or not. Consequently, this book's primary aim is to expand the explanatory power of CMT by corroborating what can be corroborated and revising what needs to be revised. To the extent that these efforts prove successful, metaphor researchers across multiple disciplines will be able to pursue productive research into conceptual metaphor without being impeded by inconsistent and biologically inaccurate terminology or discouraged by perpetually unresolved academic disputes.

Of course the strange admixture of grass roots popularity with theoretical inertia may be said to characterize Relevance Theory,[13] as well. When Sperber and Wilson's ideas first appeared, they seemed an elegant and thoughtful updating of the groundbreaking pragmatics research of Grice. Since that time, however, while many have praised and practically applied their insights,[14] there have been few attempts to empirically confirm Relevance Theory's basic tenets with respect to linguistic processing.[15] In terms of theoretical staying power, Relevance Theory continues to lack crucial neural details that might facilitate experimental confirmation in biological terms.

One major problem is that Sperber and Wilson's austere view of conceptualization all but precludes theoretical links with cognitive linguistics from developing.[16] The only solution may be to reimagine Relevance Theory by fundamentally reconsidering its relationship to conceptualization and, on that basis, see what kinds of interaction between Sperber and Wilson's ideas and cognitive semantics are possible. Consequently, another goal of this book will be to push CMT outside of its traditionally demarcated boundaries so as to inform and interact with neighboring theories like Relevance Theory and Fillmore's Frame Semantics[17] in order to make CMT more broadly applicable and theoretically complete.

For in the end, while there is much of value in CMT, unless it finds a way to overcome its current state of theoretical lethargy, it seems likely to be replaced by some newer, more data-driven but less semantically illuminating model of cognitive processing. Although the history of linguistics is exemplified by academic competitions in which one suggestive but incomplete theory of language replaces another,[18] such is not the ideal. When partially verified competing theories conflict with one another, circumstances may be primed for advance by way of cross-disciplinary sublation. And although there is no guarantee that attempts at sublation will ultimately win out, only freethinkers unwilling to tolerate the unaddressed contradictions will be positioned to see the narrow window of opportunity when it presents itself.

PREVIEW OF CHAPTER CONTENTS

In preparation for examining the details of figurative language processing, Chapter 1 ("Metaphor Is Grounded in Sense Perception") will survey findings from cognitive neuroscience and cognitive linguistics so as to offer provisional answers for the following questions: Is metaphor primarily linguistic or conceptual in nature? Are the results of metaphor logically predictable? Are straightforward metaphors processed consciously or unconsciously? While answering these questions by focusing on certain idiosyncrasies of the human perceptual system will not necessarily lead to ironclad proofs relating to the fundamental nature of conceptualization, detailing how incoming perceptual signals are processed and how multimodal perceptions coalesce to form concepts amounts to a crucial first step towards identifying the criteria by which metaphorical feature attribution proceeds.

Chapter 1 will assert that metaphor inferencing relies on basic capabilities of the human similarity detection system, a system that is well equipped to recognize similarities of all kinds be they visual, aural, tactile, or metaphorical. This being the case, no "black box"-type central processing module is required for metaphorical insights to be brought to mind: once conceptual domains[19] have been sufficiently developed and cross-referenced with language ability, metaphor interpretation proceeds (or at least begins) automatically.

After briefly characterizing Conceptual Metaphor Theory's view of metonymy, Chapter 2 ("Metonymic Binding and Conceptualization") will contrast metonymy and metaphor by specifying metonymic links to be an example of "binding" (a term denoting a basic type of neural connectivity that facilitates conceptualization) rather than "mapping" (the unidirectional projection of activation patterns). Having explained metonymy in neural terms, this chapter will further suggest that metonymy should be understood as a means of conceptual 'access' rather than 'reference' and will detail how traditional referential views of metonymy fail to account for certain aspects of non-verbal metonymy.

Chapter 3 ("The Challenge of Feature Attribution") will evaluate the strengths and weaknesses of various influential accounts of metaphor processing. Criteria for evaluation will include the experimental corroboration of theoretical claims, internal consistency, and overall explanatory power. Particular attention will be paid to Lakoff's Invariance Hypothesis, Conceptual Metaphor Theory's failure to provide compelling neurobiological rationale for the key term "mapping," and the psycholinguistic implausibility of feature attribution theories that posit a "matching" stage to occur early in the processing stream. After noting various problems with existing theories of metaphor inferencing, this chapter will highlight the need for a new theory of metaphor that is both neurologically plausible and capable of surmounting

each of the various inferencing challenges that other processing models have failed to overcome.

Chapter 4 ("Conceptual Filtering") will recommend viewing metaphor inferencing not as a single encapsulated process but rather as a gradually unfolding series of overlapping processing phases that vary both in terms of strategies employed and results achieved. To be specific, this chapter will posit an initial salience-oriented processing phase that transitions into an effortful directed attention phase which, in turn, will be supplanted by a passive resting-state phase of processing. Having detailed and offered neurological rationale for each phase, the unidirectional nature of metaphorical mapping will be affirmed as a crucial constraint on the initial automatic stage of feature attribution but it will also be asserted that Invariance will have progressively less influence during the directed attention and resting state phases of processing.

Chapter 5 ("Context and Goal-orientation") is primarily concerned with how contextual effects exert their influence on figurative language processing. After detailing how the historical development of the context-related ideas 'perspective' and 'point of view' resulted in an oversimplified understanding of contextual effects, it will be demonstrated that contexts are not 'brain external' social or environmental phenomena but are rather continually updated sets of neural dispositions that, while being fully integrated with the conceptual system, differ from salience-derived conceptual structures in that their activation facilitates goal-oriented behavioral routines.

It will be asserted that the major inadequacies of 20th-century accounts of context stem from their failure to explain how context and salience-driven conceptualization interact. To resolve this issue, neuroscientific and psycholinguistic findings will be examined to identify exactly how this interface is practically accomplished, both in terms of single perceptual modalities and across cognition. This survey of findings will demonstrate that the modality-specific bottom-up attentional processes that facilitate conceptualization may be differentiated from more global contextual effects and explain how these top-down reweightings of cognition result from the cuing of goal-oriented suppression routines. Finally, the processing stage at which contextual effects exert their influence on compact verbal statements will be clarified using practical metaphor inferencing examples.

Chapter 6 ("Metonymic Cues and Narrative Framing") will define "framing" as the conscious verbal or non-verbal elicitation of goal-oriented contextual effects, explain how contextual effects are able to rapidly disambiguate seemingly indeterminate metonymic statements, and note how the irony present in certain verbal statements may be understood only against the backdrop of the inferred goal orientations of the speaker. This chapter will also examine the efficacy of subtle metonymic cues in "narrative framing" and will use Critical Discourse Analysis to consider how surreptitious metaphor

both consciously and unconsciously shapes the understanding of political and other types of goal-oriented discourse. Finally, details of Conceptual Filtering Theory's "Focus-Filter-Frame Processing Model" will be reviewed.

Chapter 7 ("Metaphor Productivity and Dual-mode Instantiation") will demonstrate the role of metaphor in the augmentation of the world-wide stock of literal expressions over time by examining the subjective nature of 'literality' and the predictable trajectory of metaphorical expressions from novel insight to conventionalization to dead metaphor. With regard to dead metaphor, it will be asserted that commonly overlooked metaphorical senses (such as the figurative use of 'leg' in the phrase 'table leg') are not 'dead' in any absolute sense but rather have become semantically unproductive for most people and especially for those who have actively sought to suppress metaphorical implications.

To explain how metaphor propagates and sparks insightful recognition by way of metaphorical entailments, this chapter will introduce the "Dual-mode Instantiation Hypothesis." This proposal posits not one but two modes of metaphor instantiation that spur metaphorical understanding at the individual level, these being sense perception-prompted "organic recognition" (in which apparently unrelated insights regarding similarities across separate conceptual domains lead to spontaneous noticing) and "artificial inducement" (in which metaphorical awareness is elicited by way of intentionally communicated metaphorical expression). While functionally separate processes, these mutually reinforcing phenomena often work in tandem, the end result being a thoroughly multimodal, brain region-spanning analogical processing capability.

Finally, the Conclusion ("Invariance and Beyond") will recapitulate the basic principles and terminology that comprise Conceptual Filtering Theory and assess the ways in which its observations and hypotheses can practically contribute to metaphor theory, semantics, and pragmatics. Additionally, the relationship of CFT's view of top-down contextual effects to recent findings on embodied simulation will be briefly considered.

Aside from the Introduction, Chapters 1 through 7 and the Conclusion, this volume also features a Glossary of figurative language-related terms and an extensive Index. As the ideas, psycholinguistic details, and terminology introduced will be far-ranging, readers are encouraged to take full advantage of these features for purposes of preview, interstitial clarification, and review.

NOTES

1. One classic example of metaphor is seen in the expression, "Life is a journey." Because metaphor involves understanding one idea in terms of another seemingly

unrelated idea, by way of metaphor, the living of a human "life" is posited to have certain similarities to taking a "journey."

2. George Lakoff, "The Neural Theory of Metaphor," in *The Cambridge Handbook of Metaphor and Thought*, edited by Raymond W. Gibbs, Jr., 17–38 (Cambridge: Cambridge University Press, 2008); cf. also Jerome Feldman, *From Molecule to Metaphor: A Neural Theory of Language* (Cambridge, MA: MIT Press, 2008).

3. Feldman, *From Molecule to Metaphor*.

4. In CMT, the idea that the meaning taken away from a metaphor is determined by the order in which constituent metaphorical elements of the metaphor's linguistic expression are perceived.

5. Lakoff, "Neural Theory of Metaphor," 17.

6. E.g., Taher Naser, Reda Alhajj, and Mick J. Ridley, "Two-way mapping between object-oriented databases and XML," *Informatica* 33, no. 3 (2009): 297–308.

7. Lakoff, "Neural Theory of Metaphor," 22.

8. George Lakoff and Mark Johnson, *Philosophy in the Flesh: The Embodied Mind and Its Challenge to Western Thought* (New York: Basic Books, 1999), 79–80.

9. Ibid., 79.

10. Lakoff, "Neural Theory of Metaphor," 17.

11. E.g., William Croft, "The Role of Domains in the Interpretation of Metaphors and Metonymies," in *Cognitive Linguistics: Basic Readings*, edited by Dirk Geeraerts, 269–302 (Berlin: Walter de Gruyter, 2006). Originally published as "The role of domains in the interpretations of metaphors and metonymies," *Cognitive Linguistics* 4 (1993): 335–70.

12. E.g., Reuven Tsur, "Lakoff's roads not taken," *Pragmatics and Cognition* 7, no. 2 (1999): 339–59; Peter Stockwell, "The inflexibility of invariance," *Language and Literature* 8, no. 2 (1999): 125–42.

13. Dan Sperber and Deirdre Wilson, *Relevance: Communication and Cognition*, 2nd ed. (Oxford: Blackwell, 1995); cf. also Deirdre Wilson and Dan Sperber, *Meaning and Relevance* (Cambridge: Cambridge University Press, 2012).

14. E.g., Wilson and Sperber, *Meaning and Relevance*, 261–78, 307–38.

15. While there have been psycholinguistic attempts to confirm the efficacy of certain general principles of Relevance Theory with respect to cognition (e.g., Wilson and Sperber, *Meaning and Relevance*, 279–306), the neural facilitation of such principles remains mostly unexplored.

16. The 2012 version of Relevance Theory continues to view concepts as a type of "mentalese" and as structures "comparable to entries in an encyclopedia or permanent files in a data-base." Wilson and Sperber, *Meaning and Relevance*, 31.

17. Charles J. Fillmore, "Frame Semantics," in *Cognitive Linguistics: Basic Readings*, edited by Dirk Geeraerts (Berlin: Walter de Gruyter, 2006), 373–400.

18. Cf. R. H. Robins, *A Short History of Linguistics*, 3rd ed. (New York: Longman, 1990).

19. A "conceptual domain" is an associated set of conceptual aspects bound to a particular lexical item or some other type of perceptually discriminable point of access.

Chapter One

Metaphor Is Grounded in Sense Perception

The history of linguistics is a record of scholars disagreeing over which aspects of language are worth arguing about. While 21st-century linguists may prefer to view the current state of the discipline as the result of a gradual progression from ill-informed folk theories to empirically corroborated 'settled science,' Robins attributes the wide variety of topics covered to the fact that researchers of each era made legitimate discoveries appropriate to their preferred subfield of linguistic exploration.[1] For example, while 19th-century linguists were preoccupied with etymologies and tracing linguistic lineages,[2] their 20th-century counterparts, seeing natural language as the outward manifestation of a kind of universal logical code in need of 'cracking,' concentrated their analytical efforts on discerning and interpreting pervasive trends in the formal aspects of verbal communication.[3] Over the centuries, progress in the field of linguistics has been characterized by the 'progression' from one era's most pressing language-related concerns to those of another.

This being the case, it seems natural for 21st-century linguists with an interest in metaphor to pose the following questions: what type of linguistic analysis would best clarify the nature of metaphorical communication and how does the understanding people gain from figurative language practically come about? Because metaphor may have more to do with the details of individual meaning apprehension than with the rules of syntax or the culturolinguistic setting of discourse, neither Generative Grammar Theory nor philological studies nor sociolinguistic approaches would appear equipped to grapple with it. Cognitive linguistics, on the other hand, with its emphasis on semantics and frequent attempts to incorporate insights from cognitive science, seems best positioned to contribute.

Nevertheless, to the extent that metaphor truly is a 'cognitive' phenomenon, attempts to characterize it exclusively by way of linguistics seem destined to fail. Explaining cognition in terms of language is akin to describing biological evolution using only examples from a local petting zoo; anecdotes will always be relevant but a comprehensive account will prove impossible due to the magnitude of what is missing and the unproductiveness of the gaps. A better approach might be to examine conceptual aspects of cognition without preconceived ideas regarding whether such aspects pertain to the field of linguistics or not. Insofar as the author of this volume has judged previous theories of metaphor to be inadequate precisely because they have been unnecessarily constrained by linguistics, this book will adopt the second approach.

The account to be laid out over the following chapters originates in crucial observations about the nature of metaphor made by proponents of Conceptual Metaphor Theory (henceforth CMT), a subfield of cognitive semantics in the larger field of cognitive linguistics. Rather than immediately wading into the deep thickets of internecine debate, however, an attempt will be made to first characterize the type of cognitive system in which CMT posits conceptual metaphor to function. Drawing on relatively stable findings from neuroscience and cognitive psychology and with hopes of avoiding mistaken preconceived ideas from the outset, Chapter 1 will offer an abbreviated yet substantive account of how both identity recognition and conceptualization are products of sense perception. It will also make a few key observations about language in general and figurative language in particular. These preliminary comments will set the stage for recounting a variety of long-unresolved theoretical challenges in Chapters 2 and 3 which will be addressed through the introduction of a new theory of figurative language processing, Conceptual Filtering Theory, to be detailed in Chapters 4 through 7.

A THOUGHT EXPERIMENT ON THE RELATIONSHIP BETWEEN CONCEPTUALIZATION AND LANGUAGE

In order to accurately characterize how language users extract meaning from verbal statements, it is necessary to recognize that concepts have an existence independent of their relationships with words in language. When a person makes the statement, "An airplane is like a bird," it is not only a predication involving lexis, grammar, and other verbal features; the lexical items that comprise the statement serially stimulate activation patterns in the brain,

these being associated with the respective concepts for each lexeme. That is to say, practically speaking, each word sparks some sort of corresponding resonance in the conceptual system and these resonances combine to result in a particular hybrid pattern of neural activation. While the details of such activation will be exceedingly complex, for preliminary demonstration purposes, it may be sufficient to concentrate on the nouns involved, "airplane" and "bird."

For the phrase, "An airplane is like a bird," readers will likely have identified at least one key way in which airplanes are like birds. The word "flying" or "flight" has almost certainly come to mind. For naturally flightless humans, there is a strong conceptual overlap in the minds of most people between airplanes (devices specifically designed to stay airborne) and birds (a category of animal that includes many members highly adept at flying). This very predictable processing result (which stems from the centrality of FLYING[4] to the prototypical features[5] of both airplanes and birds) results as the conceptual domain[6] FLYING receives stimulation from the networked conceptual associations relating to the words "airplane" and "bird." In neural terms, neurochemical stimulus from two 'flying'-related concepts activated in rapid succession has pushed the amount of activation for the mutual feature FLYING above baseline levels and thereby stimulated phonemic information associated with the concept FLYING in the subvocal rehearsal system ("inner speech"[7]) in preparation for speaking the word "flying."

The fact that the mention of two domains of experience (the conceptual domains AIRPLANE and BIRD) sharing a certain feature (a third domain, FLYING) can cause the lexical unit associated with that feature to be recalled is prima facie evidence that conceptual domains can be strategically juxtaposed to achieve a predictable verbal result. Moreover, the specific words used do not matter as long as they both share the specified feature; the same result may be achieved by stating "A jet airplane is like a hawk." While processing details concerning exactly how the word "flying" comes to mind have yet to be considered, the fact that the word can be elicited through the successive mentioning of words holding the same specific feature in common is a remarkable result normally disguised by the fact that language always functions in this way.

While linguists naturally tend to focus on linguistically stimulated metaphor, it is possible to achieve the same (or at least a very similar) cognitive result in a non-verbally induced fashion either by juxtaposing or sequentially displaying the images of a bird in flight and an airplane (as in the juxtaposition of figures 1.1 and 1.2 below).

Figure 1.1. Jet airplane in flight

Figure 1.2. Hawk in flight

Because the lexical response in this case (an internal apprehension of the word "flight" or "flying" as it resonates in inner speech) has been elicited not through language but by way of conceptual feature overlap stimulated in the visual mode, the processes involved are seen to be multimodal and broadly conceptual rather than narrowly linguistic. Consequently, the "inner speech" humans sometimes become aware of during contemplation may be understood as a particularly vivid linguistic reflection of underlying thought processes but should not be confused with those processes themselves.

This stands to reason. In his discussion of how pre-linguistic children begin to conceptualize the world through sensorimotor interactions with their immediate environment,[8] Tomasello stresses the fact that without the ability to "conceptualize aspects of their perceptual experience" children would have no way to "acquire linguistic conventions."[9] In fact, because communicative behavior in human infants begins not with spoken language but with kinesthetic gestures[10] which mimic gestures perceived primarily in the visual mode, the idea that non-linguistic aspects of conceptualization might be accessible by way of non-verbal sensory stimulus should be anything but surprising.

Giving full consideration to the fact that perception and conceptualization are seen to function irrespective of verbal language ability in pre-linguistic infants,[11] language should be characterized as an outgrowth and expression of conceptualization rather than its constituent form.[12] For this reason, because conceptual bootstrapping is understood to proceed with or without the influence of linguistic inputs, the role of language in (eventually) facilitating communicative "reference" seems not to be a core function of conceptualization but rather an opportunistic extension that proves useful only after a more basic understanding of the perceived environment has already been achieved. So then, if language is not a developmentally primary phenomenon, exactly what is its relationship to the broader conceptual system?

In Boyd's characterization of "reference,"[13] the relationship between language and knowledge boils down to the question of how words can and should be "indexed" for accurate retrieval. Unfortunately for such a view, the fact that details of linguistic conceptualization differ from individual to individual means that people are not referring to a single mutually available language system but rather expressing a message in hopes that a similar meaning will be afforded by a presumably similar counterpart language system. Because human cognition varies at the individual level, the multifarious phenomenon humans casually refer to as 'language' is in reality a somewhat coherent assortment of almost 8 billion distinctively configured idiolects[14]; that is to say, although the use of a relatively standard lexicon and apparently successful communicative results may give conversants the impression that they are referencing the *same* concepts, in fact, to the extent that such

concepts are individual mental constructs, the conceptual information being 'referred' to is subtly different and so apparently referential communication may be more illusion than actuality.

Mandler brings this point home with her discussion of how the concepts of children differ greatly from those of adults even though both may be using the same word in a way that seems to be referential; she notes that equating "words with concepts on the basis of reference" can lead to a fundamental misunderstanding of "the newly verbal child's conceptual and semantic systems."[15] While a child's use of the word "dog" seems to mirror the sense of the word when it is used by an adult and the object indicated apparently agrees with the adult's referent, the child's meaning is probably more akin to 'land animal' than 'dog.' Mandler observes that, compared to adult speakers, a child's early understanding of nouns often features a certain degree of "overextension."

While particularly noticeable when the conceptualization of young children is compared with that of adults, this interpersonal conceptualization gap is always present to some degree and so must always be factored in as a potential barrier to communication. Such a thoroughly idiolect-based reference system, one in which the concept referred to by one person doesn't exactly match the concept understood by another person even though both are utilizing the same word, is a very haphazard 'reference system,' indeed.

Kuhn characterizes language in just this way when he mentions how it functions not so much to delineate the core necessary elements of a given idea for the purpose of mutual understanding but rather to add "tags" or "labels" to uncooperative and often inconsistent conceptual content so as to allow "correct identification."[16] In his view, if the idea of lexical "dubbing" were to be completely set aside, links between the conceptual and the "real world" would effectively disappear. Thus, while it is natural for scholars to attempt to define their terms precisely in hopes of maximizing interpretability, and while it is also natural for linguists to make general observations about a given language as if that language were a single unified system, the assumption that language normally provides exact and perfectly predictable 'reference' to a shared stock of conceptual content, or even ideally can provide such reference, is baseless.

LANGUAGE AS A MATTER OF ACCESS, NOT REFERENCE

Ricouer exposes the hidden premise upon which any logically consistent idea of "reference" ultimately depends in his attempt[17] to distinguish the *semantic* reference of Frege from the *semiotic* reference of Beneviste; he notes that

while Frege's idea of reference first designates a word's basic meaning which then is used to inform predication, in Beneviste's idea of reference, the meaning of the word can only be derived by analyzing its role in discourse. Ricouer goes on to note how Wittgenstein characterizes this two-way directionality of reference as an interplay between the object itself and the state of affairs in which the object resides.[18]

To the extent that language is to be explained in terms of neural processing, Wittgenstein's polarity of reference can no longer be understood as an interplay between 'things' and 'states of affairs' but rather as an interaction between '*perceptions* of things' and '*perceived* states of affairs'; in cognitive terms, this is the mutually informative relationship between simple somatosensory images on the one hand and more complex conceptual domains, kinesthetic routines, and mental frames that facilitate organismal recognition and response on the other. Seen in this way, when humans process language, what they are doing is not tagging static objects in the material world but reorganizing internal conceptual states so that agents, actions and attitudes perceived in the environment can be better recognized and responded to. In other words, language is not only about being understood but about understanding.

In fact, because the world is ever-changing, an individual's conceptual states must constantly adapt to novel information and a steady stream of environmental stimuli. In that the conceptualization of phenomena encountered for the first time will necessarily be characterized by a relative poverty of domain elaboration, newly learned lexical items are not so much precise references to some universally available, fully formed set of descriptive details as they are mutually intelligible 'access points' to less than perfectly realized conceptual domains that will likely go on to be filled out in ever greater precision through lived experience and factual information exchange.

To offer one example, having grown up in North America, I am aware of the obvious differences between a raccoon and a dog and would never confuse them. For this reason, it was with great surprise that, upon my arrival in Japan, I was informed of the existence of a creature called a *tanuki*, an appellation commonly translated into English as 'raccoon dog.' My first encounter with a *tanuki*, a raccoon-like animal with long snout and legs reminiscent of a dog, destabilized two sharply distinguished categories in my conceptual system (raccoon and dog) and spurred a partial reordering of them. While the *tanuki* as a species is distinct from both raccoons and dogs,[19] the English language 'tag' for this animal (expressing the partial similarities evident) immediately secured its place in my mind alongside its Japanese equivalent. In this case, newfound understanding was elicited not by generating an entirely unprecedented concept *ex nihilo*, but rather by linguistically reordering aspects of the already functioning conceptual system. In response

to circumstances, useful distinctions were imposed where none had been evident or necessary before.

Understanding language not in terms of communication but rather with respect to its function in individual cognition will have profound ramifications for many types of linguistic analysis.[20] For if a linguistic tradition premises its scholarship on the idea that that language is a communication tool, that tradition has unreflectively bought into a particular view of what language is for, what medium it pertains to, and how it works. To the extent that we see language as fundamentally 'communicative,' concepts in the brain seem to be little more than the predicatively useful 'content' of messages we'd like to send to others. If, however, we view lexical items as organizing principles that impose socially sanctioned structure on cognition and thereby serve as means of accessing and manipulating concepts, then linguistic communication begins to seem less like an attempt to label real-world objects to facilitate universal decoding and more like a negotiation by which one seeks to synchronize one's own mental processes with the opaque but often inferable mental states of those one comes in contact with.

While the rich and intersubjectively verifiable concepts adult language users take for granted are those that have become encrusted with layer upon layer of first-hand familiarity and trial-and-error verification over time, in fact, such a condition is not an example of linguistic communication at its most basic but rather the practical outcome of extensive language use. In worst case scenarios, however, language includes the potential for two adult conversation partners to believe they fully understand each other when in fact there has been a total communication breakdown. Moreover, because the meanings of words are ultimately subjective, communication is likely to be imperfect even when results align more or less with expectations. Consequently, to characterize language as *primarily* communicative is to ignore the fact that, without language, much of cognition would not even be comprehensible. At the individual level, language is a kind of lexically accomplished partitioning of mind that structures cognition in personally and socially adaptive ways.

For cognitive linguists, then (as opposed to semioticians and philologists), lexical items should be understood to function as 'access points' that make otherwise subconscious conceptual structures available for conscious recall and manipulation.[21] Thus, while 'reference' is an ideal term for noting discourse-oriented semiotic relationships within self-contained systems of coordinated meaning, the connotations of the term do not match well with cognitive views of language as it relates to the underlying conceptual system. For this reason, understanding figurative language in conceptual terms will likely involve leaving behind the customary discourse-related vocabulary borrowed from structural linguistics and going the extra mile to consistently

explain language-related phenomena in terms of conceptual access and conceptual domain leveraging.

ON PERCEPTION AND IDENTITY RECOGNITION

One of the primary challenges that humans and other primates face in adapting to their surroundings is the fact that, at any given moment, the organs of sense perception supply them with a flood of perceptual signals that must be sorted through simultaneously. As Parkhurst and colleagues sum up with respect to vision, "The amount of incoming information to the primate visual system is much greater than that which can be fully processed."[22] For the individual to detect and respond to threats and opportunities in the environment, the perceptual system must include efficient subsystems that quickly identify details worthy of attention.

One of the ways in which the human brain is adapted to cope with this superabundance of incoming stimulus is by paring down signal information before storage in memory. In the case of the visual system, the selective preprocessing of signal information is accomplished through several stages of "saliency mapping" (feature-sensitive topographic projection of correlated activation patterns). Rather than directing limited memory capacity toward saving complete visual scenes with photographic accuracy, a series of neuronal arrays detects a combination of narrowly delineated features of images in the retina, superior colliculus, lateral geniculate nucleus and other "pre-attentive" early visual cortical areas.[23] To name just one example, the primary visual cortex (striate cortex, or V1) includes many neurons that exhibit "orientation selectivity."[24]

Regarding the relationship of pre-attentive perceptual feature detection with the storing of images for later retrieval, incoming visual perceptions are not stored as single images but rather are broken up and streamed in parallel[25] to various specialized brain areas that capture and recall limited aspects of the specific perception with respect to color, depth of field, orientation, outline components, motion, texture, etc. This feature selectivity allows objects to be provisionally recognized as certain delimited aspects of sense experience overlap with the memory fragments of previous perceptions. It is the splintered nature of human similarity detection apparatus that allows humans to interpret even stimulus arrays of minimal detail (such as map icons or comic book-style line drawings).

Of course, this system has been evolutionarily fine-tuned to accomplish 'likely identity' recognition, not 'incidental similarity' detection. We can generally distinguish trees, salads, and wicker chairs without having first to climb, eat, or sit in them. When buying a used car, we can usually tell

if the previous owner was a heavy cigarette smoker or not because we can positively identify the smell of cigarette smoke. When we get a phone call from a good friend, we can recognize who is calling immediately because we remember the sound of that person's voice.

Although each of the preceding examples demonstrates a case of identity recognition based on a single mode of sense perception-related recall, Gibbs stresses the necessity to view the brain in terms of region-spanning interconnectivity. He explains the multimodality of image schemas[26] in the following way: "Image schemas exist across all perceptual modalities, something that must hold for there to be any sensori-motor coordination in our experience. As such, image schemas are at once visual, auditory, kinesthetic, and tactile."[27] According to such a view, conceptual domains are not simply random assortments of verbal knowledge, groupings of words and definitions that pertain to a particular arbitrary category; in fact, they are flexibly organized sets of images, impressions, and routines that result as incoming sense perceptions are correlated with recalled traces of images, impressions, and routines left by previous experiences.

Conceptualization emerges as the recalled details of synchronous perceptual inputs gradually strengthen their connections and become networked by way of a process called "associative learning."[28] Hearing a cat meow while viewing it causes stimulus-response binding to occur between images in the aural and visual systems. The concept CAT is simply the network of cat-related sensory images and verbal knowledge stored in various parts of the brain. Aside from cat-related sights, sounds, and smells, the CAT concept will link up with encyclopedic information about cats and memories such as encounters with cats during childhood.

Because of the complexity of the human brain, not all of this information will necessarily be activated every time one thinks of a cat but all of the information is available in principle due to the fact that it is has been experientially linked together in a conceptual network. As such, conceptual networks[29] are developed ad hoc through experience and are thus highly variable across individuals and undergo subtle or even fundamental reorganization over time as new experiential inputs present themselves.[30]

DETECTING IMAGE METAPHORS BY WAY OF SENSE PERCEPTION

As Trim has noted,[31] there are many geographic and geological features that have been named due to some distinctive aspects of their visual appearance. We are not surprised when we discover that the name of a horn-shaped fea-

ture on the horizon, or on a map, has come to be known as "the Matterhorn," or "Cape Horn."[32] Neither are we surprised to encounter seemingly metaphorical geologic features like box canyons, stone arches, and "needles" or apparently geometry-inspired metaphorical place names such as "the fertile crescent," Half-moon Lake, or the Bermuda Triangle.[33] Although the titles of such geographic and geological features have long been thoroughly conventionalized due to generations of linguistic use, each of these designations was likely coined in response to a phenomenon that cognitive linguists have termed "visual metaphor."

Lakoff and Turner explained visual metaphor by quoting a poem[34] that superimposes "the image of an hourglass onto the image of a woman's waist by virtue of their common shape."[35] At most basic, such image metaphors do little more than recall a visual similarity. While ideas being linked in this way might seem rather trivial upon first reflection, the fact that similarities based in the visual modality can be summoned to mind not visually but lexically is anything but trivial. Because language allows humans to actively manipulate visual memories indirectly, it is not necessary for humans to carry around pictures of things they hope to allude to. While often taken for granted due to its ubiquitous employment, the ability to summon memories stored in one modality of sensory experience (for example, vision) by way of an unrelated modality of sensory experience (audition in the case of spoken language) is a truly astonishing phenomenon that clearly indicates the multimodal interconnectedness of conceptualization.

Of course, some sense perception-derived names result from non-visual metaphor, as well. These include lemongrass (olfactory metaphor), razor grass (tactile metaphor), and whale song (aural metaphor). Each of these cases is based on some type of perceptual correlation that was originally detected by one or more people, confirmed by still others, and subsequently encoded into conventional language use.

While these examples of sense perception-derived image metaphors suggest that many conventional terms have metaphorical origins, to the extent one encounters these expressions, the metaphorical implications found in them are likely to recede. For example, a marine biologist studying hammerhead sharks would presumably become so well-acquainted with the species that connotations of the simple visual image (an aquatic creature with a head shaped like a hammer) would become relatively opaque unless specifically called to attention. For the individual that has been desensitized to it, it has become a dead metaphor. Conversely, for children or second language learners, however, the same element will seem very much alive and fraught with meaning. In such cases, it's as if metaphor in language functions as a self-explanatory, term-specific user's guide.

This self-perpetuating added value is one reason metaphor has proven so adaptive to language users over generations. In that metaphors tend to provide novel abstract understanding through meaning extension from more concrete terms, they represent a kind of intellectual capital that proliferates precisely because each new cohort of language users can easily retrace the conventionalized metaphorical arc from literal base word to figurative meaning extension.

Nevertheless, despite such obvious value for language learners, both in neural and in logical terms, all such image metaphors are nothing but particularly memorable examples of 'false-positive identification.' The luminescence of lightning bugs does not come from lightning and fireflies have no fire; it is only that someone, at some time, noticed a striking resemblance which was, in fact, a case of mistaken identity.[36] This did not stop either term from becoming conventional nomenclature.

METAPHOR IS NOT LOGICALLY VERIFIABLE

How is it that, lacking scientific verification, humans are so often content to create, appropriate, and promulgate these 'tenacious misconceptions'? The simple answer is that the human predisposition to favor metaphorical expression in certain situations reveals a crucial dependency on sense perception when making judgments.

In the case of the word "firefly," there is a noticeable visual similarity between the luminescence of the insect and the glow of a fire (or at least wafting embers) but there is no 'functional' correlation, strictly speaking. While associating the emission of light by a certain insect with the glow of a fire runs the risk of creating a fundamental misunderstanding (because the luminescence at issue is electrochemical and not pyrotechnic), the perceived visual similarity is nevertheless imputed practical value with respect to species identification. In the case of the name "firefly," the sensory subsystem used to make provisional hypotheses concerning 'identity' produced a false-positive judgment for identity but the fact that the result was false-positive did not prevent the associated image and lexical item from forging a lasting mutual connection in memory.

Because the visual metaphor (the assertion of fire-like luminescence) has been encoded into language, language will serve as an agent for the widespread dissemination of visual metaphor. It should also be stressed that apprehension of the metaphor in this case is not a complex, higher intellect-type operation; if perceptual subsystems are active and a certain amount of language ability is in place, the metaphor can be interpreted and even used by most people with only a minimum of effort.

How does this view of metaphor as an occasionally adaptive type of misidentification correspond to characterizations of metaphor by various theoreticians? While consistent attempts have been made to identify rational principles underlying metaphor processing, the belief that metaphor functions according to logic goes all the way back to ancient Greece. In particular, one might point to the ancient Greek philosopher Aristotle's attempt to apply biology-derived taxonomic categories like phylum, genus, and species to language. This cross-disciplinary approach was based on two key assumptions: that the meanings of words are stable and that the semantic outcomes of word combinations are predictable.

In his *Poetics*, Aristotle details how the logical relationship between paired elements in metaphor [μεταφορά][37] often conjoins terms associated with different levels of abstraction, describing constituent parts of metaphors by way of terms like "genus" [γένος] and "species" [εἶδος]. He further asserts that well-formed metaphor follows the rules of logical syllogism: If A is to B as C is to D, then to replace A with C in its relationship to B is to create a "metaphor by analogy."[38]

For Aristotle, if ideally formulated metaphors are proportional then, logically speaking, the elements should be reversible. In an examination of the reversibility of a well-formed "metaphor from proportion," Aristotle claimed that "if the goblet is the shield of Dionysus, then the shield may properly be called the goblet of Ares,"[39] a situation in which a reciprocal relationship pertains because both objects belong to the same "genus."

At first glance, his claim that a kind of semantic symmetry results from the logical pairing of elements appears sound. Because deities in Greek statuary are commonly depicted holding representative objects in their hands, the shield and goblet not only share the attribute of being things 'held in one's hand,' they also correspond with each other in terms of their symbolic associations with Greek deities. If Aristotle's understanding of well-formed metaphor as a logical correlation of proportionate and taxonomically comparable elements is correct, then his example demonstrates that constructing a compelling metaphor ought to be as straightforward as calculating the solution to a simple mathematical equation.

If one is only concerned with metaphor as a form of lexical ornamentation—that is, if deriving some sort of semantic 'added value' from a metaphor is not a goal—then noting superficial correlations between objects associated with Greek deities is unproblematic. Difficulties are encountered, however, when interpretation includes the expectation of discovering new insights in the form of unexpected entailments. For while the abstract category '*implements held in the hands of Greek deities*' might just as easily include bows, arrows, hammers, or tridents, in fact, both the goblet and the shield carry with

them a large number of associations, connotations which could, given the right circumstances, decisively affect the meanings taken away.

For example, because Ares was the Greek god of war, ideas associated with him tend to be understood in relation to violent conflict; consequently, the phrase "the wine cup of Ares" could potentially be interpreted as a goblet filled with the blood of those fallen in battle. While it seems unlikely that Aristotle intended to evoke such a nuance, the possibility of arriving at alternative connotations points to the fact that, even in the case of apparently well-balanced "metaphor from proportion," the semantic implications taken away depend a great deal on the context of the metaphorical statement and the level at which one chooses to interpret it.

In recent years, various scholars have objected to the idea of metaphorical symmetry by noting examples in which the meanings apprehended in metaphors tend to differ when constituent elements are reversed.[40] Indeed, when comparing the entailments of "That butcher is a surgeon," with those of "That surgeon is a butcher," the results are startlingly different. While the first sentence imputes great skill to the butcher, the second implies gross negligence and even cruelty on the part of the surgeon. With respect to this phenomenon, Glucksberg and Keysar asserted[41] that the reversal of metaphorical elements would lead not merely to a different meaning but to an entirely new metaphor.

While even basic questions relating to the reversibility of metaphorical elements have yet to be decisively resolved, Campbell and Katz are correct to point out[42] that a realistic theory of metaphor must be able to practically explain how feature attribution occurs when metaphors are being processed. Specifically, why do supposedly 'proportional' metaphors that ought to result in logically predictable if not perfectly symmetrical entailments in fact lead to such starkly different inferencing results when reversed? According to what criteria is metaphor inferencing actually accomplished? These are a few of the crucial questions to be addressed in this volume.

METAPHOR PROCESSING OCCURS OUTSIDE OF CONSCIOUS CONTROL

This may be a good time to characterize exactly what kind of 'knowledge' the human facility for metaphor provides. The conceptual system does not consist of locally stored idea units but rather brain-spanning networks of neural dispositions. As these dispositions are crucially dependent on sense perception and can only offer partial confirmation as to the actual identity of any specific phenomena perceived, their uncertain logic is that of the logical fallacy, 'guilt by association.'

In fact, mistakes in human conceptualization occur not just in extremely rare cases as exceptions that prove the rule but rather as predictable if unfortunate outcomes that occur with alarming frequency due to the splintered nature of the perceptual apparatus that forms the core of the identity recognition system. Acknowledging the limitations inherent to the perceptual system goes a long way toward explaining various seemingly illogical aspects of experience-based reasoning: the unreliable witness problem (in which eyewitness accounts of crimes often prove unreliable[43]), the mistaking of co-occurrence for causation as in classical conditioning experiments such as that of Pavlov's Dogs,[44] and the susceptibility of whole societies to mass media–facilitated brainwashing.

While a sense perception–based account of metaphor has some decidedly negative ramifications for the epistemological status of human knowledge in general, one advantage in accepting the preceding explanation of how the brain identifies incoming perceptual signals by matching them against vestiges of previous perceptions is that, by asserting that metaphor is (at least initially) processed by the same system that handles visual, aural, and tactile similarity detection, no minutely deliberative 'control center' need be posited. The fact that a functioning similarity detection system both precedes and informs language not only explains how basic metaphorical inferences are arrived at but also eliminates the need to explain metaphor as a product of conscious control.

The fact that metaphor processing is automatic is important because it eliminates the need to appeal to some sort of unseen processing agent (sometimes referred to as a 'homunculus'). In the philosophical tradition, homunculus fallacies were invalid appeals to the existence of "little people" (homunculi) within the human mind that were purported to carry out certain difficult to account for mental operations. In modern terms, deficient theories of mind are said to have homunculus problems if those theories appear to avoid the crux of analysis by appealing to an unknown black box-type 'central processing module' (a sort of 'mini-mind' that carries out detail work in some never-specified back room of cognition). For theories of metaphor, with respect to the question of how metaphor inferencing is practically accomplished, the assertion that a given theory of metaphor has a homunculus problem often amounts to a claim that technical terms like "mappings" or "image schemas" are simply scientific jargon used to disguise a lack of more concrete explanatory proposals.

In order to put this longstanding avenue of critique to rest, the issue of the presence or absence of conscious mental control in cognitive processing must be grappled with. Generally speaking, humans are under the impression that they actively make decisions in the course of their lives by doing things like

majoring in art despite parental objections or avoiding fast food in the face of multi-million-dollar ad campaigns. But while humans as independent organisms may exercise a level of freedom that allows them to go against the grain of society, the mental mechanisms by which such free decisions are arrived at are clouded in obscurity. In fact, questions of this sort are not limited to metaphor inferencing; from a neural point of view, because both unconscious categorization and conscious decision-making occur as electro-chemical activation patterns cascade through the brain, biological evidence for conscious control of moment-to-moment behavior at the microscopic level will likely prove impossible to verify.

To further detail how positing conscious control in metaphor inferencing tends to result in homunculus problems, it will be helpful to mention the classical view of concept formation. As explained by Cassirer, traditional teachings in logic dictate that the mind forms concepts by noticing similarities and differences between objects and, after reflection, picking out essential properties that define an abstract concept.[45] As such, conceptualization amounts to a kind of mental labor in which humans actively select certain properties from the "vague billowing and surging of sensory impressions." The main difficulty is how to explain why an individual brain 'decides' to divert attentional resources in the particular directions it does. Cassirer laments that even thinkers deeply engaged with this problem have tended to push it away by giving credit to some "faculty" of the "soul" that directs "noticing" (in other words, a homunculus). Consequently, the problem of feature attribution for metaphor scholars is eerily similar to the difficulty faced by cognitive scientists attempting to understand how moment-to-moment attention meshes with decision-making in general.

McGlone asserts[46] that CMT proponents use circular "homunculus fallacy"-based reasoning in claiming image-schematic motivation for metaphor. Implying that all the talk of "image schemas" and "mappings" is nothing more than a pseudo-scientific shell-game which hides a gaping homunculus-shaped theoretical hole, he states that CMT illegitimately attempts to explain metaphor comprehension "by positing metaphors in our minds that tell us how to interpret metaphors we encounter in discourse,"[47] these "metaphors in our minds" being a sort of black box processing function the existence of which is never fully explained.

Admittedly, Conceptual Metaphor Theory as described by Lakoff and Johnson[48] and Lakoff and Turner[49] failed to offer a precise account of how image schemas and metaphorical mappings in the mind actually facilitate processing.[50] Specifically, while certain aspects of cognition have been detailed by CMT proponents, the interface between metaphor and attention and the ways in which the results of neural computation are 'brought to mind'

have never been adequately explained. The only way to do this is to lay out a theory of cognition that brings issues of attention and conscious control to the forefront, a task that this volume will take up, both briefly in the following paragraphs and more extensively in the proceeding chapters.

As was mentioned in previous sections, when sensory areas of the brain become sufficiently active, a spike in activity registers in the corresponding sensory cortices. For example, while an area called the medial superior temporal is sensitive to linear, radial, and circular motion, area V4 in the ventral stream is sensitive to combinations of shape and color.[51] How does such finely calibrated sensitivity to visual stimuli affect the things we notice (or don't notice)?

Human attention is always relative. When the activation of stimuli fails to attain a critical mass, we don't notice it. When a significant level of change occurs, or when sense experience corresponds closely to vestiges of previous experience in memory, we do. To cite a very simple example, one could mention the way the brain tunes out background static (ambient noise) such as the hum of an air conditioner while actively attending to pronounced acoustic spikes such as the sound of coins being dropped onto a tile floor or a sudden burst of clapping. We tend to notice the coins and clapping more than the air conditioner because the first two meet the threshold for attracting attention while the constant drone of the air conditioner would likely result in decreased neuronal sensitivity due to the effects of habituation.[52] Consequently, some incoming sensory images go unnoticed while others, having set off attentional 'tripwires,' are allocated additional neural resources and break the surface of conscious attention.

Although post-attentional judgment issues are certainly more complex, the presets of the perceptual system, hardwired adaptation skills passed down to humans as part of our primate genetic heritage, are fully automatic and available early in development. Being able to recognize food, predators, potential mates, or useful tools requires the ability to detect visual and other types of similarities when perceptions of immediate surroundings echo memories of past experiences.[53] Visual and other sense perception–based metaphors (e.g., bottlenose dolphin, the Milky Way, and lemongrass) obviously owe their origins and ongoing viability to the specific ways certain perceived features correlate with the details of separate phenomena experienced on previous occasions.

Consequently, one could say that the metaphor comprehension system (at least in its most basic form) has successfully hijacked the images generated by pre-existing sensory perception apparatus to detect more complex types of similarity. And just as relative attention to incoming stimuli is (at least initially) allocated unconsciously, metaphor processing, as well, because it

is facilitated by the very same system, is largely accomplished outside of conscious control. This neurobiologically informed explanation of how basic metaphorical understanding is grounded in sense perception is in no way circular, nor does it appeal to any sort of homunculus-like hidden functionality.

Although specific proposals relating to the processing of figurative language have yet to be offered, it might be helpful to quickly review the three premises upon which these proposals will depend. First, language, while eminently useful in communication, may only be understood as a type of "reference" if the domain of inquiry is discourse. When studying human cognition, language should more accurately be considered a means of artificially partitioning and manipulating otherwise relatively inaccessible conceptual structures. Second, metaphorical understanding, insofar as it tends to be based on instances of false-positive identification, is not a rational operation the truth-value of which may be ascertained on logical grounds but rather is a type of often useful and occasionally invaluable misconception that stems from idiosyncrasies in the human perceptual and recognition systems. And third, it seems safe to say that tentative and partial metaphorical understanding, far from providing reliable knowledge of the world, can only provide hints that may or may not prove valuable when opportunities for practical application present themselves. To the extent that society 'authorizes' certain metaphorical formulations by way of pervasive use in language, however, particularly apt or intuitively vivid metaphors are likely to be selected into the communal store of ever-accreting linguistically encoded folk knowledge.

NOTES

1. Robins, *Short History*.
2. Ibid., 180–204.
3. Ibid., 249–53.
4. In Conceptual Metaphor Theory, "concepts" are represented in small capital letters. For example, FLYING represents the concept "flying."
5. The term "prototypicality" expresses the cognitive linguistics view that conceptual structures are not definitional, bounded entities with strict membership conditions but rather loose associations of conceptual aspects with some category examplars being more central or "prototypical" than others. Cf. George Lakoff, *Women, Fire and Dangerous Things: What Categories Reveal about the Mind* (Chicago: University of Chicago Press, 1987), 44–46, 58, 83.
6. The term "conceptual domain" refers to a coherent set of conceptual aspects bound to a particular lexical item or some other type of perceptually discriminable access point. Cf. Ronald W. Langacker, *Foundations of Cognitive Grammar 1: Theo-*

retical Prerequisites (Stanford: Stanford University Press, 1987) 63, 488; cf. also René Dirven, "Introduction," in *Metaphor and Metonymy in Comparison and Contrast*, edited by René Dirven and Ralph Pörings (Berlin: Walter de Gruyter, 2002), 15.

7. "Inner speech" refers to the activation of lexeme-associated phonetic images in the sub-vocal rehearsal system of Broca's area (area BA 44). Cf. Eraldo Paulesu, Christopher D. Frith, and Richard S. Frackowiak, "The neural correlates of the verbal control of working memory," *Nature* 362 (1993): 342–44; cf. also discussion of "post-lexical phonological encoding" in Peter Indefrey and Willem J. M. Levelt, "The Neural Correlates of Language Production," in *The New Cognitive Neurosciences*, 2nd ed., edited by Michael S. Gazzaniga (Cambridge, MA: MIT press, 1999), 862. A more in-depth discussion of inner speech will be offered in Chapter 4.

8. Michael Tomasello, *Constructing a Language: A Usage-based Theory of Language Acquisition* (Cambridge, MA: Harvard University Press, 2003), 62; cf. also Jean M. Mandler, *The Foundations of Mind*: *Origins of Conceptual Thought* (Oxford: Oxford University Press, 2004), 11–15.

9. Tomasello, *Constructing a Language*, 63.

10. Michael Tomasello, *The Cultural Origins of Human Cognition* (Cambridge, MA: Harvard University Press, 1999), 57–62.

11. Mandler, *Foundations of Mind*, 7.

12. E.g., Wilson and Sperber's characterization of thought as a kind of "mentalese." Cf. Wilson and Sperber, *Meaning and Relevance*, 31.

13. Richard Boyd, "Metaphor and Theory Change: What Is 'Metaphor' a Metaphor For?" in *Metaphor and Thought*, 2nd ed., edited by Andrew Ortony (Cambridge: Cambridge University Press, 1993).

14. An "idiolect" refers to the uniqueness of an individual's language use. While a variety of statistical patterns can be observed across a given language in general terms, individual language users inevitably differ from other users with respect to the fine details of vocabulary, grammar, and pronunciation.

15. Mandler, *Foundations of Mind*, 244.

16. Thomas S. Kuhn, "Metaphor in Science," in *Metaphor and Thought*, 2nd ed., edited by Andrew Ortony (Cambridge: Cambridge University Press, 1993), 535–37.

17. Paul Ricoeur, *The Rule of Metaphor*, translated by Robert Czerny with Kathleen McLaughlin and John Costello, SJ (London: Routledge, 1978), 216–18.

18. Ibid., 218.

19. Although raccoon dogs (*Canidae Nyctereutes Procyonoides*) strongly resemble raccoons (*Procyonidae Procyon Lotor*) they belong to an entirely different taxonomic family. Moreover, while belonging to the same *Canidae* family as dogs, wolves, and foxes, they are distinct from each of them in terms of both genus and species (*Tanitsu Uchida dōbutsu bunruimei jiten* [Tanitsu and Uchida's Zoological Taxonomic Dictionary] (Tokyo: Nakayama Shoten, 1990), 1081–83).

20. Beatrice Warren, "Aspects of Referential Metonymy," in *Metonymy in Language and Thought*, edited by Klaus-Uwe Panther and Günter Radden (Amsterdam: John Benjamins, 1999); Beatrice Warren, *Referential Metonymy* (Stockholm: Almqvist and Wiksell, 2006); Debra Ziegeler, "Arguing the Case against Coercion,"

in *Aspects of Meaning Construction*, edited by Günter Radden, Klaus-Michael Köpcke, Thomas Berg, and Peter Siemund (Philadelphia: John Benjamins, 2007), 102–103; Murray Knowles and Rosamund Moon, *Introducing Metaphor* (Abingdon: Routledge, 2006), 54.

21. Cf. Mandler, *Foundations of Mind*, 7–8.

22. Derrick Parkhurst, Klinton Law, and Ernst Niebur, "Modeling the role of salience in the allocation of overt visual attention," *Vision Research* 42, no. 1 (2002): 107.

23. Laurent Itti and Christof Koch, "Computational modeling of visual attention," *Nature Reviews Neuroscience* 2 (2001): 196.

24. Mark F. Bear, Barry W. Connors, and Michael A. Paradiso, *Neuroscience: Exploring the Brain*, 4th ed. (Philadelphia: Wolters Kluwer, 2016), 348–50.

25. Bear et al., *Neuroscience: Exploring*, 362–66.

26. According to Gibbs, image schemas are defined as "dynamic analog representations of spatial relations and movements in space" which, although they are derived from perceptual and motor processes, are not themselves sensorimotor processes. He goes on to characterize image schemas as "imaginative, non-propositional structures that organize experience at the level of bodily perception and movement." Cf. Raymond Gibbs, Jr., "Embodiment in Metaphorical Imagination," in *Grounding Cognition: The Role of Perception and Action in Memory, Language, and Thinking*, edited by Diane Pecher and Rolf A. Zwaan (Cambridge: Cambridge University Press, 2005), 69.

27. Gibbs, "Embodiment in Metaphorical," 91.

28. Bear et al., *Neuroscience: Exploring*, 827–28.

29. Zwaan and colleagues have offered experimental evidence for "residues of a perceptual experience, stored as patterns of activation in the brain," an idea fully consistent with the views expressed in Chapter 1. Cf. Rolf A. Zwaan, Robert A. Stanfield, and Richard H. Yaxley, "Language comprehenders mentally represent the shapes of objects," *Psychological Science* 13, no. 2 (2002): 168.

30. For a more thorough account of the integrated development of perception and conceptualization, cf. Daniel C. Strack, *Literature in the Crucible of Translation: A Cognitive Account*, 2nd rev. ed. (Okayama: University Education Press, 2016), 14–23.

31. Richard Trim, *Metaphor and the Historical Evolution of Conceptual Mapping* (Houndmills, UK: Palgrave Macmillan, 2011), 4.

32. Ibid.

33. Although there are times when etymological origins are obscured because the naming occurred so long ago, one might also mention various wildlife and vegetation examples including the bald eagle, bottlenose dolphin, brain coral, butterfly fish, firefly (also called lightning bug), frilled lizard, hammerhead shark, hooded owl, peacock bass, pennant fish, praying mantis, rainbow trout, sawtooth fish, seahorse, swordfish, tiger shark, and weeping willow. There are also visual metaphor–motivated extraterrestrial phenomena such as blood moons, the Milky Way (called the "river of heaven" [*Ama-no-gawa*] in Japanese), and a multitude of constellations including the "Big Dipper."

34. André Breton and Mark Polizzotti, *André Breton: Selections* 1 (Berkeley: University of California Press, 2003), 89.

35. George Lakoff and Mark Turner, *More than Cool Reason: A Field Guide to Poetic Metaphor* (Chicago: The University of Chicago Press, 1989), 90.

36. This is not to say that metaphor has no practical value in cognition. It is simply to suggest that, in strictly logical terms, broader metaphorical understanding often begins with an isolated case of misunderstanding.

37. Ibid., 80.

38. Ibid., 81.

39. Aristotle, "The Art of Rhetoric," translated by J. H. Freese, in *Aristotle: The Art of Rhetoric* (Cambridge, MA: Harvard University Press, 1926), 369, 371.

40. Cf. Sam Glucksberg, Matthew S. McGlone, and Deanna Manfredi, "Property attribution in metaphor comprehension," *Journal of Memory and Language* 36 (1997): 50–67.

41. Sam Glucksberg and Boaz Keysar, "Understanding metaphorical comparisons: Beyond similarity," *Psychological Review* 97, no. 1 (1990): 3–18.

42. John D. Campbell and Albert N. Katz, "On reversing the topics and vehicles of metaphor," *Metaphor and Symbol* 21, no. 1 (2006): 2.

43. Cf. Hal Arkowitz and Scott O. Lilienfeld, "Why science tells us not to rely on eyewitness accounts," *Scientific American*, January 1, 2010, https://www.scientificamerican.com/article/do-the-eyes-have-it/.

44. Bear et al., *Neuroscience: Exploring*, 827.

45. Ernst Cassirer, *Language and Myth*, translated by Susanne K. Langer (New York: Dover, 1946), 24.

46. Matthew S. McGlone, "Hyperbole, homunculi, and hindsight bias: An alternative evaluation of conceptual metaphor theory," *Discourse Processes* 48, no. 8 (2011): 563–74.

47. Ibid., 566.

48. George Lakoff and Mark Johnson, *Metaphors We Live By* (Chicago: The University of Chicago Press, 1980).

49. Lakoff and Turner, *More than Cool Reason*.

50. Cf. Matthew S. McGlone, "What is the explanatory value of a conceptual metaphor?," *Language and Communication* 27, no. 2 (2007): 113.

51. Bear et al., *Neuroscience: Exploring*, 358–59.

52. Ibid., 827.

53. Cf. Arthur M. Glenberg, "What memory is for," *Behavioral and Brain Sciences* 20 (1997): 4.

Chapter Two

Metonymic Binding and Conceptualization

Perhaps because the role of metonymy[1] in communication seems understated when compared with the dramatic 'semantic leaps' afforded by metaphor, attempts to explain metonymy in Conceptual Metaphor Theory have always been something of an afterthought. This is unfortunate because metaphor and metonymy, while different in terms of what they accomplish separately, often function in tandem: cognitive literature proponents and other discourse specialists have consistently noted how hidden metonymy often lends decisive support to metaphor in narrative and other extended discourse contexts.[2] For this reason, an explanation of metaphor that fails to sufficiently credit the contribution of metonymy can only be considered incomplete.

In particular, issues in need of resolution include the basic nature of metonymy, its function within conceptualization, its relationship to metaphor, and its role in the elicitation of contextual effects. Additionally, one might hope to resolve the ongoing debate about whether metonymy should be understood as a projection between conceptual domains or a differential activation within a single domain, and whether "mapping" (a term normally mentioned with respect to metaphor) properly applies to metonymy or not. Questions have even been raised as to whether there is any functional difference between metaphor and metonymy at all.[3] Such points of contention over fundamental issues have caused metonymy specialists to spend more time debating and defending definitions and starting assumptions than attempting to make new discoveries about the pervasive role of metonymy in language and cognition.

If metonymy were a rather unimportant peripheral phenomenon, or if it were simply a slightly less noticeable form of metaphor, such controversies and practical problems might be easily brushed aside. To the extent that this book's primary objective is to offer a more complete and theoretically

consistent view of metaphor processing by consciously keeping the conceptual grounding of metaphor firmly in mind, the issue of metonymy and its relationship to conceptualization cannot be sidestepped. This being the case, before proceeding to details relating to metaphor processing, it will be necessary to clearly explicate the role of metonymy in cognition and conceptualization. This chapter will detail how metonymy reflects the hidden links undergirding conceptualization and thus facilitates metaphor not incidentally but as the inevitable consequence of metaphor's own dependence on the details of conceptualization during inferencing.

THE CONCEPTUAL NATURE OF METONYMY

Despite the fact that metonymy is so ubiquitous in everyday language that an ability to interpret it is likely to be taken for granted, in certain cases the meanings of metonymic expressions are less than transparent. Although the idiom 'lend a hand' passes all but undetected in everyday English and even translates directly into a few other languages,[4] seemingly straightforward metonymic expressions of this nature often cause trouble for young children, non-native speakers, and those with certain narrowly delimited language deficits.

For example, a few years ago my preschool-age daughter happened to wander into a room where I was doing some spring cleaning. Seeing her staring at the stacks of books, papers, and miscellaneous items scattered around, I casually remarked, "I've got a mess on my hands." Her response? "Not on your hands, on your floor!" In fact, her observation was completely correct; my hands were clean and the floor around me was cluttered. Nevertheless, my unconsciously selected metonymic statement regarding my 'hands' had nothing to do with *where* the mess was physically located and everything to do with *whose responsibility* it was to clean up. In metonymy, simple vocabulary and grammar often disguise surprisingly subtle implications.

In fact, psychological studies have affirmed metonymy to be a potentially obscure communicative technique albeit one that is often less challenging than metaphor. In attempting to evaluate the ways in which metonymy and metaphor comprehension relate to cognitive development (using chronological age and "receptive vocabulary"-derived estimated mental age as standards), Rundblad and Annaz noted how "comprehension of metaphor and metonymy steadily improves throughout childhood and adulthood"[5] but further found that metonymy comprehension appears to start earlier than metaphor and that it continues to be superior to metaphor comprehension over the course of mental development. These findings echo the views of other language researchers who also characterize metonymy as being the more basic of the

two in terms of cognitive processing difficulty.[6] If metonymy is truly more basic, it would go a long way towards explaining the fact that metonymy is less conspicuous than other figures of speech; the more basic the trope, the more natural for it to be taken for granted.

While the results of such language development studies are revealing, the comparative format of Rundblad and Annaz's study itself brings to mind an intriguing question: Why is it that so many figurative language scholars feel the need to analyze metonymy not in isolation but as a counterpart phenomenon to metaphor? Despite their obvious differences, many researchers detect a vague affinity between metaphor and metonymy. The following section will briefly introduce the basic theoretical positions of CMT and then cross-reference these with neuroscientific knowledge to distinguish metonymy from metaphor with respect to conceptualization.

METONYMY IN CONCEPTUAL METAPHOR THEORY

When Lakoff and Johnson published the book that is perhaps the foundational document of Conceptual Metaphor Theory, *Metaphors We Live By*,[7] they stressed the interrelationship of metaphor and metonymy. In order to characterize the traditional view of metonymy in CMT, it will first be necessary to summarize its viewpoint on metaphor.

Whereas many previous theories had understood metaphor to be a primarily linguistic (that is, lexico-grammatical) and often rhetorically 'ornamental' phenomenon with semantic implications, Lakoff and Johnson characterized it as being primarily conceptual.[8] With respect to traditional linguistic views of metaphor, they stressed that attempting to define metaphor in terms of the syntax of statements used to elicit it is to fundamentally mischaracterize what metaphor is; CMT proponents claim it to be "the understanding of one concept in terms of another."[9]

Furthermore, Lakoff and Johnson asserted that in most cases metaphor is not facilitated by *ad hoc* ("one-shot") correspondences created *de novo* for every metaphorical expression but rather it accesses a preexisting reusable network of entrenched associations. From the moment of birth, as humans experience the world around them, they receive somatosensory inputs which they must make sense of to control their bodies, navigate space, and manipulate objects in their environment. These neural dispositions emerge and stabilize in early development to form image schemas. As this image schematic system is operational by the time children begin to learn language, when they encounter words and begin to relate them to encyclopedic knowledge, this partially developed 'proto-conceptual' system serves to ground lexical

understanding. The term "embodiment," then, refers to the predictable yet long unrecognized fact that human cognition (including language) often if not always mirrors the genetically predetermined abilities and neural constraints that facilitate and guide human development.

Concerning the grounding of metaphorical understanding in embodied, experientially derived categories, Lakoff and Johnson claim that the "non-physical" is typically conceptualized in terms of the "physical," and that the "less clearly delineated" tends to be understood in terms of the "more clearly delineated."[10] That abstract metaphorical understanding should be informed by more concrete and basic concepts only stands to reason. Such a situation harmonizes well with Tomasello's assertion that the normal trajectory of child language development begins with concretely practical simple nouns[11] and conceptually simple verbs relating to specific activities involving material objects or body parts.[12]

From this perspective, the employment of concrete nouns and conceptually basic verbs functions as a necessary prerequisite to more sophisticated linguistic communication; more abstract (often metaphorical) expressions are seen to be understood and adopted only during later periods of linguistic development.[13] In the same way that an understanding of algebraic equations cannot precede a basic knowledge of integers and arithmetic in mathematics, the comprehension of abstract concepts is premised on an understanding of concrete words and experientially grounded phrases. In this way, abstract language appropriates the conceptualization details of more concrete phrasing for adapted use.

Consequently, although lexical units certainly do have reciprocal relationships with other lexical units in the mature adult language system, young children are not introduced to new lexical items by way of metalinguistic explanations such as definitions or verbal analogies. Rather they begin by learning practically useful words related to their own bodies (nose, mouth, finger), typically encountered objects (cup, ball), and people they interact with regularly (Mama, Dada).[14]

One of the strongest validations of this concept-grounded theory of linguistic bootstrapping is that it passes the common sense test. During the course of cognitive development, it is a given that children are less likely to understand verbal instructions if they have no practical experience with the objects and processes being explained. For example, while the request to "fry an egg" may seem simple, the meagerness of the phrase's lexical and grammatical profile conceals a whole range of expectations concerning background knowledge and learned repertoires. From the simple but in no way negligible idea that an egg must be separated from its shell before it can be fried to the variety of motor skills necessary to facilitate egg-cracking,

contents extraction, and proper cooking technique, responding to this request is not merely an issue of lexical and grammatical knowledge. As such, language expresses not only 'head knowledge' (surface recognition of what objects are) but embodied understanding of 'how things work' (situational awareness, understanding of force dynamics, and kinesthetic routines to act on these).

Thus, for Lakoff and Johnson, 'conceptualization' refers to the amalgam of stored sensory images in memory, memories of experiences involving those images, and motor routines associated with them. Because these multi-modal concepts are not discrete propositional objects but emergent states of neural networks[15] that are stored not with photographic accuracy but as adaptively profiled, input channel–attuned orientational dispositions throughout the neural system, they facilitate flexible recall of previously experienced real-world entities and situations whatever the modality of perception.

Nevertheless, while the *fact* of the multimodality of concepts is broadly affirmed among cognitive linguists, there have been few attempts to draw on the abundance of neuroscientific resources to consciously fill in corresponding gaps in linguistic theory. One reason for this is that cognitive linguists are probably reluctant to stray outside of their field of specialized training (in most cases experimental or theoretical linguistics) to search for and incorporate relevant information from the biological sciences. Admittedly, such cross-disciplinary information transfers must be done with care or there will be the risk of misinterpretation or oversimplification. On the other hand, if cross-referencing is precisely what is needed to break a theoretical logjam, why wouldn't one feel an urgent desire to confirm one's theoretical findings by way of outside information sources? Keeping this goal of neurological cross-verification firmly in mind, the following section will offer neuroscientific rationale for retaining the idea of unidirectional mapping in the case of metaphor and also explain why, for the same reasons, mapping does not seem to apply in the case of metonymy.

MAPPING APPLIES TO METAPHOR BUT NOT TO METONYMY

In cognitive neuroscience, "mapping" refers to the primarily unidirectional correlated projection of action potentials.[16] Far from being a thinly corroborated speculative hypothesis, "mapping" is a widely acknowledged type of processing that facilitates the identification of objects in a sentient being's environment by relaying sensory information as a set of qualia- and orientation-sensitive parameters that can be efficiently scanned by the focus

of attention.[17] Consequently, mapping in the neural context often involves the correlation of perceptible features for purposes of identification.

In the field of cognitive linguistics, Lakoff and Johnson use the word "mapping" to indicate the situation in which there is conceptual feature overlap between elements of otherwise unlike conceptual domains. Used in this way, Burns's phrase "My love is like red, red rose"[18] juxtaposes two normally incompatible concepts, a person's LOVED ONE and a ROSE, and posits that certain attributes of the person somehow "map" (that is, connect in a correlated way) to certain attributes of the flower.

While "mapping" in the neural sense involves correlating key features of incoming stimulus against sets of features stored in memory so as to detect feature overlap as a leading indicator of identity, metaphorical mapping lexically stimulates two sets of associated features (concepts) in serial fashion so as to detect feature overlap as a leading indicator of noteworthy similarity. While the points in the processing stream where overlaps are detected may differ, both the means (serial activation of correlated features) and the results (attention garnered as a consequence of feature overlap) are ostensibly the same. This being the case, it seems reasonable to state that metaphorical mapping accomplished by lexical means is a close corollary to neural projection not incidentally but because both processes are facilitated by the same identity recognition system. Although Lakoff's use of the term "mapping" to express feature correlation may have originated in mathematical set theory,[19] using the word "mapping" to describe metaphor processing is legitimate not by way of distant analogy but because it *actually is* a form of neural mapping.

Lakoff and Turner have used the word "mapping" with respect to metonymy, as well. They state: "*Metonymy* involves only one conceptual domain. A metonymic mapping occurs within a single domain, not across domains."[20] Here they are positing a single-domain view of metonymy in which the PART FOR WHOLE substitution relationship often evident in metonymic phrasing is understood to link two conceptual domains or sub-domains. For example, when Burns refers to "my love," the concept LOVE (a feeling of affection) stands in for the name of the object of the poet's affection. In this way, the identity of the beloved is expressed by oblique reference to the feelings that person evokes. How does such an expression differ from metaphor?

If one were to use the phrase "my rose" or "my teddy bear" to refer to a loved one, these are cases of metaphor because both 'roses' and 'teddy bears' are inanimate objects in the real world and clearly distinguishable from people. In the case of "my love," however, the association is based on feelings of affection for a person that are already associated with that person's identity in the mind of the admirer. Consequently, using the words "my love" to refer to the person is not to create an artificial juxtaposition of unlike

objects to highlight a similarity but a way of communicating the identity of the person's broader conceptual profile by alluding to a constituent part of it (emotional attachment for that loved one being attributed to the person making the statement).

Upon reflection, this second situation (expressing conceptual identity through the highlighting of a delimited aspect of the concept) fails to meet the conditions for the neuroscientific definition of "mapping." In that "mapping" is defined as a unidirectional correlated projection of action potentials, there must be some sort of feature correlation between the two domains in question for mapping to be accomplished. Because metonymy does not elicit a correspondence between unlike concepts but rather asserts identity by leveraging already associated features within a single concept, Lakoff and Turner's claim that metonymy is a single-domain phenomenon is difficult to harmonize with their claim that it functions by way of "mapping" (a cross-domain correspondence).

This issue has been a theoretical problem for many cognitive linguists as they have attempted to clarify the nature of metonymy. For example, Warren notes that although the term "mapping" seems appropriate for referring to connections in metaphor, it seems less so in the case of metonymy.[21] Benczes and colleagues,[22] Brdar and Brdar-Szabó,[23] and Strack[24] have all made similar observations. If metonymy is to be regarded as a single-domain phenomenon, the problematic word "mapping" needs to be replaced with a term that accurately reflects the nature of the links posited. The next section will offer an alternative account of single domain metonymy using ideas and terminology originating in cognitive neuroscience.

THE CASE FOR METONYMIC BINDING

Tomasello observes that "[a]ll mammals live in basically the same sensorimotor world of permanent objects arrayed in representational space" and the skill set mammals share includes the abilities to "remember 'what' is 'where' in their local environments" and "categorize objects on the basis of their perceptual similarities."[25] Bownds characterizes[26] this "representation-holding function" of the brain not as a higher order associative function but rather as a simple stimulus-response system by which animals store, recall, and respond to perceptions derived from the varied environments in which they find themselves. In other words, one skill-set that all mammals share is the ability to store and recall a complex combination of incoming stimuli from various sensory organs for the purpose of identifying and responding to objects and agents in the outside world.

Neuroscientists, studying both humans and other mammals, have termed the linking of complex multimodal perceptual information "binding" and have been slowly but surely addressing this "binding problem" since at least 1961.[27] In her introduction to a special issue of *Neuron* devoted to binding, Roskies mentions "binding" as a phenomenon which links information "across visual space" and "types of features." Occurring in various modalities, "auditory binding" allows a single voice to be discriminated in a crowd, "binding across time" facilitates the recognition of object motion and "cross-modal binding" associates "the sound of a ball striking a bat with the visual percept of it, so that both are effortlessly seen as being aspects of a single event."[28] From this explanation, it will be apparent that the types of multimodal associative connection Roskies is referring to closely mirror the categories and concepts proposed by cognitive scientists and cognitive linguists[29]; it is these same multi-modal categories and concepts that form the basis of metonymic and metaphoric understanding in CMT.

With respect to the close relationship between conceptualization and metonymy, one of the most intriguing findings of research into Stimulus-Response bindings is that these bindings potentially offer neurobiological motivation to account for how metonymy enables partial domain aspects to activate larger domains as a whole. Henson and colleagues note that when a given set of stimuli has been "paired with a response" resulting in the features of the stimuli becoming "bound" to that response, "later repetition of some of the features (. . .) may be sufficient to retrieve the response . . ."[30] The fact that partial features of a stimulus can (in some cases) retrieve the response previously elicited by the stimulus as a whole is exactly the type of associative activation necessary for explaining Part For Whole metonymy. Seen in this light, metonymy is nothing less than an efficient conceptual strategy for leveraging the neural links by which spatiotemporally contiguous mental images have been bound together into concepts.

Indeed, continuing research on the nature of conceptual domains in cognitive linguistics reveals many close parallels with the research of neuroscientists attempting to study binding.[31] This broad convergence of compatible research results serves not only to affirm neuroscience views of binding with evidence from linguistics but also corroborates cognitive linguistics views of conceptualization by way of neuroscientific findings.

While the preceding paragraphs have suggested that the term "binding" better matches the details of conceptual cohesion and metonymy than mapping does, it is not sufficient to simply replace the inaccurate term "mapping" with "binding" when metonymy is being discussed. For if metonymy functions solely and explicitly by way of the bindings that enable conceptualization, then a much bolder claim may be warranted: that metonymy is not

simply a verbal feature *related to* conceptualization but may actually be seen as a *reflection of* conceptualization with respect to lexicalized concepts. Put differently, to study metonymy is to probe the associative details of verbally accessible conceptualization.

Given the profound implications for linguistics if such a potent characterization of metonymy were to prove correct, it may be an appropriate juncture to specify exactly what counts as a concept in cognitive linguistics. According to Langacker, a conceptual domain is defined as any "coherent area of conceptualization relative to which semantic units can be characterized" and may be "basic," "abstract," or of "any degree of complexity."[32] For example, the concept CAT might feature a number of associations in the mind of someone considering the lexical item, "cat": the basic appearance of a cat in visual cortices, the sound of a cat's meow and the sound of the word "cat" in auditory cortices, the smell of a cat or of cat food in the olfactory cortices, abstract understandings in which lions and tigers are considered to be 'cats,' the feel of a cat's fur in tactile memory, encyclopedic information about a variety of famous cartoon cats, lexical knowledge about cat-related idioms like "Cats have nine lives" or "It's raining cats and dogs" and possibly even mental images of the various performers who have played the role of "Catwoman" in the movies or on television.[33] The associations primed by the lexical unit "cat" are potentially very extensive.

In fact, research has indicated that the initial brain response to a spoken word results in just such broad activation. Psycholinguistic findings concerning the nature of spreading activation in cases of polysemy (cases in which a single word has multiple meanings) show that the types of neural activation involved are not narrowly "targeted" but are rather examples of unfocused spreading activation[34] that include every possible sense of the word in question.[35] For example, in their research on polysemy (of which metonymic polysemy is one type), Cutler and Clifton mention that "[s]tudies of the cross-modal priming task have produced evidence for momentary simultaneous activation of all senses of an ambiguous word, irrespective of relative frequency or contextual probability."[36] For example, the word "scale" was found to prime both the words "weight" and "fish."[37] Nevertheless, such primings were only available momentarily; "contextually inappropriate meanings" ultimately were found to play no role in processing.[38]

In neurological terms, it can be said that when potentially ambiguous (semantically indeterminate) metonymic statements are processed, although either the literal or metonymic sense may be more salient, the levels of activation of the less salient senses are still sufficient to keep them on standby so that they may be quickly accessed should such a line of inferencing be required. The fact that the metonymic function of a phrase is understood to

be facilitated by the polysemy of the individual lexical items that comprise that phrase strongly implies that lexical access cued by metonymy displays the same unfocused spreading activation that polysemous words do in general. Thus, in terms of the neural pathways it makes use of, PART FOR WHOLE metonymy should be viewed as the targeted stimulation of a lexically bound conceptual aspect that spurs the neural activation of the conceptual structure as a whole in an untargeted way. For this reason, the disambiguated meaning taken from a metonymy will depend less on the relative likelihood (statistical probability) that a certain sense was intended than on the perceiver's sensitivity to subtly communicated contextual cues.

METONYMIC FUNCTION DOES NOT DEPEND ON SUPERIOR OR INFERIOR DOMAIN STATUS

Among cognitive linguists that have attempted to explain how metonymic connections are facilitated, Croft's "Domain Highlighting" explanation[39] in particular has been regularly cited. In this view, some domains (or subdomains) in metonymy are "intrinsic" (central) domains and some are "extrinsic" (secondary) domains. When a "secondary domain" determines the meaning construed from a metonymy, Croft refers to such a function as "domain highlighting."[40] According to this characterization, some "extrinsic" aspect of a domain is "highlighted" in place of some more "intrinsic" and central aspect of the concept. In Croft's analysis, then, the actress Halle Berry's role as "Catwoman" would represent such a "secondary" type of "extrinsic" domain. Although viewed to be secondary with respect to the "intrinsic" meaning of Berry's name, by way of metonymic connections, mention of Catwoman nevertheless facilitates the shift of reference necessary for the role to obliquely allude to the actress.

Croft's view of metonymy makes a point of distinguishing "domain highlighting" from what he calls metonymic "mapping."[41] He states, "[i]n metonymy, [. . .] mapping occurs only within a domain matrix. However, it is possible for metonymy, as well as for other lexical ambiguities, to occur across domains within a domain matrix. In this way, domains do play a significant role in the interpretation of metonymy."[42] The problem with Croft's analysis is that if one takes "metonymic binding" to be the basis for conceptual domains, there is no need to establish any hierarchical relationships between domains and sub-domains just for the sake of maintaining the working definition of "mapping" as a correspondence "across" domains.

In Langacker's definition above, a domain is said to be a coherent knowledge structure bound to a semantic unit (usually a lexical item); in this

characterization, no mention is made of 'intrinsic domains' or 'extrinsic subdomains of secondary importance' because, from a neural point of view, all domains are created equal: as ever-changing bundles of somatosensory dispositions in the mind, the demarcation lines between domains are necessarily provisional and, in principle if not in practice, any domain can potentially be conjoined with any other domain. And while one might indeed distinguish between firmly entrenched domains and relatively tenuous and temporary ad hoc domain aspects,[43] these distinctions make no difference to the definition of metonymy. If the interactivating relationship between two partially overlapping domain aspects is sufficient to facilitate metonymy in language, then the question of which is the domain and which is the subdomain is irrelevant. If binding is the crucial process that fuses the multimodal minutiae of sense perception into concepts, metonymy is a way to indirectly leverage one experientially bound conceptual aspect by way of another aspect by taking advantage of the mutuality of their pre-existing association.[44]

ON SO-CALLED "REFERENTIAL METONYMY" AND SITUATIONAL AWARENESS

In Chapter 1, skepticism was expressed concerning the commonly held supposition that language is a form of 'reference'; while language in discourse does evidence certain referential tendencies, if one focuses on language processing in the mind, it seems more appropriate to view language in terms of partitioning and access. For similar reasons, to the extent one sees metonymic function as a natural corollary of conceptual binding, metonymy's traditional status as a quintessentially referential function[45] must be called into question, as well.

Although linguists have become aware of metonymic links because of the role they are often seen to play in linguistic communication, the reason metonymies are capable of playing such roles in the first place is because the neural connections they leverage are responsible for establishing and maintaining the organism's identity recognition system. For this reason, while it is natural for linguists to understand metonymy in terms of reference because that is its most obvious function in discourse, with respect to individual cognition, metonymy's primary raison d'être lies elsewhere.

What is the practical difference between reference and access? Reference implies a coordination of basically stable entities according to some predetermined correlation criterion. According to this definition, a dictionary is a good example of reference but unfortunately, in neural terms at least, spoken language is an extremely poor example. Because the meanings attached to

the words an individual uses are found neither in the books of authors nor the brains of others but only in the mind of that particular cognizing individual, and because the semantic pole of conceptualization is undergoing constant incremental change, the situation described by everyday verbal language use is not characterized by dependable reference equally available to all. Rather, language offers the individual cognizer reliable 'handles' with which to access and manipulate ever-changing dispositional networks. Similarly, the bindings that facilitate metonymy are not 'means of reference' but rather function as the associative 'cords' by which multimodal sets of otherwise unrelated conceptual details are bundled together.

The case of the logo for the Japanese transport company Yoshida *Kei-unsō* [Yoshida light transport] represents a situation in which both metaphoric and metonymic understanding are seen to be stimulated non-verbally.[46] The company's logo is very simple; it depicts the images of a right hand and wrist (palm forward) and the footprint made by a left foot (both colored white) inside a red valentine-type heart shape. While the logo is slightly mysterious, a moment's thought reveals that the depicted hand metonymically represents the company's willingness to do 'manual' labor, specifically the 'carrying' of goods. The 'footprint' depicted indicates the company's ability to transport such goods from location to location. While the hand and foot metonymically stand in for 'manual labor' and 'footwork,' the heart which surrounds them metaphorically indicates the company's 'caring attitude' as they go about their duties. Needless to say, these visual domain leveraging techniques, while certainly communicative, are difficult to term "referential." The effectiveness of such allusive techniques adds further evidence to the proposition that metonymic function is not solely a matter of linguistics.

Consequently, "metonymy" should be redefined as a conceptual stimulation strategy in which sensory stimulus (lexical, visual, auditory, etc.) is used to indirectly elicit activation of one conceptual domain through the direct stimulation of a partially overlapping domain aspect of it. Such a characterization harmonizes well with Warren's observation that metonymic expressions are "based on actual, normally well-established relations between [. . .] referents,"[47] save only that, again, the word "referent" cannot be used in a strict sense unless one is examining language as a matter of discourse rather than cognition.

There are some scholars, however, who see metonymy not in terms of conceptual activation but rather as a case in which some implied word or phrase has simply been elided for the sake of communicational brevity. For example, Warren asserts that metonymy is a phenomenon that utilizes strategic omission to refer to a given subject indirectly. In her words, "(referential) metonyms are basically abbreviated noun phrases" in which an "implicit

head" has been omitted but is nevertheless "mentally present for the speaker and retrieved by the interpreter."[48] According to such logic, to interpret the CONTAINER FOR CONTENTS metonymic expression "I can't believe he ate the whole bag!," it would be necessary to retrieve the omitted ending "of chips" so as to avoid believing that the bag itself had been ingested. In this case, though, common sense rather than grammar may be at work. Because people do not usually eat bags but might sometimes eat snack food packaged in plastic bags, listeners can guess the true situation readily with minimal mental effort. While interpreting the statement may indeed necessitate accounting for the omitted head in some way, guessing the grammatical particulars in such a case is less important than realizing that a bag full of snack food is being alluded to. Consequently, understanding the complex situation implied by the otherwise indeterminate word "bag" is the most crucial issue.

To further clarify how implicit understanding of specific situations (a form of context) decisively influences the form of verbal expressions, consider a more complex example: imagine driving down a freeway with an acquaintance who has offered to drive you home. Unfamiliar with the interchange just ahead, the friend asks: "Is this our exit?" Without much reflection, you interpret the question and respond "yes" in time to take the correct exit. In fact, however, the metonymic access[49] provided by the word "*our*" in the question "Is this *our exit*?" results not from the simple omission of a phrase. To accurately summarize the idea expressed by the abbreviated metonymic expression "our exit," one would need to ask, "Is this the freeway exit we need to use to get to your house?" As this painstakingly worded, precisely formulated question is grammatically dissimilar to its metonymic substitute, the metonymically abbreviated query is seen not to be a simple grammatical elision but rather a wholesale conceptual reformulation of grammar *that has never been produced to begin with*. Although the human mind can certainly generate such convoluted grammar when precision is demanded, the fact that the base idea may be expressed in a much simpler (if less exact) metonymic way points to the fact that the shortcuts taken in metonymic phrasing stem from the efficiency of the inherent associational capacities of the underlying system.

In fact, Tomasello makes a similar argument when he asserts that shared contextual information is exceedingly important in interpretation. He notes that common expressions like *it*, *she*, *they*, *here*, and *the guy we met* lack explicit coding and therefore rely on mental attunement. Such so-called 'referents' cannot be determined directly but rather must be inferred from some "common conceptual ground."[50] Metonymy is communicatively efficient precisely because it makes use of experientially grounded associations that are so intuitively apparent in context that they may be safely taken for granted.

ON THE INVISIBLE LINGUISTIC PRODUCTIVITY OF DEAD METONYMY

While metaphor is an attractive communication technique because it allows one to express certain otherwise less than straightforward ideas in vivid or enlightening ways, Pauwels notes that corpus surveys of metonymy show it to be consistently employed as a kind of "avoidance strategy"[51] used in cases when one does not desire to actually name what is being alluded to. By way of example, one might mention situations in which euphemistic metonymic phrasing replaces more straightforward language so as to accommodate certain subtle communication goals.

Consider the case of a parent who returns home carrying a large birthday present to surprise a child with. Knowing that the child is playing in the next room, a second parent might remark, "Put that purchase away before someone sees it." In this case, the word "purchase" metonymically stands in for "the birthday present you just bought" while the word "someone" has been strategically utilized to avoid overtly mentioning the child's name (which would risk attracting attention). Both words have been carefully chosen so as to reflect a shared contextual awareness that if the child were to see the present, the birthday surprise would be spoiled. Far from being an exceptional case, the metonymic displacement strategy used here clearly displays the value of metonymic euphemism in situations when straightforward phrasing seems less than apropos for one reason or another.

To mention a more conventional example, consider the word "toilet." As this word is commonly understood to mean a seat-like mechanism for the disposal of filthy bodily refuse, people tend to refer to it by substituting metonymic euphemistic expressions: in particular, the compound words and phrases washroom, bathroom, restroom, powder room, and lavatory all express the concept TOILET by shifting the highlighted domain aspect to alternative activities that (may or may not) happen to occur in the room the toilet occupies (for, truth be told, 'bathrooms' often lack bathing facilities and the 'restroom' seems a less than ideal place to rest).

Of course, use of such toilet-related metonymic euphemism is in no way limited to English. Common Japanese language equivalents include *o-te-arai* (literally, 'hand-washing [place]') and *keshō-shitsu* ('makeup application room'). In fact, although the American English word "toilet" concretely refers to a seat-shaped flushing device, the literal meaning derives from the French "toilette," a term that indicates a kind of "dressing room"; consequently, the literal English word, "toilet," is seen to have etymological roots that trace back to a metonymic euphemism in a foreign language.

Given the strong tendency for conventional metonymic expressions to seem more and more literal with frequent use, one senses the need to coin a new term, "dead metonymy." Given the subtle nature of metonymic function, it will come as no surprise that such semantic shifts[52] tend to take place imperceptibly. Take the phrase 'empty pool.' The word "pool" in this expression would seem to have originated in the phrase 'swimming pool,' a literal designation which denotes a pool of water meant for swimming. Since it makes no sense to interpret an 'empty pool' as 'a pool of water without water,' we find that (over time and with frequent use) the commonly understood meaning of the word "pool" has shifted from the original 'pool of water' meaning to a particular highlighted domain aspect of it, specifically 'a reinforced hole in the ground.' The seemingly literal phrase 'empty pool' turns out to be an almost imperceptible example of a case in which an allusion to a domain as a whole (SWIMMING POOL) in fact alludes to an alternatively conceptualized domain aspect (REINFORCED HOLE) that only reveals itself in certain highly specific linguistic circumstances. The fact that the very existence of this extremely subtle WHOLE FOR PART metonymy can only be detected through careful analysis exemplifies one difficulty encountered by those attempting to evaluate the extent to which metonymic function underpins thought and language. If metonymies tend to be easier to process than metaphors because they are facilitated by a more basic variety of cognitive function, dead metonymies may prove more difficult to detect than dead metaphors for exactly the same reason.

METAPHOR AND METONYMY AS COMPLEMENTARY SEMANTIC FUNCTIONS

By way of review, metaphor is facilitated by details of conceptualization and the details of conceptualization are determined by the ways in which concepts are bound together, some of these bindings being accessible by way of metonymy. For this reason, the conceptualization details that facilitate metonymic function turn out to be the same conceptual details that metaphor crucially depends upon. This being the case, metonymy and metaphor, rather than being understood as unrelated phenomena that find themselves incidentally juxtaposed in certain linguistic settings, should rather be recognized as complementary features of conceptualization that tend to function in tandem because the productivity of a metaphor often depends to some extent on enhancement by way of verbally expressed metonymic links.

This view, of course, harmonizes with the fundamental tenets of Lakoff and other CMT proponents who see language as being grounded in conceptualization. Having said this, the theoretical progress of CMT has been obstructed by terminological inconsistency precisely because metonymy's crucial role in conceptualization had not been fully recognized. Additionally, while the introduction of the term "mapping" has proved illuminating with respect to metaphor, its indiscriminate use has likely impeded theoretical understanding of the nature of concept formation and metonymic function.

In the end, because metonymy and metaphor operate according to the hidden principles of conceptualization in the mind of an individual, traces of their existence detected in language at least partially reflect the entrenched connectivity of mind itself. Precisely because metonymy and metaphor are irretrievably conceptual in nature, they do indeed represent a window on the hidden structures of cognition and how the mind operates.

NOTES

1. Traditionally, the term "metonymy" refers to expressions in which a delimited part of an idea is used to express the idea as a whole. For example, in the seafaring expression "all hands on deck," the word "hands" is used metonymically to indicate crew members (who presumably use their hands to accomplish many of their shipboard duties).

2. E.g., Daniel C. Strack, "Who are the bridge-builders?: Metaphor, metonymy and the architecture of empire," *Style* 39, no. 1 (2006): 37–54.

3. E.g., John A. Barnden, "Metaphor and metonymy: Making their connections more slippery," *Cognitive Linguistics* 21, no. 1 (2010): 1–34.

4. While the English idiom "lend a hand" may be translated directly into Japanese (*te wo kasu*) and Spanish (*echar una mano*), translation into Chinese, French, and German requires paraphrase.

5. Gabriella Rundblad and Dagmara Annaz, "Development of metaphor and metonymy comprehension: Receptive vocabulary and conceptual knowledge," *British Journal of Developmental Psychology* 28 (2010): 556.

6. Ekaterina Klepousniotou and Shari R. Baum, "Clarifying further the ambiguity advantage effect in word recognition: Effects of aging and left-hemisphere damage on the processing of homonymy and polysemy," *Brain and Language* 103 (2007): 149; Charles Denroche, *Metonymy and Language: A New Theory of Linguistic Processing* (New York: Routledge, 2015), 56.

7. Lakoff and Johnson, *Metaphors We Live By*.

8. Experimental psychologists and cognitive linguists who have devoted time to studying examples like those mentioned have tended to come to the conclusion that metonymy, no less than metaphor, is not merely linguistic but actually conceptual. Cf. Raymond W. Gibbs, Jr., *The Poetics of Mind: Figurative Thought, Language, and*

Understanding (Cambridge: Cambridge University Press, 1994), 319–20; Antonio Barcelona, "Clarifying and Applying the Notions of Metaphor and Metonymy within Cognitive Linguistics: An Update," in *Metaphor and Metonymy in Comparison and Contrast*, edited by René Dirven and Ralph Pörings, 207–77 (Berlin: Walter de Gruyter, 2002); Klaus-Uwe Panther and Linda Thornburg, "The Roles of Metaphor and Metonymy in English –er Nominals," in *Metaphor and Metonymy in Comparison and Contrast*, edited by René Dirven and Ralph Pörings, 279–322 (Berlin: Walter de Gruyter, 2002); Jeannette Littlemore, *Metonymy: Hidden Shortcuts in Language, Thought, and Communication* (Cambridge: Cambridge University Press, 2015).

9. Lakoff and Johnson, *Metaphors We Live By*, 133.
10. Lakoff and Johnson, *Metaphors We Live By*, 59.
11. Michael Tomasello, *First Verbs: A Case Study of Early Grammatical Development* (Cambridge: Cambridge University Press, 1992), 41, 210.
12. Ibid., 265.
13. Rundblad and Annaz, "Development of metaphor," 550.
14. Tomasello, *First Verbs*, 41.
15. Paul Thagard, *Conceptual Revolutions* (Princeton: Princeton University Press, 1992), 19.
16. Andrew J. King, "Sensory experience and the formation of a computational map of auditory space in the brain," *BioEssays* 21, no. 11 (1999): 901; Bear et al., *Neuroscience: Exploring*, 799–801, 850–1; cf. also "priority map," Bear et al., *Neuroscience: Exploring*, 918; "sensory map," Bear et al., *Neuroscience: Exploring*, 920.
17. For an overview, cf. Daniel C. Strack, "Solving metaphor theory's binding problem: An examination of 'mapping' and its theoretical implications," *Metaphor and Symbol* 31, no. 1 (2016): 4–5.
18. A slightly adapted version of the first line from the famous poem "A red, red rose" (itself apparently an adaptation) by Robert Burns in *Poetical Works of Robert Burns*, edited by William Wallace (London: W. R. Chambers, 1958), 413.
19. George Lakoff, "The Contemporary Theory of Metaphor," in *Metaphor and Thought*, 2nd ed., edited by Andrew Ortony (Cambridge: Cambridge University Press, 1993), 210.
20. Lakoff and Turner, *More than Cool Reason*, 103.
21. Beatrice Warren, "An Alternative Account of the Interpretation of Referential Metaphor and Metonymy," in *Metaphor and Metonymy in Comparison and Contrast*, edited by René Dirven and Ralph Pörings (Berlin: Mouton de Gruyter, 2002), 127.
22. Réka Benczes, Antonio Barcelona, and Francisco José Ruiz de Mendoza Ibáñez, eds. *Defining Metonymy in Cognitive Linguistics: Towards a Consensus View* (Amsterdam: John Benjamins, 2011).
23. Rita Brdar-Szabó and Mario Brdar, "Metonymic Chains and the Nature of Metonymy," in *Defining Metonymy in Cognitive Linguistics: Towards a Consensus View*, edited by Réka Benczes, Antonio Barcelona, and Francisco José Ruiz de Mendoza Ibáñez (Amsterdam: John Benjamins, 2011).
24. Cf. Strack, "Solving metaphor."
25. Tomasello, *Cultural Origins*, 16.

26. M. Deric Bownds, *Biology of Mind: Origins and Structures of Mind, Brain, and Consciousness* (Hoboken: John Wiley and Sons, 1999), 35.

27. Frank Rosenblatt, *Principles of Neurodynamics* (Washington, DC: Spartan Books, 1961).

28. Adina L. Roskies, "The binding problem," *Neuron* 24 (1999): 7.

29. Lawrence W. Barsalou, "Ad hoc categories," *Memory and Cognition* 11, no. 3 (1983): 211–17; cf. also Lakoff and Johnson, *Metaphors We Live By*, 152.

30. Richard N. Henson, Doris Eckstein, Florian Waszak, Christian Frings, and Aidan J. Horner, "Stimulus-response bindings in priming," *Trends in Cognitive Sciences* 18, no. 7 (2014): 379.

31. Strack, "Solving metaphor."

32. Langacker, *Foundations*, 488.

33. Bear et al., *Neuroscience: Exploring*, 840.

34. Rapp and colleagues have noted that metonymies activate "a bihemispheric, predominately left-lateralized fronto-temporal network including the inferior frontal gyrus" and that the level of activation is greater than that garnered by literal sentences. Cf. Alexander M. Rapp, Michael Erb, Wolfgang Grodd, Mathias Bartels, and Katja Markert, "Neural correlates of metonymy resolution," *Brain and Language* 119 (2011): 201.

35. The idea that spreading activation results in the momentary activation of all aspects of a word harmonizes well with Giora's "exhaustive access model" of lexical access. Cf. Rachel Giora, *On Our Mind: Salience, Context, and Figurative Language* (Oxford: Oxford University Press, 2003) 40–41.

36. Anne Cutler and Charles Clifton, "Comprehending Spoken Language: A Blueprint of the Listener," in *The Neurocognition of Language*, edited by Colin M. Brown and Peter Hagoort (Oxford: Oxford University Press, 1999), 140.

37. Cf. William Onifer and David A. Swinney, "Accessing lexical ambiguities during sentence comprehension: Effects of frequency of meaning and contextual bias," *Memory and Cognition* 9, no. 3 (1981).

38. Cutler and Clifton, "Comprehending Spoken Language," 141.

39. Croft, "Role of Domains," 280–81.

40. Ibid.

41. The fact that the resulting activation pattern will depend crucially on one domain being highlighted in terms of the other is the reason that the words "target" and "source" are (more or less) apt with respect to the domains involved in metaphor. In the case of metonymy, however, because all polysemous aspects of the cued metonymic word will be initially accessed and because the range of viable choices is delimited to options that reflect only well-established relations between constituent aspects, it would seem that the terms "source" and "target" have been misapplied.

42. Croft, "Role of Domains," 280.

43. Cf. Barsalou, "Ad hoc categories."

44. While the term "domain highlighting" may be useful with respect to classic synecdoche types of metonymy, the word "leveraging" is probably more flexible in that it does not presuppose any particular hierarchical relationship between activated domain and cuing domain aspect.

45. Cf. Lakoff and Johnson, *Metaphors We Live By*, 36; Antonio Barcelona, "Reviewing the Properties and Prototype Structure of Metaphor," in *Defining Metonymy in Cognitive Linguistics: Towards a Consensus View*, edited by Réka Benczes, Antonio Barcelona, and Francisco José Ruiz de Mendoza Ibáñez (Amsterdam: John Benjamins, 2011), 10.

46. Yoshida *Kei-unsō* [Yoshida light transport], "Yoshida *Kei-unsō* homepage," accessed March 29, 2017, http://www.yoshidakeiunsou.co.jp/.

47. Warren, "Alternative Account," 120.

48. Ibid.

49. While not traditionally thought to be a type of metonymy, Langacker notes that certain possessives such as "their office" and "the dog's fleas" offer conceptual access points to the broader "possessed" entity; that is to say, in cognitive grammar terms, the possessive function is accomplished metonymically. Cf. Ronald W. Langacker, "Metonymic Grammar," in *Metonymy and Metaphor in Grammar*, edited by Klaus-Uwe Panther, Linda L. Thornburg and Antonio Barcelona (Amsterdam: John Benjamins, 2009), 55.

50. Michael Tomasello, *Origins of Human Communication* (Cambridge, MA: MIT Press, 2008), 57–58.

51. Paul Pauwels, "Putting Metonymy in Its Place," in *Metonymy in Language and Thought*, edited by Klaus-Uwe Panther and Günter Radden (Amsterdam: John Benjamins, 1999), 272.

52. Cf. Denroche, *Metonymy and Language*, 61.

Chapter Three

The Challenge of Feature Attribution

ON FEATURE ATTRIBUTION

In the context of metaphor theory, "feature attribution" refers to a detailed account of exactly how a particular metaphor leads to the meanings it does. In the last few decades, "feature attribution" has come to be regarded as perhaps the foremost challenge in the field of metaphor research because, even while theories attempting to explain metaphor processing have proliferated, traditional methods of assessing a given theory's relative plausibility have patently failed.

In particular, verbal explanations of the inferencing process have regularly been found wanting. Theory-specific accounts of metaphor inferencing are often accompanied by painstaking verbal recapitulations purporting to confirm why a metaphor means what it does and oftentimes these glosses make perfect sense. The apparent reasonableness of such explanations notwithstanding, because the language of analysis itself tends to include sophisticated but insufficiently scrutinized phrasing based on explicit or implicit analogy, descriptions of why a certain metaphor leads to a particular semantic outcome often conceal a variety of uncorroborated starting assumptions. Consequently, even carefully worded and seemingly rigorous explanations of feature attribution cannot necessarily be taken at face value.

Until metaphor experts back up their ex post facto entailment accounts with the ability to predict how a broad range of metaphors will likely be interpreted by a group of actual human subjects, the validity of such theoretically defensible yet practically vague explanations will continue to be called into question. For while the ability to forecast feature attribution details is not the only criteria by which a theory of metaphor may be judged, if a theory

of metaphor is not able to explain how metaphorical entailments are generated, there is little reason to judge it superior to a competing theory which also claims a certain level of experimental validation and theoretical backing.

The primary goal of this chapter will be to characterize the strengths and weaknesses of various influential theories of metaphor and thereby arrive at a list of challenges that a functional feature attribution model would need to overcome before it can be considered viable. Specifically, theories addressed will include the "Defective Utterance View" variously expressed by Searle, Grice, and others, the "Interaction Theory" of Black, the metaphorical mapping view of CMT (featuring Lakoff's "Invariance Hypothesis"), the "Class Inclusion Theory" of Glucksberg and colleagues, Ortony's "Salience Imbalance Hypothesis," and the "Structure Mapping Theory" of Gentner and colleagues. After briefly summarizing and critiquing these viewpoints, a number of specific problems relating to feature attribution will be highlighted, all of this in preparation for a new theory of feature attribution to be proposed in Chapter 4.

THE DEFECTIVE UTTERANCE VIEW

For Searle,[1] focused as he was on the literal/figurative dichotomy so as to assess the truth value of utterances, metaphors are an example of a "false statement."[2] Searle felt that metaphorical statements such as "Lawyers are sharks" or "This school is a zoo" would likely be processed as follows: with literal meanings determined first, once falsehoods (statements judged non-literal because of their aberrant truth value) have been detected, the listener is forced to 'work harder' to 'find' some other possible meaning to make sense of the statement. In such an account, which assumes a 'literal statement first' default in processing, metaphorical understanding seems to result from a logical 'process of elimination' scenario in which relatively less likely alternatives occasionally win out depending on circumstances.

One drawback of this account is that analysis stems entirely from 'common sense' views of the nature of language and mind. The common sense logic expressed through Searle's argument may be summed up as follows: Just as being lied to in everyday life sometimes results in the necessity for a person to do some challenging detective work to discover the truth, when the mind processes a false statement, it will also be forced to 'work harder' to 'find' an alternative interpretation. While Searle's view certainly represents one of a number of coherent explanations, it happens to be a prime example of the kind of homunculus thinking mentioned in the previous chapter. In a homunculus view of mind, internal thought processes are often presumed to correspond to the ways in which an individual person responds to similar

problems in everyday life. Unfortunately, the processing of information in the human mind doesn't necessarily align with common sense expectations about how such processing is likely to be carried out.[3] In fact, the weight of psychological evidence points to the opposite state of affairs: that seemingly straightforward psychological processes are often structured in surprisingly complicated ways.

A more fundamental problem with Searle's account is that psychological studies have failed to corroborate his view that processing metaphor is always more difficult than processing literal statements. While experimental evidence demonstrates that some types of metaphor do take more processing time than literal statements, when the metaphorical statements are offered in context, the processing lag disappears.[4] Furthermore, in the case of highly familiar idiomatic expressions that include metaphor, metaphorical statements require no more processing time than that needed for literal statements.[5]

Moreover, contrary to Searle's assertion that the literal sense of a word functions as a default selection that must be overridden when obviously incorrect, experiments by Frisson and Pickering indicate that when multiple senses of a given word are encountered, "there is no immediate activation of a single fully specified sense" but rather the activation of an "underspecified core sense"[6] that includes the potential to facilitate access to both literal and metonymic senses. While the presentation of contextual cues prior to stimulus onset can cause a relatively rapid homing in process to occur, at the initial stage of processing there is no decisive bias toward any particular meaning, whether literal of figurative. Consequently, while Searle's characterization of metaphor as a kind of mental 'plan B' when normal interpretation goes awry is still commonly credited by many linguistic generalists, metaphor specialists keeping an eye on experimental results tend to regard such a Defective Utterance View as untenable.

THE EXTRANEOUS DETAIL ELIMINATION PROBLEM

In Black's "Interaction Theory," metaphor is characterized neither as a substitute for literal statements nor as a variety of formal comparison but rather as a primarily semantic phenomenon with "its own distinctive capacities and achievements."[7] One key aspect of the theory is the assertion that metaphorically derived inferences necessarily reflect the extended meanings of the words involved. For Black, such "systems of associated commonplaces" are experience-based webs of knowledge that "readily and freely" evoke implications. They also potentially include misinformation, half-truths, and downright mistakes ("as when a whale is classified as a fish"[8]).

One key finding of Interaction Theory is the two-way influence between paired ideas in metaphor. For his example, "man is a wolf,"[9] when metaphorical language brings together the two systems of associated commonplaces, not only does "man" seem to become more wolf-like but "the metaphor makes the wolf seem more human than he otherwise would."[10]

In this analysis, Black identifies one of the foremost problems in metaphorical feature attribution, namely, the fact that the statement does not seem to view some generic HUMAN domain through some equally generic, essentialized WOLF domain. If it did it might result in rather peculiar entailments like humans hunting in packs or eating meat raw. While such ideas are not logically precluded, neither do they seem to be the implications most people would take away (barring a very specific context that would naturally imply such entailments). For this reason, when someone makes the statement "Lawyers are sharks," a line of inferencing which posits lawyers to be good swimmers can safely be ignored. The question arises, then, by what criteria are conceptually central but metaphorically irrelevant inferences effectively filtered out. Let's term this processing issue the Extraneous Detail Elimination Problem.

THE SUBJECTIVE ENTAILMENT PROBLEM

Furthermore, in the case of "Man is a wolf," WOLF characteristics seem to be distilled down until they correspond only to a certain cold and calculating type of human aggressiveness. Perhaps the "system of associated commonplaces" relating to wolves is informed more by storybook images than scientific observation. In fact, Freeman, who traces the first documented use of the "man is a wolf" metaphor in Western tradition[11] to the ancient Roman comic dramatist Plautus's mention of the Latin proverb *lupus homo homini*,[12] suspects that Black was able to take the entailments of his WOLF metaphor for granted precisely because of the "long history of fables from Aesop on [as well as] children's stories anthropomorphizing animals."[13]

In any case, wolf-related features in Black's example do not simply represent a balanced view of the essential characteristics of wolves as opposed to other animal species but rather represent a skewed distillation of seemingly less essential attributes that have more to say about the domain being adapted than about the domain being applied. Here we have encountered another key obstacle to be cleared before a feature attribution model can be considered viable: the fact that sometimes the most prominent entailments that result from a metaphor seem to be subjectively arrived at. For the sake of clarity, let's call this the Subjective Entailment Problem.

THE UNIDIRECTIONAL MAPPING/ BIDIRECTIONAL INFLUENCE PROBLEM

One of the primary theoretical underpinnings of CMT is called the Invariance Hypothesis. Although hinted at[14] in Lakoff and Johnson's *Metaphors We Live By*, its most succinct explication is found in Lakoff's 1990 article, "The Invariance Hypothesis: Is abstract reason based on image schemas?"[15]

In terms of its explanation for inferencing results, the Invariance Hypothesis notes the prevalence of imagistic consistencies found in figurative language and then uses a number of particularly systematic cases to claim that metaphorical motivation underlies most if not all instances of abstract thought. For example, in the expression "Let's put all that behind us," one person encourages another person to forget the abstract difficulties that have negatively affected their relationship by figuratively 'walking away from those difficulties without looking back.' If the person's counterpart agrees to forget, then a practical resolution has been reached regarding this abstract state of conflict. If the person doesn't agree, they might respond, "No, we need to face this head on." It is evident that, although both individuals recognize the nature of the conflict as abstract, they nevertheless use metaphorical phrasing to refer to it as if it were a tangible object in their shared physical environment.

Lakoff asserts that a physical understanding of what it is to 'walk away from something and forget about it' is the cognitive basis for whatever understanding people impute to the abstract phrase, "Let's put all that behind us." In attempting to explain why metaphorical expressions tend to align consistently with certain types of embodied physical experience, it will be helpful to review exactly how memories of such experiences are stored.

The human brain does not operate like a warehouse full of unitary engram packages awaiting retrieval but rather saves information as complex permutations of heightened electrochemical activity correlated multimodally across neural subsystems.[16] Consequently, physical experiences of 'walking away from something and leaving it behind' are not propositional statements but rather are comprised of linked neural dispositions from various somatosensory and associational subsystems stored in response to real-life experiences of walking away from things. Such experiences are likely to include memories of making a conscious decision to fix attention elsewhere and the recollection that once distance has been placed between oneself and a given object, the object will appear smaller and less consequential.

While the desire to be cautious about accepting such sweeping claims is eminently understandable, if metaphors related to 'walking away from things' were *not informed* by the experientially derived conceptual domain WALKING AWAY FROM THINGS, exactly what would such metaphorical phrases

be informed by?[17] To deny the fact that many metaphorical phrases tend to closely mirror the idiosyncrasies of embodied experience is to ignore a huge preponderance of circumstantial evidence for systematicity.[18] While skepticism in the face of completely unwarranted speculation is not only allowed but absolutely vital to scientific inquiry, abandoning a well-corroborated, relatively straightforward account of metaphorical motivation in favor of some yet to be determined explanation that is virtually assured to seem both convoluted and tenuous by comparison seems to have less to do with intellectual rigor than with methodological obstinacy.

In any case, according to Lakoff, the reason abstract metaphorical expressions have so many parallels with embodied physical experience is because these expressions are crucially informed by image schemas,[19] the experience-enhanced fundamental patterns of neural association that make somatosensory inputs actionable and intelligible.[20] Seen from this angle, the Invariance Hypothesis amounts to a claim that abstract metaphorical ideas (such as, "Let's put all that behind us") are constrained by neural activation patterns that have been gradually entrenched through lived experience (as when people physically leave things behind). Thus, for CMT proponents, metaphors often display parallels with physical reality not incidentally or due to culturally instilled habit but because language itself tends to be organically grounded in such patterns of somatosensory understanding.

In that the relationship between the two domains linked through metaphor is characterized by feature projection from one domain to another, attributes typically associated with relatively well-understood domains of experience are seen to inform the understandings of more abstract domains. The way this is accomplished is through a type of neural activity called "mapping." While Lakoff has admitted that the term "mapping" was originally derived from mathematical set theory,[21] his more recent accounts mention it as being mapping in the neurocognitive sense (that is, as correlated projections of activation patterns[22]).

The terminology used by CMT proponents reflects a strong belief in the unidirectional nature of metaphoric association. The term "source domain" refers to the domain that contributes new features to the "target domain" (the topic of metaphor inferencing and recipient of these features). Unfortunately, reflection on these CMT terms shows them to be ill-conceived and inconsistent. For while it is natural that features from the "source" domain should transfer to the "target domain" to create a newfound understanding, when the 'direction' of such metaphorical projection is expressed, it results in a metaphor taking the form Target Is Source, the order of which is both counterintuitive and (from a processing viewpoint) wrong.

By way of demonstration, consider CMT's most representative example of conceptual metaphor, Life Is A Journey (presumably based on natural lan-

guage expressions such as "Life is a journey"). In this conceptual metaphor, the first domain LIFE is not the "source" as one might expect but rather the "target" (because it is characterized as the recipient of JOURNEY domain projections). Similarly, the domain JOURNEY, despite it being mentioned second in the formulation, is not the "target" but the "source" (again because projections are conceptualized as emanating from it). Consequently, while CMT characterizes projections as beginning with the "source" and projecting to the "target," expressions of this relationship denote the target first and the source second (as if the sequence of projection were in the opposite order).

While technical terminology may occasionally include certain seemingly arbitrary or possibly even counterintuitive aspects, in this case, it seems legitimate to ask, 'If the terms used to express some underlying cognitive reality seem intuitively wrong with reference to the very phenomena they have been designed to reflect, wouldn't that indicate that they are, in fact, flawed at the conceptual level?' This is not a trivial issue because to the extent the metaphorical implications of terms fail to mirror the conditions they are purported to describe, theoretical advance may be impeded. In fact, because metaphor-related terminology (going back to Richards[23] and Black) has been a constant source of confusion, one key challenge for a valid theory of metaphor is to overcome the Inconsistent Terminology Problem by providing metaphor-related working vocabulary that is both intuitively comprehensible and justifiable in terms of cognition.

In *Metaphors We Live By*, Lakoff and Johnson take issue with Black's assertion that the influence between metaphorical elements is a two-way street.[24] They point out that when life is understood as a journey, it does not imply that "just as we can lead only one life, so a traveler can take only one journey."[25] In such cases, prominent features of the more concrete domain (JOURNEY) tend to be applied to the more abstract domain (LIFE) and not vice-versa. Lakoff and Johnson certainly make a valid point. Metaphors, far from spurring a completely mutual exchange of implications, tend to cause the initially considered domain to be adapted in line with the features of its subsequently attended counterpart.

And yet Black's view is not without its own merits. Numerous scholars have observed[26] that, at least in certain cases, influence between metaphorical domains does (at times) seem to run in both directions, a situation that has led to much skepticism[27] concerning the viability of the Invariance Hypothesis.

If both claims are correct, metaphor theory is at an impasse because it would seem that both Black's Interaction Theory and Lakoff's Invariance Hypothesis cannot be true at the same time. Consequently, one more challenge for a feature attribution model to overcome would be to adequately explain this tension between unidirectional mapping (if metaphor requires

unidirectional mapping at all) and the impression of limited bidirectional influence. Admittedly, if the CMT unidirectional mapping tenet is false then there is no contradiction; nevertheless, let's term this potential conflict the Unidirectional Mapping/Bidirectional Influence Problem.

THE INDEFINITE DOMAIN PROBLEM

In explaining a version of Class Inclusion Theory,[28] Glucksberg argues against the plausibility of "matching" theories of metaphorical feature attribution. Noting that any two objects probably share an almost unlimited number of features, theories of feature matching must either provide a "mechanism for extracting subsets" or "simply postulate prior feature selection and proceed from there."[29] Consequently, Glucksberg's theory accomplishes feature attribution not by 'matching' but by understanding metaphors as implicit class-inclusion statements, the class members of which are thought to spontaneously emerge in preparation for metaphorical use.

For example, the figurative statement "Yeltsin was a walking time bomb" asserts that the former President of the Russian Republic "belonged to a category exemplified by time bombs."[30] As rationale for this viewpoint, he mentions the ad hoc categories described in the research of Barsalou[31] who views concepts not as static propositional entities but rather as highly flexible (and sometimes even temporary) virtual mental constructs that are constrained both by individual goals and outside contexts. The term "attribute sets," as used by Glucksberg, refers to categories that are "partly retrieved from memory and partly constructed as needed."[32]

One difficulty with this assessment of categories is that it seems to imply that metaphor users always have a firm grasp of the categories they utilize and that they use them consistently. Unfortunately, when language users employ metaphorical expressions, there are times when the concepts referred to are only implicitly or vaguely understood. Glucksberg's assertion that metaphorical concepts are "partly retrieved from memory and partly constructed as needed" implies an ability to detect deficiencies in categories recalled from memory so as to produce spontaneously improvised or subtly adapted categories that (somehow) immediately conform to the exact needs of the moment. It seems unlikely that conversants who remain blissfully unaware of the base concepts of the metaphors they are using might accomplish this.

Furthermore, while categories of the first type (explicit categories retrieved from memory) can obviously play a role, it's difficult to understand how a spontaneously improvised category could be constructed online ('on the fly') without resulting in a huge lag in processing time. Assuming that

a given category has yet to be stored in memory, to the extent that it needs to be actively constructed, processing time should slow down accordingly. Timing issues such as this tend to cast doubt on Glucksberg's uncorroborated assertion that spontaneously generated categories commonly contribute to metaphor inferencing.

Moreover, according to what criteria does Glucksberg practically differentiate supposedly old categories from new? If the kind of category improvisation he posits is said to spontaneously emerge in response to stimuli, wouldn't it be necessary for a variety of latent neural connections to pre-exist the new category being invoked? Because it is a physical impossibility for new neurons to suddenly appear or new synapses to spontaneously form in response to momentary stimulus, without the existence of latent connectivity, there would be no way for such a new category to simply 'materialize.' And if latent connections are already in place (even if weakly so), then the category is not exactly new, just 'yet to be entrenched.' Given the fact that adult human brains, rather than spontaneously producing fresh neurons and synapses, simply reweight connectivity between existing neurons and synapses,[33] categories said to form *de novo* must necessarily make use of pre-existing connections. In this sense, categories that Glucksberg characterizes as newly emergent could only be heretofore latent categories that finally break the surface of conscious awareness as a result of the incremental rebalancing of already existing connections. If such were the case, the situation described unquestionably stretches the definition of 'spontaneous.'

Glucksberg's 'spontaneous category construction' hypothesis basically proposes that the production of every metaphorical utterance must include a processing stage devoted either to "category retrieval" or "category creation." Ironically, after spending a great deal of time criticizing Searle's initial 'literal derivation step' in metaphor processing as unnecessary, his own theory posits a 'category retrieval/creation step' that is no less problematic. Chiappe is correct in observing that, far from giving precise details about how such category member identification would be performed, Glucksberg "presupposes" such a selection process, rather than "explaining it."[34]

A related problem for Class Inclusion Theory (as mentioned by Cherata[35]) is that the abstract categories it posits as arising during processing (to be used subsequently as stand-alone interpretive domains) are often not flexible enough to deal with new related metaphorical statements. That is to say, while the details of feature attribution may conform well to accommodate a specific metaphor, when a new related metaphor needs processing, a slightly different interpretive angle may be required, a situation which ought to slow down comprehension while category details are being adapted. In reality,

however, metaphors with slightly differing conceptual profiles appear to be handled with little difficulty, a situation which would argue against any need for spontaneous category modification.

Decontextualized metaphorical statements represent a major problem for Glucksberg's theory of spontaneous category construction because they offer very little detail to inform the selection or revision process and in some cases provide almost no time to accomplish improvisation after the entire stimulus has been presented. As a case in point, consider the implications of the following underspecified examples:

She flew to Miami.
He hopped on his bike and flew home.

These statements reflect two of a number of possible ways to interpret the word "flew." While the first case quite obviously seems to reflect a literal trip by airplane, the second statement connotes an equally obvious yet only loosely related figurative connotation.

To make sense of statements like "He hopped on his bike and flew home" (in which an inappropriate literal meaning seems to be 'replaced' by a more logically consistent figurative meaning), Ortony proposed the Salience Imbalance Hypothesis. According to Ortony, interpretation of metaphor begins with the futile attempt to recognize a high-salience inferencing option followed by a decision to compromise and 'settle for' a low-salience interpretation.[36] According to this logic, the more salient inferencing option (presumably the literal one) will be provisionally accepted but will be discarded if that line of reasoning is discovered not to make sense. Thus, in Ortony's view, because bicycles are not typically known to "fly" in any literal sense, the illogicality[37] of the literal interpretation causes it to be precluded whereupon the figurative interpretation presents itself as the next most salient fallback option.

If such were the case, however, by what means is the brain able to so quickly assess logical coherence? The fact that the problematic word "flew" does not appear until the very end of the sentence will cause problems for both Ortony's and Glucksberg's theories because experimental evidence shows that proper interpretations for idiomatic metaphorical expressions are available almost immediately; no processing time is allowed for judging logical coherence (as the Salience Imbalance Hypothesis would necessitate) or for constructing a new category on the fly (as posited by Class Inclusion Theory). Moreover, neither theory offers detailed explanations concerning how these crucial processing steps might actually be facilitated. For the moment, let's characterize the difficulties involved in rapidly processing underspecified metaphors the Indefinite Domain Problem.

THE REVERSIBILITY CHALLENGE

One of the strongest aspects of Glucksberg's category-based asymmetric feature attribution model is its ability to account for the non-reversibility of metaphoric comparisons. To demonstrate the fact that reversing the domains of a metaphor results in completely different metaphorical implications, consider the following previously mentioned examples:

That surgeon is a butcher.
That butcher is a surgeon.

In these examples, although the most prominent conceptual aspect that the two domains share is CUTTING FLESH, the actual results of inferencing unexpectedly highlight not similarities but discrepancies: a butcher-like surgeon seems guilty of malpractice while a surgeon-like butcher is praised for having exceptional skill.

Glucksberg sees Ortony's inability to specify processing details as evidence that the Salience Imbalance Hypothesis must be carried out by a "matching process," a type of processing which, on its own, cannot offer coherent explanations as to why less salient features sometimes overcome more salient features during inferencing; for this reason, he prefers his own "feature-contrast model of similarity assessment" which he considers to have greater explanatory power.[38] Additionally, Glucksberg correctly notes[39] that Ortony's Salience Imbalance theory fails to account for the fact that, in many cases, the prominent features highlighted *after* metaphorization were not even minimally recognized before it. Without positing a more exhaustive "feature-contrast" type of processing, the sudden promotion of previously unnoticed features to prominent inferencing results cannot be accounted for.

Nevertheless, Glucksberg completely ignores the original reason for which Ortony posited the influence of salience in the first place. If likely inferencing options are not evaluated in terms of relative salience, how is it that a much greater number of logically possible but actually trivial features don't compete for attention? For example, both surgeons and butchers charge money for their services; if relative salience of inferencing options is not an issue, what is to preclude this trivial similarity from dominating what Glucksberg terms "the first stages of comprehension"?[40]

Consequently, another challenge to address will be that of Reversibility; namely, why is it that the predominant inferencing results of one metaphor are often replaced by dissimilar results when the order of domain presentation is reversed. In the end, a viable theory of metaphorical feature attribution must be able to coherently explain not only *how* results differ when metaphorical elements are reversed but *why* results differ in the specific ways that they do.

THE ABSTRACT DOMAIN PROBLEM AND THE ABSTRACTION LEVEL MISMATCH PROBLEM

Wolff and Gentner note that theories of metaphor "have split according to whether they attempt to capture the directional projection side of metaphor or the emergent commonalities side."[41] Sensing a need to delineate a role for both types of processing, they assert[42] that metaphor inferencing requires both a matching stage (in which commonalities between domains are detected) and a mapping stage (in which inferences are projected).

Having said this, they have two strong objections to mapping as proposed by CMT advocates. First, they claim[43] that modality-specific, raw perception-based aspects of metaphor are not clearly related to the interpretations of relatively abstract metaphors such as "The heart is a pump." While their argument seems to imply that such metaphors are relatively exceptional cases, in fact there is a superabundance of metaphors that negotiate metaphorical similarity between relatively concrete and relatively abstract domains.[44] Nevertheless, Wolff and Gentner's practical objection still pertains. In metaphors like "This career is a jail," because CAREER seems relatively abstract and JAIL seems more concrete, the question of exactly how the mind correlates the seemingly mismatched conceptual domains involved has yet to be adequately addressed.

Secondly, Wolff and Gentner assert[45] that "strong embodiment" approaches like CMT include no mechanism for facilitating the reversal of metaphor inferencing so that bidirectional influence between domains can be accounted for. To compensate for these perceived defects they propose an updated version of Bowdle and Gentner's "Career of Metaphor Theory,"[46] an extension of "Structure-Mapping Theory."[47]

With respect to emphasis, this group of theories tends to focus on explaining certain relatively abstract and structurally complex types of metaphor including the analogical reasoning underlying historical scientific discoveries.[48] In this sense, the model is mainly concerned not with compact, single dimension metaphors but rather complex analogies that must be derived from similarities in relations between members of otherwise unlike sets (such as the scientist Rutherford's comparison of the atom to the solar system[49]).

In terms of inferencing details, Structure-Mapping Theory "predicts (a) an initial processing stage of symmetric alignment; and (b) a later directional phase in which inferences are projected to the target."[50] As evidence for this assertion, Wolff and Gentner offer a variety of data which shows metaphorical understanding to develop relatively late in processing. For example, for one data set, they claim that analysis of participant metaphorical understanding at specific cut-off points in processing (1200 ms and 1800 ms) lends sup-

port to their theory by showing that, because "understanding" happens late in the process, the more "directional" asymmetric processing must occur in a relatively later processing phase.[51]

Unfortunately, Wolff and Gentner have failed to take neurobiology into account. In particular, they have neglected to note the ways that automatic and attentional processes differ and how they are coordinated in cognition. Automatic processes, including initial stage functions such as mapping in somatosensory areas, tend to be more streamlined and are facilitated by neurons that fire at higher rates.[52] Conversely, processes that require concentrated, focused attention are secondary not only because of their location downstream in the flow of incoming sensory information but because, being non-mapped, there are no minutely hardwired pathways for electrochemical stimuli to traverse.

By way of corroboration for this assertion, in a study cited in Wolff and Gentner's own article,[53] Fischler and Goodman mention[54] a case in which the speed of "automatic processing" evidenced in their own experiment (40 ms Stimulus Onset Asynchrony) turned out to be "an order of magnitude" faster than the "attentional processing" (400 ms SOA) mentioned by Neely[55]; they went on to observe that automatic responses are normally faster and more efficient than attentional responses.[56]

Such a hierarchy of cognitive processing, well-attested in neuroscientific research, is necessary because, among the broad range of incoming stimulus, not all channels are worth paying attention to. Automatic processes accomplish quick but efficient "first-pass" types of analysis and then, only after incoming stimuli has made its initial run through the system, do particularly excitatory elements elicit attention and garner more resources for fine-grained observation. This sequential relationship between automatic and attentional processes is backed by common sense, as well. How could the efficient allocation of neural resources be accomplished before an initial evaluation of incoming stimuli has yet to be attempted?

The order Wolff and Gentner propose seems even more unlikely when one considers the fact that the brain's processing is not segmental but continuous and gradually unfolding. The brain does not delay processing until a spoken metaphorical utterance has been completely perceived but rather initiates neural computation with the first detected phoneme[57] and maintains ongoing analysis even after an utterance is complete.[58] This being the case, to argue that symmetric processes (those involving conscious attention) occur before automatic processes (those that function primarily by way of mapping) have fulfilled their basic duties is biologically precluded. To claim that symmetric metaphorical analysis of a full sentence precedes the automatic responses spurred by each individual phoneme as it is perceived is to assert a type of processing that miraculously outruns its inputs. Barring some astonishingly

counterintuitive neurobiological discovery, such a situation would appear to be a practical impossibility.

Once again, Wolff and Gentner's own article makes reference to research that reinforces this very point. They note that psycholinguistic research into stimulus onset asynchrony (SOA) with respect to the speed of activation argues strongly that the first stage of the processing of semantic content occurs as quickly as 40 ms after stimulus onset.[59] (In other words, in a task designed to confirm that a semantically related word is primed in response to the activation of another given word, a priming effect can be observed as quickly as 40 ms later.) In their analysis of experimental results, Fischler and Goodman claim that the "extremely short SOAs used in the present study, along with the lack of correct prime recall, would seem to preclude the possibility of an attentional component of the priming effects observed at the short SOAs."[60]

It is strange that Wolff and Gentner, after considering the above research, would still make the claim that symmetric matching (an attentional process) would need to be completed before mapping (an automatic process). In that semantic activation is seen to occur as quickly as 40 ms after onset of stimulus, the cutoffs in their own experiment (1200 ms and 1800 ms) are positioned at such a late juncture that automatic processes would have no meaningful effect on the data. Having said this, the stated criterion they use for judging the speed of processing is "comprehension."[61] If CMT proponents are correct in their appraisal that processing is often unconscious and precedes comprehension then Wolff and Gentner are measuring and drawing conclusions from the wrong end[62] of the phenomenon in question.

So what is the explanatory value of Wolff and Gentner's Structure Mapping Engine (their preferred connectionist model[63]) that manages to complete its processing quickly by way of a "symmetrically aligned" phase followed by a more "directional" one? Because the model's initial parallel-processed "local match" stage produces a "large number of potential correspondences"[64] rather than narrowing correspondences down, it is difficult to imagine such a brain-based processing stage being completed before 40 ms have elapsed (which would need to occur for the model to be accurately representing neural computation[65]).

This being the case, what are we to make of Wolff and Gentner's observation that relational similarity-based "comprehensibility" has been demonstrated to emerge relatively late in processing?[66] Such a fact is easy to account for if one does not conflate the *processing* of metaphor (which could happen *sub rosa*) with metalinguistic *understanding* of metaphorical aptness. If CMT's conceptual domain-based view of metaphor is accurate, most of the processing of metaphor happens quickly through automatic types of inferencing like mapping while conscious understanding of the results of

such *sub rosa* inferencing only become available after the results of first-pass neural computation have registered in conscious attention, if even then; there is no contradiction in saying that metaphors take more time to understand than to process.

While connectionist models (including the Structure Mapping Engine mentioned above) are certainly valuable in demonstrating that results similar to those produced by brain-based metaphor processing can be electronically simulated *in some way*, the neural details of metaphor processing cannot simply be reverse-engineered without reflecting on how the brain actually streams and channels information.[67] For while speedier microprocessors can be developed so as to make computer-based processing as fast as necessary to achieve brain-like results, the brain's epigenetically predetermined architecture is heavily reliant on mapping and spreading activation to accomplish its goals. Consequently, arguing that some as yet unrecognized brain-based symmetric processing phase dominates the initial stages of the neural computation of language is to make a neurobiologically uninformed and profoundly counterintuitive case.

FEATURE ATTRIBUTION PROBLEMS SUMMARIZED

This chapter has mentioned a variety of theories of metaphor, each making recommendations about capabilities that must be included in a viable working model and each offering critiques of other models that, despite their strong points, are seen to fall short in some way. For this reason, the task of explaining metaphorical feature attribution may be thought of as a kind of 'metaphor inferencing obstacle course.' Until an otherwise coherent theory can overcome each obstacle, that theory will be found wanting despite its otherwise plausibly asserted explanative power.

Before offering a new theory of feature attribution, it will be useful to review the various 'obstacles' that have been mentioned in this chapter along with the metaphorical expressions that exemplify them. They are (in order of appearance):

The Extraneous Detail Elimination Problem
  Lawyers are sharks.
The Subjective Entailment Problem
  Man is a wolf.
The Unidirectional Mapping/Bidirectional Influence Problem
  Man is a wolf.
The Inconsistent Terminology Problem
  Life is a journey.

The Indefinite Domain Problem
She flew to Miami.
He hopped on his bike and flew home.
The Reversibility Challenge
That surgeon is a butcher. / That butcher is a surgeon.
The Abstract Domain Problem
The atom is a solar system.
The Abstraction Level Mismatch Problem
This career is a jail.

Focusing on the challenges listed above, let's summarize what a fully functional model of metaphor processing would need to accomplish.

First, a fully functional metaphor processing model would need to be able to explain metaphorical entailments in detail. Aside from producing a list of likely common sense entailments, it would also need to offer rationale as to why certain trivially true but nevertheless irrelevant lines of inferencing have been eliminated, thus overcoming the Extraneous Detail Elimination Problem. Additionally, it should account for the Subjective Entailment Problem in which metaphorical entailments seem not to be the logically predictable outcome of two generic conceptual domains impartially combined but rather conform more to the idiosyncrasies of one domain than the other. It must also offer greater detail relating to the Reversibility Challenge. It is not enough to simply claim that when metaphorical elements are reversed they produce a different metaphor; ideally, a model should give clarification as to precisely why the order of presentation is important and how such a change in order might cause entailments to differ.

There are also issues relating to the processing of seemingly vague or incommensurable domains. These include the Abstract Domain Problem, the Abstraction Level Mismatch Problem, and the Indefinite Domain Problem. How is the brain able to successfully process metaphors that seem to have little concrete similarity, metaphors that are out of balance with respect to level of abstraction, and metaphors that are processed quickly despite an apparent lack of conceptualization detail?

A fully functional metaphor processing model would also need to account for the Unidirectional Mapping/Bidirectional Influence Problem. If metaphor generally functions as a unidirectional process in which features of a more concrete domain often tend to be projected onto a more abstract one, why does the concrete domain sometimes appear to be receiving subtle influences in the reverse direction?

Finally, a viable explanation of metaphor must solve or at least alleviate metaphor theory's longstanding Inconsistent Terminology Problem. Key

terms should ideally be memorable, internally consistent, and neurobiologically accurate.

These are the problems facing metaphor theory at the time of this writing. In the next chapter, the author will propose Conceptual Filtering Theory, an adaptation and elaboration of Conceptual Metaphor Theory that will retain the explanatory elegance of CMT while responding to legitimate criticisms leveled by CMT's detractors. In so doing, CFT will offer a detailed, neurally plausible account of feature attribution.

NOTES

1. Searle's view of metaphor exemplifies what has been called the Standard Pragmatic Model. Cf. John R. Searle, *Expression and Meaning: Studies in the Theory of Speech Acts* (Cambridge: Cambridge University Press, 1985); cf. also Paul H. Grice, "Logic and Conversation," in *Syntax and Semantics 3: Speech Acts*, edited by Peter Cole and Jerry L. Morgan, 41–58 (New York: Academic Press, 1975).
2. Similarly, Beardsley's definition of metaphor explains metaphor as a "significant attribution that is either indirectly self-contradictory or obviously false in its context." Cf. Monroe C. Beardsley, *Aesthetics: Problems in the Philosophy of Criticism* (New York: Harcourt, Brace, and World, 1958), 142.
3. Bear et al., *Neuroscience: Exploring*, 627.
4. Andrew Ortony, Diane L. Schallert, Ralph E. Reynolds, and Stephen J. Antos, "Interpreting metaphors and idioms: Some effects of context on comprehension," *Journal of Verbal Learning and Verbal Behavior* 17 (1978): 473–76.
5. Cf. Dawn G. Blasko and Cynthia M. Connine, "Effects of familiarity and aptness on metaphor processing," *Journal of Experimental Psychology: Learning, Memory, and Cognition* 19 (1993): 298.
6. Steven Frisson and Martin J. Pickering, "Obtaining a figurative interpretation of a word: Support for underspecification," *Metaphor and Symbol* 16, nos. 3–4 (2001): 159.
7. Max Black, *Models and Metaphors: Studies in Language and Philosophy* (Ithaca: Cornell University Press, 1962), 37.
8. Ibid., 40.
9. While Black's use of the term "frame" is reminiscent of the cognitive linguistics term "frame," the two are unrelated. Black's term is akin to CMT's "target domain."
10. Ibid., 44.
11. Margaret H. Freeman, "Multimodalities of metaphor: A perspective from the poetic arts," *Poetics Today* 38, no. 1 (2017): 70.
12. In *Asinaria*, phrased "*lupus est homo homini, non homo, quom qualis sit non novit*" ["Man is no man, but a wolf, to a stranger."] Cf. Plautus, *Asinaria or The Comedy of Asses*, translated by Paul Nixon, in *Plautus 1: Amphitryon, The Comedy*

of Asses, The Pot of Gold, The Two Bacchises, The Captives (London: Heinemann, 1916), 176–77.

13. Freeman, "Multimodalities of metaphor," 69.

14. Lakoff and Johnson, *Metaphors We Live By*, 131–32.

15. George Lakoff, "The invariance hypothesis: Is abstract reason based on image-schemas?" *Cognitive Linguistics* 1, no. 1 (1990): 39–74; cf. also Lakoff, "Contemporary theory."

16. Edelman, *Bright Air*, 130; Gerald M. Edelman and Giulio Tononi, *A Universe of Consciousness: How Matter Becomes Imagination* (New York: Basic Books, 2000), 149.

17. Glenberg states, "Given that theories cannot literally be airtight, and that people's emotional states cannot literally be high, it is hard to image how cognition could be based on the mappings of arbitrary symbols and produce such (easy to understand) language." Glenberg, "What memory is for," 2–3.

18. Gibbs offers an extensive list of empirical research findings that all strongly corroborate various aspects of CMT. Cf. Raymond W. Gibbs Jr., "Multiple constraints in theories of metaphor," *Discourse Processes* 48, no. 8 (2011): 575–84.

19. Gibbs refers to "image schemas" as dynamic "non-propositional mental structures" that, while derived from perceptual experiences in specific modalities, serve to organize such experiences and coordinate complex sensorimotor responses. In handling routinized aspects of perception and behavior outside of conscious awareness, these experience-derived cross-modal structures free up conscious attention to execute more directed types of mental activity. Cf. Gibbs, "Embodiment in Metaphorical," 69.

20. It is rather curious when proponents of other theories of metaphor not only deny that metaphors are based on image schemas but imply that image schemas themselves are a figment of Lakoff's imagination (e.g., McGlone, "Hyperbole," 566). Perhaps if the phrase "experience-derived patterns of neural association" were substituted for "image schemas" they might be surprised at what they are denying the existence of.

21. Lakoff, "Contemporary Theory," 210.

22. Cf. Lakoff, "Neural Theory," 20.

23. I. A. Richards, *The Philosophy of Rhetoric* (New York: Oxford University Press, 1936).

24. Forceville makes the case that Black never asserted "bidirectionality of feature transfer or even the reversibility of terms," but it might be asserted that, to the extent the metaphor causes *both* domains to be activated differently than if they had been activated separately, Black's viewpoint would indeed entail a type of mutual influence with respect to neural propagation. Cf. Charles Forceville, "(A)symmetry in metaphor: The importance of extended context," *Poetics Today* 16, no. 4 (1995): 678–82.

25. Lakoff and Johnson, *Metaphors We Live By*, 131–32.

26. Freeman ("Multimodalities of Metaphor," 61–62) asserts that interdomain influence is a crucial aspect of poetic creativity. Holyoak and Thagard (Keith James Holyoak and Paul Thagard, *Mental Leaps*, Cambridge, MA: MIT Press, 1995, 196) mention the MIND THROUGH COMPUTER metaphor as an example of the bidirectional

influence of ideas in scientific inquiry because "accessible aspects of mind have been used to suggest new ways of doing computation, just as computation has provided new ways of understanding thinking." While the bidirectional productivity of linking these two domains is apparent, questions concerning aptness of the analogy remain.

27. E.g., Forceville, "(A)symmetry in Metaphor"; Stockwell, "Inflexibility of invariance."

28. Sam Glucksberg and Matthew S. McGlone, *Understanding Figurative Language: From Metaphors to Idioms* (Oxford: Oxford University Press, 2001).

29. Glucksberg and McGlone, *Understanding Figurative Language,* 30.

30. Ibid.*,* 38.

31. Barsalou, "Ad hoc categories," 211–17.

32. Glucksberg and McGlone, *Understanding Figurative Language,* 44.

33. The vast majority of neurons and synapses develop primarily before birth (Bear et al., *Neuroscience: Exploring*, 786; cf. also Edelman, *Bright Air*, 94–97) with refinement of connections through adolescence by way of reductions of neurons and synapses (Bear et al., *Neuroscience: Exploring*, 801–803). There is, however, evidence that adult neurogenesis does in fact occur in the hippocampus (Bear et al., *Neuroscience: Exploring*, 787).

34. Dan L. Chiappe, Review of *Understanding Figurative Language: From Metaphors to Idioms* by Sam Glucksberg and Matthew S. McGlone, *Metaphor and Symbol* 18, no. 1 (2003): 60.

35. Ştefania Alina Cherata, "The Class-Inclusion Theory of Metaphor: A critical view," *Bucharest Working Papers in Linguistics* 2 (2011): 129–45; cf. also David Ritchie, "Categories and similarities: A note on circularity," *Metaphor and Symbol* 18, No. 1 (2003): 49–53.

36. Andrew Ortony, "The Role of Similarity in Similes and Metaphors," in *Metaphor and Thought*, 2nd ed., edited by Andrew Ortony (Cambridge: Cambridge University Press, 1993), 351.

37. Actually the apparent violation of a tacit agreement between speaker and listener to cooperate in a communicative act (Ortony et al., "Interpreting Metaphors," 465).

38. Glucksberg and McGlone, *Understanding Figurative Language,* 32–33.

39. Ibid., 35.

40. Ibid., 32.

41. Phillip Wolff and Dedre Gentner, "Structure-mapping in metaphor comprehension," *Cognitive Science* 35 (2011): 1458.

42. Ibid.

43. Ibid., 1481.

44. Zoltan Kövecses, *Metaphor and Emotion: Language, Culture, and Body in Human Feeling* (Cambridge: Cambridge University Press, 2000), 4.

45. Wolff and Gentner, "Structure-mapping," 1457.

46. Brian F. Bowdle and Dedre Gentner, "The career of metaphor," *Psychological Review* 112, no. 1 (2005): 193–216.

47. Cf. Dedre Gentner, "Structure-mapping: A theoretical framework for analogy," *Cognitive Science* 7, no. 2 (1983): 155–70; Dedre Gentner and Arthur B.

Markman, "Structure-mapping in analogy and similarity," *American Psychologist* 52 (1997): 45–56.

48. Dedre Gentner, "Are Scientific Metaphors Analogies?" in *Metaphor: Problems and Perspectives*, edited by David S. Miall, 106–32 (Brighton: Harvester Press, 1982).

49. Ibid., 110–12.

50. Wolff and Gentner, "Structure-mapping," 1458.

51. Ibid., 1460–62.

52. Edelman and Tononi, *Universe of Consciousness*, 169.

53. Wolff and Gentner, "Sructure-mapping," 1474.

54. Ira Fischler and George O. Goodman, "Latency of associative activation in memory," *Journal of Experimental Psychology: Human Perception and Performance* 4, no. 3 (1978): 467.

55. James H. Neely, "Semantic priming and retrieval from lexical memory: The roles of inhibitionless spreading activation and limited-capacity attention." *Journal of Experimental Psychology: General* 106, no. 3 (1977): 226–54.

56. Fischler and Goodman, "Latency of associative activation," 467–68.

57. Michael Spivey, *The Continuity of Mind* (Oxford: Oxford University Press, 2007), 55, 166, 187.

58. Ibid., 203–206.

59. Fischler and Goodman, "Latency of associative activation."

60. Ibid., 467.

61. Wolff and Gentner, "Structure-mapping," 1462.

62. Measuring processing speed by experimentally pinpointing the first glimmer of comprehension is akin to ascertaining the time it takes for a freight train to travel between stations by comparing its starting time with the time when its final car passes the second station. While such a measurement may be useful for indicating when the tracks will finally be clear, the train's actual speed between stations cannot be calculated unless one can verify the length of the train.

63. Brian Falkenhainer, Kenneth D. Forbus, and Dedre Gentner, "The structure-mapping engine: An algorithm and examples," *Artificial Intelligence* 41 (1989): 1–63; cf. also Kenneth D. Forbus, Dedre Gentner, and Keith Law, "MAC/FAC: A model of similarity-based retrieval," *Cognitive Science* 19 (1995): 141–205.

64. Wolff and Gentner, "Structure-mapping," 1459.

65. It would seem that Wolff and Gentner's model, rather than attempting to determine the most likely processing scenario based on details of the neurobiological subsystems observed to contribute, speculates that neural computation must proceed in a way similar to their Structure-Mapping Engine program based solely on this computer model's purported ability to produce roughly comparable results within brain-like time constraints.

66. Wolff and Gentner, "Structure-mapping," 1462.

67. Edelman, *Bright Air*, 226–27.

Chapter Four

Conceptual Filtering

While Chapters 1 and 2 answered basic questions about the nature of conceptualization and its relationship to metonymy and metaphor, Chapter 3 surveyed the strengths and weaknesses of a variety of influential theories of metaphor processing. Now that such preliminary issues have been addressed, Chapter 4 will introduce Conceptual Filtering Theory (henceforth CFT), a theory of conceptual processing designed to explain the details of metaphor inferencing and especially the semantic outcomes elicited by metaphor in compact verbal settings.

After briefly characterizing the key role played by unidirectional mapping in the first stage of metaphor processing, three sections will be allocated to explain the three successive phases of inferencing posited by CFT. Following a detailed account of each processing phase, the remaining sections will emphasize the relative merits of this new inferencing model as a whole and review how CFT practically overcomes the various 'processing model viability' challenges detailed in Chapter 3.

Along the way, new terminology will be introduced. This new conceptual domain-related vocabulary has been selected so as to accurately reflect underlying neurobiological processes to the greatest extent possible. As such, should the terminology of CFT be found easy to understand, theoretically consistent, and applicable to a wide range of analysis, this result has occurred not incidentally but because the details of human conceptual processing were taken into consideration from the outset.

AN OVERVIEW OF CONCEPTUAL FILTERING THEORY

At the risk of oversimplification, the various extant theories of metaphorical feature attribution may be said to fall into three general categories, these being "matching theories" (e.g., the Defective Utterance View and the Salience Imbalance View), "mapping theories" (e.g., Conceptual Metaphor Theory), and "matching then mapping theories" (e.g., the most recent version of Structure Mapping Theory). Conceptual Filtering Theory[1] represents a fourth category which, in terms of processing sequence, can best be described as a "mapping then matching theory,"[2] albeit with the qualification that the mapping and matching phases are characterized not as two discrete steps within a single process but as somewhat overlapping processing phases. Within this processing model, although the late-unfolding "matching" mode is seen to be crucial for handling more complex metaphors, CFT posits most inferencing outcomes to be the result of automatic processing by way of neural projection (mapping).

The crucial factor in determining which domain aspects remain active through the automatic mapping phase is their relative salience. As Tuggy notes, in straightforward communicative situations, speakers tend to "filter out" specifications "below a certain level of salience."[3] This 'filtering out' occurs not consciously but automatically as the result of neural projection. Salience is primarily a matter of more entrenched domain features having a greater chance of being successfully projected than less salient ones. In experimental terms, salience may be assessed using the criteria offered by Giora in her "Graded Salience Hypothesis."[4]

While relative salience of domain aspects is an obviously important issue, some metaphorical aspects actually "drop out" of processing not due to relative lack of salience but due to the fact that the counterpart domain lacks any corresponding neural nodes[5] to receive activation (a point that CFT will characterize as lack of metaphorical "applicability"). In the case of metaphor, when two conceptual domains are stimulated one after the other, conceptual aspects common to both domains will spur excitatory reverberation within covalent nodes (groups of neurons shared by both domains). In contrast, neural nodes of the initially stimulated domain that have no counterpart in the subsequently stimulated domain receive no additional activation thus causing those nodes to revert to baseline levels. This reversion to baseline effectively 'filters' them out of the resulting temporary hybrid conceptual state.[6] Consequently, the two factors that initially determine inferencing results in the automatic mode of processing are relative salience and applicability.

Although First-pass Conceptual Filtering has yet to be fully explained, there are already some potentially confusing terminology problems evident. While CMT's use of the term "mapping" (the projection of domain aspects)

seems well suited to explain the initial phases of processing in CFT, some of the other terms prominently utilized in CMT (especially references to so-called "source" and "target" domains) do not sufficiently reflect neurobiological reality in that they fail to suggest the possibility that certain central features of the focused upon topic are likely to be filtered out of the resulting inferencing outcome.

Ideally, terminology for explaining and analyzing metaphor should reflect not only the directionality of mapping but the nature of the results of inferencing after mapping has been accomplished. To achieve this, CFT will recommend discarding extant domain-related terminology and referring to the domains involved in metaphor as the FOCUS and FILTER domains, respectively. To be more exact, CFT will express metaphorical projection as FOCUS THROUGH FILTER, a formulation that understands both FOCUS and FILTER to be conceptual domains linked by way of unidirectional mapping.

Acceptance of the terms FOCUS and FILTER will lead to a number of distinct advantages over previously used working vocabulary. First, unlike CMT terminology with its counterintuitive domain presentation order,[7] the term "FOCUS domain" clearly indicates the domain to be adapted while the term "FILTER domain" indicates not only that a second domain is being applied to the first but also makes clear that the integration involved is a partially subtractive process in which non-shared elements of the FOCUS domain will be filtered out. A further advantage of these CFT terms is that the association between the two domains is characterized in terms of attention: the CFT term FOCUS suggests that this domain is initially attended to and *continues* to be attended to even after metaphorical projection has been accomplished.

In that the terms "FOCUS domain" and "FILTER domain" both accurately reflect the idiosyncrasies of the unidirectional mapping process, they should be considered vastly superior to the corresponding implications of CMT domain terms which strangely impute theory-irrelevant ideas such as 'processing objectives' (target domain) and 'place of origination' (source domain). Because the terms "FOCUS" and "FILTER" have been selected for their ability to succinctly express the neural realities of mapping without generating unwanted implications, these terms effectively solve the previously mentioned Inconsistent Terminology Problem.

From a neural point of view, metaphor may be characterized as the stimulation of a temporary hybrid conceptual state through the sequential activation of two sets of partially overlapping neural nodes. Whenever domain aspects overlap, firing frequencies in shared nodes will remain at a high level of activation; conversely, nodes of the first domain that are not shared with the second domain (non-conjunctive nodes) will revert to baseline levels of activation thereby filtering those nodes out of the final processing outcome.

Because CFT posits metaphorical mapping to be a type of neural projection based on the fact that the inputs of sense perception are known to be mapped and that the results of such mapping are stored in a correlated manner, mapping is not a tenuous, mostly hypothetical black box function but rather a specific neural projection processing configuration that may be considered one among many possible permutations of a generally recognized neural process.

Having said this, to argue for the biological plausibility of metaphorical mapping is not to argue that mapping is the only type of processing involved when humans make sense of metaphor. To allow for the differentiation of automatic mapping from other more recursive and time-intensive inferencing processes, two further types of Conceptual Filtering will be proposed. Specifically, CFT's three processing phases are "First-pass Conceptual Filtering" (an automatic mapping process that quickly facilitates straightforward interpretation of metaphor), "Sustained Conceptual Filtering" (an iterative mapping process directed by focused attention), and "Ongoing Conceptual Filtering" (a.k.a. "afterthought," a more time-intensive and unconscious matching process). The next section will clarify exactly how unidirectional mapping contributes to First-pass Conceptual Filtering. Two following sections will then go on to introduce the two further types of processing, along the way clarifying how they differ from and complement the unidirectional mapping phase.

RAPID INFERENCING BY WAY OF FIRST-PASS CONCEPTUAL FILTERING

First-pass Conceptual Filtering (constituting the most important, initial articulation of unidirectional mapping as mentioned above) both accounts for the rapid processing speed in comprehension of conventional metaphor and explains why inferencing outcomes change when the presentation order of metaphorical domains is reversed. In terms of neural computation, the sequence in which stimuli are introduced creates a time delay that results in differential activation.

When metaphors are expressed verbally, the activation of each word necessarily occurs in a certain order due to the serial nature of verbal communication. For example, in the statement, "That surgeon is a butcher," use of the word "surgeon" stimulates the conceptual domain SURGEON (comprising all conceptual aspects associated with that domain) in the mind of the hearer (see the topmost portion of Diagram 4-1). Following soon after, the speaker's reference to the lexical item "butcher" in turn brings the BUTCHER domain online (see the lower portion of Diagram 4-1).

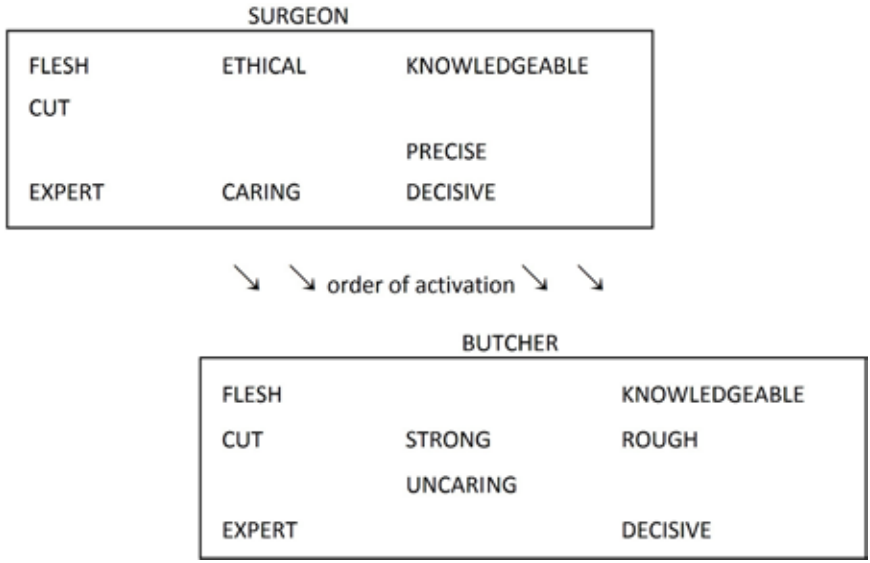

Diagram 4-1. SURGEON THROUGH BUTCHER metaphor processing details

Once the two domains have been sequentially stimulated, the covalence of certain elements in the SURGEON domain with domain elements in the BUTCHER domain causes lexical items associated with both domains to be primed and to become available to conscious attention.

The question of exactly how the results of metaphor inferencing come to conscious attention has (to my knowledge) never been addressed. The most likely explanation is that sequential conceptual stimulation leads to increased firing rates of certain conceptual elements past crucial thresholds, this in turn causing the phonetic profiles associated with those elements to "echo" to the surface of conscious awareness by way of "inner speech." Inner speech[8] refers to the activation of lexeme-associated phonetic images in the sub-vocal rehearsal system of Broca's area (area BA 44). Thus, while metaphor inferencing proper may be characterized as a *sub rosa* process involving the stimulation of overlapping conceptual elements in association cortices, the results of this process feed back to phonetic profiles in auditory memory and thus become perceptible mind-internal cognitive phenomena. Of course this inner speech function is not unique to metaphor processing but is a capability crucial to all kinds of language production.

The results of processing (as illustrated by Diagram 4-1) are shown in Diagram 4-2.

Diagram 4-2. Resulting temporary hybrid conceptual state for "That surgeon is a butcher"

While metaphor processing often results in the simple identification of overlapping domain features, the metaphor SURGEON THROUGH BUTCHER represents a somewhat more complex example. With respect to Diagram 4-2, note that, while the SURGEON and BUTCHER conceptual domains (in Diagram 4-1) include multiple common (conjunctive) elements (e.g., FLESH, CUT, EXPERT, KNOWLEDGEABLE, and DECISIVE), there are also elements that are unique to butchers (specifically the underlined aspects STRONG, UNCARING, and ROUGH). Activation of the unique elements of the FILTER domain with conjunctive elements of both domains results in novel associations which will attract the focus of attention in the resulting temporary hybrid conceptual state. In this way, the domain SURGEON will be artificially associated with the ideas "strong," "rough," and "uncaring," attributes not normally associated with a skillful surgeon but which serve to emphasize the ironic incongruity[9] in this metaphorical observation.

Moreover, as the typical SURGEON domain aspects ETHICAL, CARING, and PRECISE are nodes not shared with the BUTCHER domain, their activation levels will decay and revert to baseline (indicated by the lines crossing out these domain aspects in Diagram 4-2). Thus, Diagram 4-2 reflects a temporary hybrid conceptual state (a perceived meaning) characterizing the metaphor SURGEON THROUGH BUTCHER in terms of a STRONG, ROUGH, UNCARING SURGEON. With respect to attentional specifics, First-pass filtering will lead to the noticing of salient conjunctive nodes by way of inner speech while emergent (novel) domain elements will become available to conscious attention either immediately following the First-pass or else during subsequent directed processing (explanation to follow).

Reversing the order of introduction of conceptual domains to express "That butcher is a surgeon" produces the First-pass processing details found in Diagram 4-3 and the inferencing results in Diagram 4-4.

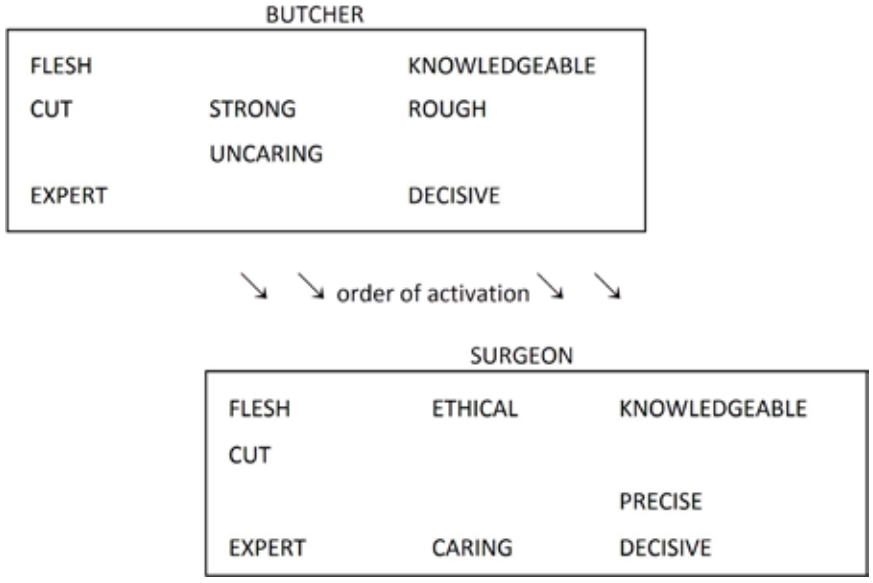

Diagram 4-3. BUTCHER THROUGH SURGEON metaphor processing details

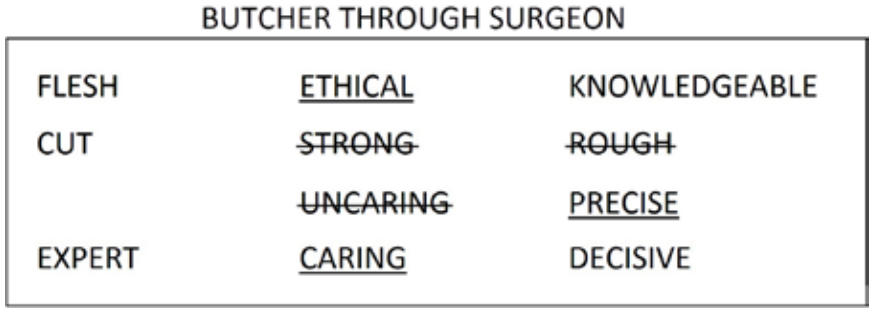

Diagram 4-4. Resulting temporary hybrid conceptual state for "That butcher is a surgeon"

In the case of Diagrams 4-3 and 4-4, the metaphor BUTCHER THROUGH SURGEON, while comprised of the same conceptual domains seen in Diagram 4-1, nevertheless produces a completely different inferencing result, namely an ETHICAL, CARING, PRECISE BUTCHER.

The Reversibility Challenge demands an account of not only how but why reversing the order of conceptual domains in metaphorization produces the new permutation of entailments it does. CFT responds to this challenge with the following explanation: sequential metaphor processing with a short time

delay has successfully filtered out "butcher"-specific domain elements (in the case of the butcher) and "surgeon"-specific domain elements (in the case of the surgeon), thus effectively highlighting FILTER domain elements that are novel with respect to each FOCUS domain concept. The variance among inferencing details that occurs due to changes in presentation order is somewhat consistent with the formal logic-based observations of Tversky[10] concerning the basic properties of similarity comparison. Rejecting "geometric models" of similarity comparison which posit similarities between entities to be relatively near to or distant from corresponding points in geometric space, Tversky asserts that similarities are actually "asymmetric relations" in which the relative salience of compared features determines comparison outcomes. Noting that it is common to say "Turks fight like tigers" but strange to say "Tigers fight like Turks,"[11] Tversky demonstrates the intransitivity of feature comparison in general and metaphorical comparison in particular.[12]

The decisive influence of sequencing order on processing results has been experimentally attested to, as well. Fischler and Goodman, who noted the benefits of "successive presentation" in metaphor processing, stressed that when paired stimuli feature a relatively strong associative relationship, "successive presentation" had a greater facilitation effect than stimuli presented "simultaneously."[13] In making this observation, they affirmed the proposal of Kadesh and colleagues that because successive presentation garners greater associational effects than simultaneous presentation, associational effects require the sequential introduction of stimuli to be optimally meaningful.[14] CFT's explanation of the mechanics of conceptual filtering (in terms of salience selectivity facilitated by unidirectional mapping) gives neurobiological rationale supporting Tversky's theoretical views while simultaneously offering a practical explanation for Fischler and Goodman's empirical observations.

Observing that First-pass Conceptual Filtering can potentially result in the conscious awareness of metaphorical implications is not to suggest that every person will necessarily become aware of all implications on the initial run of stimuli through the system. The degree to which both conceptual domains have been developed (extent of domain elaboration) will partially determine the level of awareness elicited by automatic processing. Furthermore, the presence of gist understanding is no guarantee that deeper analytical insights will be immediately available to conscious awareness. What is accomplished by way of First-pass Conceptual Filtering is likely to be a vague apprehension of fundamental meaning rather than a precise and complete understanding of a full range of metaphorical implications.

The fact that, lacking further activation, non-conjunctive domain elements revert to baseline levels (even as the mapping of applicable nodes proceeds) partially accounts for the Extraneous Detail Elimination Problem. This

problem is exemplified by the way that apparently irrelevant details disappear from the resulting temporary hybrid conceptual state for metaphorical statements such as "Lawyers are sharks." As the FOCUS domain LAWYERS is projected through the FILTER domain SHARKS, conjunctive domain aspects (covalent nodes integral to both domains) are stimulated. In this case, the assertion "Lawyers are sharks" activates mutually salient conceptual domains such as SINGLE-MINDED AGGRESSIVENESS. Meanwhile, prototypical aspects of the LAWYER domain (e.g., CARRY BRIEFCASES, CHARGE HIGH FEES, etc.) that have no counterpart nodes in the SHARK domain receive no further activation and revert to baseline levels of activation. Similarly, shark attributes (such as the idea that a shark is a GOOD SWIMMER) not specifically elicited by contextual cues will fail to receive activation because GOOD SWIMMER is not a salient domain aspect of the LAWYER domain. In this way, non-applicable features are effectively 'filtered out' of the emergent temporary hybrid conceptual state.

In light of the presence of such theoretical and practical rationale, the assertion that domain presentation order has critical implications for processing results represents a non-negotiable basic tenet of First-pass Conceptual Filtering. Because metaphor is often examined in written textual format, metaphorical expression in written form can potentially be understood as if it were a preexisting, instantaneously apprehended phenomenon when, in fact, both spoken and written language are perceived in serial fashion.[15] In neural processing, this serial nature of domain presentation may be understood as one set of activation patterns succeeding another set in three-dimensional neural space.

Now that the important salience-oriented first stage of First-pass Conceptual Filtering has been introduced, it would only be logical to explain the second stage of First-pass Conceptual Filtering, namely the disambiguation of meaning by way of context. Unfortunately, this second stage will require extensive preliminary explanation. Moreover, due to the fact that contextual effects display thoroughgoing influence over mind in general rather than narrow influence over language processing, it will be more appropriate to explain their broader role first and their decisive influence on metaphor processing only after their big picture functionality has been properly explicated. This being the case, observations concerning the role of contextual effects in metaphor processing will be postponed until Chapter 5.

FINE-GRAINED PROCESSING THROUGH SUSTAINED CONCEPTUAL FILTERING

In recognition of the fact that not all metaphorical understanding is available immediately, CFT posits a slower, more effortful process called Sustained

Conceptual Filtering as an extension of and complement to First-pass Conceptual Filtering. As has been observed, there will be times when unidirectional automatic processes like First-Pass Conceptual Filtering are insufficient to lead to a viable interpretation. Sustained Conceptual Filtering[16] is a relatively time-consuming iterative mapping phase that can facilitate more fine-grained analysis in such situations.

In contrast to First-pass Conceptual Filtering (which functions in a unidirectional manner over relatively well-entrenched neural pathways), Sustained Conceptual Filtering occurs as feedback from conscious attention cascades through a variety of less well-entrenched or more circuitous neural pathways, contributing subtle processing variations from one moment to the next as processing continues. In the case of First-pass filtering, we have already seen how the results of processing break the surface of conscious attention by way of the inner speech sub-vocal rehearsal system. As strong domain element overlaps and novel associations will naturally attract the focus of attention, further neural resources will be allocated. In all likelihood, the application of such resources will result in an awareness of mental effort that the cognizer will tend to interpret as evidence for the initiation of 'conscious control.'

As mental effort is applied through conscious fixation on the sound images registering in inner speech, the results of First-pass filtering will be recursively relayed back to associational cortices for further processing. Because various higher order processing areas naturally require more or less time to complete their processing, results of these various mental processes will inevitably boomerang back to inner speech in staggered fashion. For this reason, effortful mental processing in the Sustained Conceptual Filtering mode results in a more or less constant stream of processing results that register in conscious attention, these being once again pushed back through associational processing areas. This constant flow of staggered activity will result in a more diffuse and partially randomized type of iterative mapping activity.

The influence of this attention-directed iterative mapping phase helps to explain why the FILTER domain in a metaphor seems to adapt itself to the FOCUS domain in certain cases when a metaphor is considered at length (mentioned in Chapter 3 as the Unidirectional Mapping-Bidirectional Influence Problem). With respect to such bidirectional influence, Wisniewski has remarked that "concepts change when they combine, and current models do not go far enough in accounting for this change."[17] The idea that the sustained processing of a metaphor might incrementally influence the internal structure of the FILTER domain is thoroughly plausible. In particular, as effortful attempts to solve difficult metaphor inferencing problems successively cascade through a variety of microscopically discriminable processing pathways during Sustained Conceptual Filtering, the activation of this range of neural

connections will strengthen only those FILTER domain elements that overlap with domain elements of the FOCUS domain. For this reason, to the extent that mental effort is exerted, the neurally modified conceptual structure of the FILTER domain will gradually come to mirror the structure of the FOCUS domain due to the increased level of activity associated with that FOCUS domain. In this way, seemingly "bidirectional" mutual influence will emerge gradually in response to the randomly articulated repetition of a primarily unidirectional mapping process.

To offer a practical example, consider processing details relating to the metaphorical expression "man is a wolf": due to this metaphor, certain salient human-related features seem to affect how the WOLF domain is perceived. If mapping is a one-time, momentary occurrence, influence of the FOCUS domain (HUMANS) on the FILTER domain (WOLVES) would likely be minimal. That said, repeated attempts to process HUMAN THROUGH WOLF metaphors in sustained or ongoing manner would result in a repetition of the WOLF domain being stimulated in conjunction with applicable HUMAN-related activation patterns. To the extent that this asymmetric pattern of association is consistently applied, a relatively "anthropomorphized" wolf domain is likely to emerge. In this way, the Subjective Entailment Problem has been partially accounted for.

Of course, there may be other processes at work that partially account for perceived bidirectional influence, as well. Holyoak and Thagard note an effect evident in the cognition of children they term "personification": "Personification (. . .) may well be the most powerful analogical tool in the mental repertoire of children. (. . .) [C]hildren (and adults) tend to rely on the source analog of a person" when they do not already know much about the domain in question, with "younger children relying most heavily" on this strategy.[18] That is to say, because the conceptual domain humans have the greatest knowledge of is HUMANS, this domain becomes the default FILTER domain whenever the corresponding FOCUS domain is relatively less well understood. Over centuries of sociohistorical time and multiple generations, such consistently expressed metaphorical understanding would almost inevitably result in human characteristics being artificially grafted onto the WOLF domain in human narratives about wolves. To the extent that such gradually accreting changes to a FILTER domain become textually calcified, bidirectional influence will become more of a culturally transmitted conceptual artifact than an idiosyncrasy of conceptualization manifesting itself in individual cognition. Whenever humans try to metaphorically explore a less well understood domain, their fallback FILTER domain tends to be anthropocentric, thus causing even domains unrelated to humans to gradually recast themselves in terms amenable to the idiosyncrasies of human experience.

Over time, as various consistent entailments of the WOLF THROUGH HUMAN metaphor are intuited, socially confirmed, and ultimately fossilized into oral and written narratives, the fact that only a specific selection of features from the wolf domain is being transmitted in narrative form from generation to generation (even as encounters with endangered wolves become increasingly scarce), will inevitably skew the WOLF domain by bringing it into alignment with human concerns.[19] Put bluntly, repeated metaphorical viewing of non-human entities through the prism of humanistic conceptual domains will inevitably result in the anthropomorphization of such non-human domains. The efficacy of such a process goes a long way toward explaining many of the thoroughly anthropomorphized folk narratives that have been passed down over generations.[20]

Of course the following clarification is crucial: to the extent that non-human domains are firmly grounded in somatosensory perceptions from the real world, radical skewing of conceptual domain information need not result. Practically speaking, people with ample exposure to wolves in the wild will not tend to anthropomorphize wolves in the way that the folk tale *Little Red Riding Hood* does. Nevertheless, especially in cases where real-world experience of the domain in question is lacking (domain elaboration poverty), non-human conceptual domains will be particularly vulnerable to anthropocentric entailment effects.

Sustained concentrated attention, while potentially efficacious in the short term, is extremely taxing on neural resources if carried on for too long. For this reason, when faced with a slow to resolve processing dilemma, one crucial issue is how long effortful concentration may be sustained. In metaphor processing, because in principle anything can be compared with anything else, quick curtailment will necessarily result in an awareness of only a few relatively salient covalent nodes while extended analysis will result in an awareness of a wider range of less salient nodes. As concentrated attention is sustained, the salience of results will progressively diminish until, all likely options and even some implausible ones having been explored, no further results become available to conscious awareness.

It should be stressed that resorting to effortful Sustained Conceptual Filtering is not always necessary; First-pass Filtering alone is often sufficient to foreground covalent domains or markedly novel inferences against the decaying background activation levels of less salient or non-applicable conceptual elements.[21] In fact, First-pass Conceptual Filtering will be most efficacious in situations where prefabricated metaphorical stimuli achieve maximally salient outcomes in linguistic fashion. For this reason, conventionalized metaphors tend to include mostly domain combinations fine-tuned to achieve predictable results by way of First-pass Conceptual Filtering. Conversely,

Sustained Conceptual Filtering will have more elaborative potential for non-conventional metaphors in which heretofore unrecognized metaphorical entailments need to be elicited.

ATTENTION-FREE PROCESSING THROUGH ONGOING CONCEPTUAL FILTERING ("AFTERTHOUGHT")

With respect to the various types of processing observed in the human brain, Dunn and colleagues mention "interacting routes" of processing in which "rapid, reflexive" default responses work unconsciously only to be succeeded by slower, more subtle processes that generate more complex and "dispassionate" analysis of situations.[22] As a way to describe the influence of these slower, more detail-intensive processes of metaphor inferencing, CFT posits the contribution of "resting-state brain activity."[23] Amounting to a type of relatively passive "afterthought," Ongoing Conceptual Filtering exerts its greatest influence after the First-pass and Sustained Conceptual Filtering phases have run their course.

Cognitive scientists have long noted that Left-hemisphere (LH) and Right-hemisphere (RH) brain activation seems to differ both in terms of strategies and goals. In the context of figurative language study, Giora and Stringaris have stressed that while LH is more generally active and adept at handling conventional metaphoric meanings in relation to context, RH appears to be more sensitive to creative, non-salient, complex and open-ended figurativity.[24]

The work of Kounious and colleagues gives concrete corroboration to this view in their observations on the efficacy of a more passive and prolonged variety of processing.[25] Specifically, they noted that subjects who solved problems through the use of diffused rather than focused attention displayed RH lateralized neural activation. Regarding the possible advantages of using such RH-intensive thought processes, they observed that diffuse conceptual attention "allows a concept in semantic memory to activate both remote and close associations" so that closely related (or highly similar) associations are not given priority as is usually the case.[26] In fact, various studies[27] have noted that unconscious thought processes are in some ways superior to conscious deliberative processes when complex information must be processed.

With regard to what they term "deliberation-without-attention effects," Dijksterhuis and colleagues propose that it is sometimes advantageous to "think consciously about simple matters and to delegate thinking about more complex matters to the unconscious."[28] In that such Ongoing Conceptual Filtering is posited to occur late in processing and would be optimally applied to metaphor inferencing problems complex enough to remain unresolved

despite the contributions of both First-pass and Sustained Filtering, RH-intensive "attention-free" processing seems likely to account for incidences in which metaphorical entailments are recognized during 'afterthought.' If this hypothesis is correct, Ongoing Conceptual Filtering[29] would represent an additional (relatively symmetric) matching phase of processing by which the brain might handle difficult inferencing problems resistant to First-pass and Sustained Conceptual Filtering.

In that Ongoing Conceptual Filtering spurs an interplay between the Left and Right hemispheres, it is likely to result in both domains of metaphor being activated not unidirectionally (that is, according to their conventional order of activation) but rather bidirectionally (with the order of activation effectively randomized) by way of unfocused spreading activation. This mutual interaction between domains is likely to result in a greater awareness of bidirectional influence.

In any case, should iterative focused attention prove insufficient to resolve the processing dilemma at hand, people regularly deal with problems by allowing more diffused association strategies to function over time. Indeed, phrases such as "sleeping on it," "meditating on it," "chewing it over," or "forgetting about it and coming back to it later" all reflect the fact that humans, while lacking awareness of the neural mechanisms underlying the strategy, nevertheless consciously recruit resting state "afterthought" in the face of seemingly intractable problems.

ON THE PROCESSING OF ABSTRACT DOMAINS

One objection to CMT mapping views of inferencing was that it was felt they could not account for the processing of 'abstract' conceptual metaphors. In fact, however, the lack of ability to perceive concrete grounds upon which to base mapping relations may stem partly from the fact that cognitive parameters, while exceedingly concrete according to their own internal functional logic, often lie outside of conscious attention and furthermore may not match up with human metalinguistic understanding of what is 'concrete.'[30] Because image schemas necessarily function *sub rosa*, judgments concerning literalness or figurativity may have little relationship to the actual cognitive processing functions involved.

For example, with respect to the previously mentioned Abstract Domain Problem and the seemingly structural analogy in the statement, "The atom is a solar system," the domains ATOM and SOLAR SYSTEM would appear to be abstract due to the fact that neither domain has naturally perceptible structure in human scale. Scientists, including Rutherford and Bohr, with detailed knowl-

edge of both systems nevertheless noticed structural similarities between the two, with the most crucial realization being the great mass of the nucleus at the center of the atom. Once this detail was experimentally confirmed, a comparison of the attraction between the atom's nucleus and its electrons with the sun and its planets led naturally to the cognitive model, ATOM THROUGH SOLAR SYSTEM, and to further related discoveries by extrapolation.

In noticing such a similarity, the fact that the scale of an atom and a solar system are so vastly different is irrelevant so long as such motion can be imagined (internally visualized by way of embodied simulation[31]) in certain brain areas calibrated to recognize and store perceived examples of rotary movement. Such tightly defined recognition patterns are found, for example, in the dorsal stream which specializes in breaking down incoming visual representations, one instance being the medial superior temporal (MST) which includes cells selective for linear, radial, and either clockwise or counterclockwise circular motion.[32] Due to the fact that MST is one of the areas that preprocesses mapped stimuli in a unidirectional stream of incoming signals, it will not be accessible to conscious awareness in the ways that areas of neocortex are. Nevertheless, the role of the MST in visual processing clearly shows that the brain is equipped with neural recognition areas capable of detecting and selectively storing circular motion phenomena. Consequently, the difficulty in positing a 'structural' similarity between an atom and the solar system lies not in some alleged structural similarity-appraisal deficiency in human cognition but rather in the fact that most human minds would not have a strong enough grasp of the abstract domains in question to allow such a hypothesized structural similarity to be intuited.

It has been repeatedly stressed that the human somatosensory system, because it breaks down complex perceptual signals into minimalist yet adaptive recognition traces for use in later recall, is well equipped to recognize even a highly abstracted, schematic phenomenon such as rotation. That such orientation-detection apparatus is capable of matching images projected over perceptual channels with abstract image schemas distilled from experience should be obvious; this is the basic ability that underlies all basic perceptual understanding and recall.

Moving beyond this fundamental system functionality to posit that abstracted schematic dispositions in memory might be compared with other imagined states by way of mental simulation is no great supposition. In fact, the very schematicity of perceptual memories and the adaptiveness of the system would virtually assure that such internal cross-referencing of abstract concepts could be carried out as an imagined simulation with minimal mental effort. Humans compare memories of unrelated events and correlate impressions of highly dissimilar (and even abstract or imagined) phenomena all the time.

To offer another example of how disparate domains might be correlated (with respect to the Abstraction Level Mismatch Problem) let's consider the metaphorical phrase "This career is a jail." In this metaphor, the abstract domain CAREER is a relatively intangible complex idea while JAIL seems extremely concrete, at least in its core concept relating to a physically existing 'jail' building, the outside or inside of which many people have probably experienced firsthand in everyday life. Consequently, attempts to align the variety of abstract domain elements typically associated with a CAREER to the relatively concrete domain elements associated with a JAIL would seem to be prevented by a lack of natural conceptual overlap due to the fact that one domain seems more abstract than the other.

The point to remember, however, is that First-pass Conceptual Filtering makes no claims that all or even a majority of domain aspects must match up for metaphor inferencing to be facilitated; the claim is, rather, that if there are *any* overlapping domain aspects at all, be they concrete or abstract, it is these conjunctive neural nodes that will be stimulated and this partial overlap in activation will cause lexical items relating to those nodes to rise to the surface of conscious attention.

In fact, whether recognized immediately or following intense reflection, the phrase "This career is a jail" does include conceptual overlap: because "jail" is a prototypically negative term associated with 'everyday restrictions' and 'lack of ability to move about freely,' the hearer will likely perceive this (admittedly abstract) conceptual overlap and attribute it to the speaker's dissatisfaction with his or her job (a necessary context for interpretation). Such narrow-band inferencing will only work, however, when the FILTER domain includes markedly salient prototypical domain aspects, as is the case with the domain element RESTRICTION in the conceptual profile of JAIL. While there are undoubtedly people who find comfort and stability in being incarcerated, for the vast majority of humanity, going to jail is a negative experience to be avoided. The processing of the concept JAIL is relatively straightforward precisely because its prototypical negative features (restriction of activity, lack of ability to travel, limited social contact, etc.) are so obvious.

In situations in which prototypical implications are absent and first-pass inferencing fails to provide a satisfactory level of resolution, there are delayed iterative and diffused processes (specifically, Sustained and Ongoing Conceptual Filtering) that can achieve semantic resolution, as well. Consequently, an initial lack of obviously commensurable elements is no insurmountable barrier to metaphorical understanding, provided that there are some as yet unrecognized commensurable parameters of cognition that may be uncovered through more effortful or time-intensive types of processing.

In the final analysis, the path to the understanding of a metaphorical statement may be quick and relatively automatic, or sustained and neurally "laborious," or protracted and seemingly passive. While the specific type of processing that will bring maximal resolution to a pair of domains requiring analogical processing is likely to differ from one instance to the next, as an adaptive conceptual processing organ, the human brain is naturally equipped with multiple capabilities that will be successively employed until such resolution has been achieved or interest in the analogical problem itself has diminished.

RATIONALE FOR CFT DOMAIN TERMINOLOGY EXPLAINED

As detailed in Chapter 3, terminology has been a source of great confusion and conflict among metaphor researchers since the mid-20th century. In that each set of metaphor-related terms tends to be inextricably connected with its specific theoretical paradigm, it is not enough to simply state that the terminology is, by nature, imperfect. For if the underlying theory is correct and human mental processes actually function according to the conceptual logic implied by the terminology, then researchers may be required to 'grit their teeth' and use the set of terms that best reflects such an underlying reality. Having said this, it would appear that not only the working vocabulary but the various theories of metaphor themselves have irremediable problems.

In recognition of the fact that ideally useful terms will accurately reflect the situations they express, the first part of this chapter proposed Conceptual Filtering Theory, a theory that explains metaphorical feature attribution in terms of the serial overlay of the stored results of somatotopic projections. Consequently, CFT uses two main terms to express the primarily unidirectional influence one conceptual domain has on another in metaphor: the FOCUS domain and the FILTER domain. The FOCUS domain is the topic of metaphorical inquiry and represents the primary domain adapted during the course of metaphor processing. In Lakoff and Johnson's iconic example, "Life is a journey," the conceptual domain LIFE is the FOCUS domain. As metaphor proceeds, activation levels for the various domain elements that comprise the conceptual domain LIFE will change as the FOCUS domain is projected through the second type of conceptual domain, the FILTER domain.

Metaphor is accomplished as FILTER domain activation patterns partially overlap with activation patterns of the already activated FOCUS domain resulting in a temporary hybrid conceptual state in which the FOCUS domain is partially reflected. It is the absence of certain FOCUS domain elements in the

resulting temporary hybrid conceptual state that has led to the adoption of the term "FILTER domain"; for indeed, the specific conceptualization details of the FILTER domain will determine which FOCUS domain aspects remain active and which are excluded due to the lack of covalent activation.

In the Conceptual Filtering account of metaphor inferencing described over the entirety of this chapter, the primary metaphorical image being alluded to in CFT is "filtering," a term that implies light being filtered by a lens filter in photography or the application of a filter effect in photo editing software. Having said this, it is not impossible to consider Sustained or Ongoing Conceptual Filtering in terms of a liquid or granular substance continuously passing through a physical filter of some kind. While the 'light filtering' conceptualization is more suggestive with respect to First-pass Filtering, both conceptual models of filtering are productive as they serve to represent different modes of processing.

Because First-pass projection causes activation patterns in the FOCUS domain to be selectively altered by way of its interaction with the FILTER domain, it is neurally accurate to say that the FOCUS is adapted *through* the FILTER domain. Consequently, when describing the metaphorical interaction of conceptual domains, CFT proposes the formulation FOCUS THROUGH FILTER. For this reason, in CFT formulation, the phrase "Life is a journey" will be expressed LIFE THROUGH JOURNEY. Because the fundamental asymmetry of similarity comparison[33] is made explicit by way of CFT terminology, the use of the word THROUGH to express the 'sequential transformative' relationship between metaphorical domains represents a much-needed improvement to the 'synchronous equivalence' implied by use of the capitalized verb "IS" in CMT formulation.

In conclusion, it should be stressed that, although the Invariance Hypothesis seems fundamentally correct in its basic premises, its inability to account for bidirectional influence ensured a certain measure of ongoing theoretical skepticism. CFT's three-phase account of metaphor processing remedies this inadequacy by characterizing the Invariance principle not as the final word on figurative language processing but rather as the first and most important constraint on feature attribution when salient inferencing options are present. That said, the influence of Invariance will be less decisive when strong salient inferencing options are unavailable. Furthermore, while the Invariance principle accounts for the generation of *possible* salient interpretations, it does not determine which lines of inferencing will actually receive maximal attentional resources. This task will be handled not by Invariance but by contextual disambiguation. As explaining contextual disambiguation will require a careful delineation of the dynamic ways in which salience and contextual factors

work in tandem to determine interpretive outcomes, a thorough explanation of the subject will be provided at length in the next chapter.

NOTES

1. Conceptual Filtering Theory represents an adaptation and expansion of basic ideas expressed in the following poster presentation: Daniel C. Strack, "Directionality in figurative language interpretation: Prior activation determines details of feature attribution in metaphor processing," poster presented at IEEE ICDL-EpiRob 6, Cergy-Pontoise, France, September 2016.

2. Although primarily feed-forward in orientation, CFT posits the contribution of more diffused processing styles at later stages, as necessary.

3. David Tuggy, "Schematic Network," in *Cognitive Linguistics: Basic Readings*, edited by Dirk Geeraerts (Berlin: Walter de Gruyter, 2006), 175.

4. Giora, *On Our Mind*, 26.

5. The term "neural node" is used here to reflect the fact that most neural connectivity is facilitated not in terms of individual neurons but rather by way of "populations" of multiple neurons. A "neural node" is simply a group of neurons at a point of intersection within a conceptual network that accomplishes their function as a population rather than by way of the targeted activation of single neurons.

6. The term "temporary hybrid conceptual state" refers to a state of heightened neural activity sufficient to bring the 'meaning' of a metaphor to conscious awareness. For this reason, the meaning spurred by the metaphor is the impression an individual receives on a given occasion due to heightened awareness for the duration of the temporary hybrid conceptual state. As such, 'meanings' are mind-internal, unrepeatable cognitive phenomena.

7. Cf. the discussion of the Inconsistent Terminology Problem in Chapter 3 for details.

8. Paulesu et al., "Neural correlates," 342–44; cf. also discussion of "post-lexical phonological encoding" in Indefrey and Levelt, "Neural correlates," 862.

9. The irony elicited by this metaphor indicates that an understanding of the typical goal orientations of a surgeon has been factored into this processing example. A more precise explanation of the general principles involved in irony elicitation will be deferred until the extended discussion of goal orientations and contextual effects in Chapter 5.

10. Amos Tversky and Eldar Shafir, *Preference, Belief, and Similarity: Selected Writings* (Cambridge, MA: MIT Press, 2004), 7–46.

11. Ibid., 8.

12. While Ortony adapts the basic stance of Tversky to his own metaphor inferencing model (Andrew Ortony, "Beyond literal similarity," *Psychological Review* 86 (1979): 171), Glucksberg accurately points out that this adaptation is not asymmetric enough to explain metaphor and proposes his own further adaptation (Glucksberg and McGlone, *Understanding Figurative Language*, 32). Unfortunately, neither Ortony

nor Glucksberg recognizes the fact that, while Tversky is certainly *generally* correct in pointing out how asymmetries in similarity assessment play out with respect to formal logic, the brain is not wired according to the precepts of formal logic; as unidirectional mapping is the main neural facilitator of metaphor inferencing, the actual embodied 'logic' of metaphor cannot be characterized apart from the hardwired alogical tendencies of the neural processes that undergird it.

13. Fischler and Goodman, "Latency of associative activation," 466.

14. Irving Kadesh, Marilyn Riese, and Moshe Anisfeld, "Dichotic listening in the study of semantic relations," *Journal of Verbal Learning and Verbal Behavior* 15, no. 2 (1976): 213–25.

15. While verbal messages are perceived in auditory processing as a sequence of phonemic inputs, written language is perceived sequentially as the eyes track across a visual array of written information, recognizing letters and words in succession.

16. This idea roughly corresponds to what Tsur called "delayed conceptualization," a term he contrasted with "rapid conceptualization," the former term denoting situations in which accuracy and subtlety is valued more than speed of response. Cf. Reuven Tsur, *Toward a Theory of Cognitive Poetics*, 2nd ed. (Brighton: Sussex Academic Press, 2008), 577–78.

17. Edward J. Wisniewski, "When concepts combine," *Psychonomic Bulletin and Review* 4, no. 2 (1997): 167.

18. Holyoak and Thagard, *Mental Leaps*, 90–91.

19. Safina notes how wolves in literary and culturally transmitted narratives generally are not so much living things as amalgamations of the "the projected fears of people insecure about civilization." Cf. Carl Safina, *Beyond Words: What Animals Think and Feel* (London: Souvenir, 2016), 170.

20. As Freeman ("Multimodalities of Metaphor," 70) notes, the origins of the Human Through Wolf metaphor, rather than representing a recent cultural construct, probably reflect animal-human associations that emerged in the world of preliterate myth some 40,000 years ago. Cf. Chip Walter, "The first artists," *National Geographic Magazine*, January 2015, http://ngm.nationalgeographic.com/2015/01/first-artists/walter-text.

21. Paula Rubio-Fernández, "Concept narrowing: The role of context-independent information," *Journal of Semantics* 25, no. 4 (2008): 401.

22. Barnaby D. Dunn, Tim Dalgleish, and Andrew D. Lawrence, "The Somatic Marker Hypothesis: A critical evaluation," *Neuroscience and Behavioral Reviews* 30 (2006): 263.

23. John Kounios, Jessica I. Fleck, Deborah L. Green, Lisa Payne, Jennifer L. Stevenson, Edward M. Bowden, and Mark Jung-Beeman, "The origins of insight in resting-state brain activity," *Neuropsychologia* 46, no. 1 (2008): 281–91; cf. also Bear et al., *Neuroscience: Exploring*, 720–23.

24. Rachel Giora and Argyris K. Stringaris, "Metaphor, Neural Substrates of," in *The Cambridge Encyclopedia of the Language Sciences*, edited by Patrick C. Hogan (Cambridge: Cambridge University Press), 490–91.

25. Kounios et al., "Origins of insight."

26. Ibid., 283.

27. E.g., Ap Dijksterhuis, Maarten W. Bos, Loran F. Nordgren, and Rick V. Van Baaren, "On making the right choice: The deliberation-without-attention effect," *Science* 311, no. 5763 (2006): 1005–7; Ap Dijksterhuis and Loran F. Nordgren, "A theory of unconscious thought," *Perspectives on Psychological Science* 1, no. 2 (2006): 95–109.

28. Dijksterhuis et al., "On making," 1007.

29. Another type of Ongoing Conceptual Filtering is recalibrating feedback. Spivey notes how primarily feedforward "supramodal salience maps" nevertheless have ways of feeding back activation patterns to unimodal sensory systems (*Continuity of Mind*, 133–34). In this post-processing stage, the synaptic weightings of conceptual domains are recalibrated in response to prior activity. While details would need to be verified, both the process of recalibration and the resulting changes in synaptic weightings could potentially contribute to bidirectional conceptual elaboration.

30. The literal/figurative distinction will be addressed in detail in Chapter 7.

31. Raymond W. Gibbs and Teenie Matlock, "Metaphor, Imagination, and Simulation: Psycholinguistic Evidence," in *The Cambridge Handbook of Metaphor and Thought*, edited by Raymond W. Gibbs, Jr. (Cambridge: Cambridge University Press, 2008), 161–69.

32. Bear et al., *Neuroscience: Exploring*, 358.

33. Tversky and Shafir, *Preference*, 7–46.

Chapter Five

Context and Goal Orientation

Looking back over previous chapters, metaphor inferencing results have been partially explained by noting the key role played by salience in unidirectional mapping. In the process, CFT appears to have overcome all of the theoretical 'obstacles' enumerated in Chapter 3's 'metaphor inferencing obstacle course' except one: The Indefinite Domain Problem. This chapter will address this rather complex issue by surveying a broad range of linguistic, psychological, and neurological studies to clarify how global contextual effects exert decisive top-down influence on the conceptual system. It will be asserted that inconspicuous goal-oriented cues can disambiguate even vaguely elaborated metaphors through the rapid intervention of suppression routines.

ON THE METAPHORICAL IMPLICATIONS OF TRADITIONAL VIEWS OF CONTEXT

From the era of classical rhetoric to the present, scholars familiar with metonymy and metaphor have stressed that context-related factors like 'starting assumptions' and 'background information' must be considered when trying to account for interpretive outcomes. In fact, theories of language that have taken metonymy and metaphor seriously have generally acknowledged that, in the final analysis, contextual cues play an outsized role in guiding figurative language interpretation.[1] This being the case, it seems all the more surprising that 21st-century researchers have failed to agree on how *or even when* contextual effects exert their influence on the figurative language processing stream.[2] While most scholars agree that contextual effects are deployed rapidly and to great effect, the specific triggers that set off such

deployment and the reasons for which context so dominates processing have been shrouded in mystery.

One reason that practical attempts to analyze contextual effects have been so long in coming is that, until recently, conceptualization itself had not been well understood. As long as concepts were thought to be discrete proposition-like meaning units in the mind[3] and the "holistic unitary" account[4] of concepts seemed unassailable, context (rightly judged to be relatively more complex and analytically impenetrable than concepts) could be farmed out to pragmatics specialists so as to keep the study of basic referential meaning as spare and tidy as possible.

As a practical consequence of this "divide and conquer" approach to linguistics, semanticists have been quick to claim that 'social' elements and deep background information relating to context should be addressed by experts in pragmatics[5] while pragmatics specialists like Grice have tended to abdicate responsibility for the "decoding" of more explicit communicative content.[6] For the same reasons, certain types of ambiguity were seen to be lexical (that is, positioned firmly within the realm of semantics), while other types of ambiguity were characterized as stemming from contextual factors.

Unfortunately, this traditional division of labor—in which pragmatics specialists have examined contextual effects using the analytical tools of traditional pragmatics—has proved less than ideal because it is cognitive semantics and not pragmatics that has developed terminology fine-tuned for dealing with complex mental phenomena.[7] Because Conceptual Filtering Theory aims to provide a relatively complete, neurobiologically plausible description of metaphor inferencing, the role of contextual effects must be accounted for whether they rightly belong to the field of pragmatics or not.[8] Moreover, because CFT is (for better or worse) systematically premised on a distributed view of concepts, contextual effects must be explained in a way that allows them to interface with such a distributed conceptual system. For this reason, Conceptual Filtering Theory intends to blur the dividing line between semantics and pragmatics and treat contextual effects not as outside influences which occasionally inform the predictable decoding of semantic formulae but rather as complex internalized patterns of situational awareness that can only function to the extent they practically intermesh with the multimodal neural disposition networks of conceptualization.

Before attempting any detailed explanations, however, it may be helpful to examine the seemingly "scientific" roots of the classical view of context and in so doing verify why the oversimplified understanding it afforded has proven so compelling. This classical view was premised on the twin propositions that context is simultaneously an 'outside' environmental factor not directly related to conceptualization, and that internal reflections of such out-

side contextual 'factors' are substantially abbreviated and "propositional."[9] Briefly mentioning the philological origins of the context-related terms 'perspective' and 'point of view' may allow the reader to recognize how certain occasionally useful but ultimately flawed ideas about context have obscured academic discussions on the subject.

While words like 'point of view' and 'perspective' are readily understood by present-day English language users, only a few centuries ago, these terms were neither in general use nor broadly understood. It is for this reason that Edgerton has termed the medieval Italian artist and architect Brunelleschi's discovery of linear perspective "one of the most decisive ideas in the history of Western technology and science, as well as art."[10] In around 1425, Brunelleschi adapted principles from Greek optics (*perspectiva naturalis*, in Latin) to realize a highly regarded painting based on geometric linear perspective principles (*perspectiva artificialis*). Thanks to the promotional efforts of Alberti, the practical understanding and application of this new type of perspective soon began to influence a wide variety of Renaissance artistic and scientific pursuits. Not surprisingly, popular invocation of the term was not far behind. The first attested English-language use of "perspective" in its 'point-of-view' sense was in 1598.[11] The perspective-related phrase "point of view" itself did not enter the English vernacular until sometime after 1727,[12] while the word "viewpoint" finally came into common usage after 1856.[13]

The present-day terms "perspective" and "point of view" disguise an extremely sophisticated set of assumptions about the interrelations of material objects in space. According to Argan and Robb, "linear perspective" is not so much a drafting technique as a "method or mental procedure for the determination of value."[14] That is to say, the idea of perspective goes beyond simple line extension; rather it is an attempt to accurately represent the relative proportional surface area of objects in one's visual field. Consequently, when one attempts to view objects from 'a different perspective,' the simple point-of-view change experienced by the observer leads not only to a new angle of vantage but to a fundamental recalculation of the relative prominence of each and every object under consideration.

Thus, while it is certainly verbally expedient to summarize the complex adjustment of object prominence in one's visual field by mentioning a change in one's "point of view" (that which is visible from a single unitary 'point,' perhaps imagined as a spatial location a few centimeters behind the eyes and equidistant from each ear), two problems with this type of oversimplified expression need to be kept in mind. First of all, because the 'points of view' attributed to others are not *actually perceived* but must be imagined as adjustments to the baseline understanding provided by one's own 'point of view,' differing perspectives are naturally regarded as *external factors* that contrast

with the fully integrated (and therefore seemingly objective) perspectives offered by one's own embodied visual sense. Secondly, the verbal shorthand that allows such differing perspectives to be 'summed up' tends to underestimate the degree to which relative values need to be recalculated with respect to attended phenomena.

Comparing the simple two-dimensional visual details determined by one's 'point-of-view' to the situated details of embodied context, context is revealed to be orders of magnitude more complex because it potentially reflects the situation-specific relative weighting of cognitive parameters *across all cognitive modalities*. While characterizations of a given 'context' (just like characterizations of a certain 'viewpoint') tend to be referenced in a shorthand manner as if they amount to propositionally expressible, easily summated ideas, the actual influence on the conceptualization of a person experiencing such an altered 'context' cannot be adequately reflected in unitary propositional terms but should rather be seen as a myriad of complex relational shifts and concomitant reweightings in virtually every facet of situated understanding across the entirety of that individual's cognitive system. Put simply, abbreviated expressions of context, while informative and certainly better than nothing, are grossly oversimplified.

STATISTICAL FEATURES OF CONCEPTUALIZATION

Before explaining how such complicated situation-specific reweightings can be reflected in figurative language processing, it will be useful to review the statistically complex nature of conceptualization itself. To ensure that mental states accurately reflect the current details of the perceiver's surroundings, conceptualization is continuously updated by incoming signals from sense perception. The fact that this updating occurs incrementally is crucial; a "prototype"-based categorization system can only be gradually adjusted in such a way.

Theories of mind before the cognitive science era viewed categories as 'all-or-nothing' taxonomic classes; that is, entities under examination were judged to be either members of a certain category or non-members, with no members exhibiting special status within a given category.[15] Beginning in the early 1970s, however, Rosch carried out a series of experiments that challenged this orthodox view.[16] To mention one example, results of an experiment that examined the subjective impressions of experiment participant reactions to colors[17] harmonized with the findings of Berlin and Kay that focal colors are better representatives of color categories than other colors.[18] Such findings may be explained with reference to details of neurobiology. Human vision de-

tects color through the contributions of light frequency-attuned neurons called cone cells.[19] Because the three varieties of cone cell exhibit peak frequency response to the colors red, green, and blue, respectively, vision researchers termed these colors "focal colors."

One reason that toys made for young children often feature the focal colors red, green, and blue is that toddlers, whose vision systems are still being calibrated, have visual preferences that are relatively insensitive to shades, hues, and other types of color ambiguity. While adult color preferences display more variety and less predilection for focal colors, exemplars of the basic color palette (including red, green, and blue) remain the light wavelength frequencies that the apparatus of visual perception can most easily attend to.

To the extent that human vision fixates on focal colors better than it does on other colors, the relationship between focal colors and other colors is not one characterized by equivalence of cognitive response but rather constitutes an asymmetry in neural activation. Consequently, with respect to visual perception, focal colors are understood to be 'best representative' prototypical colors while other colors (which elicit lower levels of neural response) are judged to be less prototypical. This being the case, the connection between frequency-attuned cone cells and statistical imbalances in how people perceive color exemplifies how the various details of human physical embodiment lead to differential conceptual responses in relation to otherwise apparently equivalent perceptual stimuli.

As Rosch continued her experimentation, she noticed "prototype effects" in experiments relating to everyday objects and animals, as well. For example, when American university students rated various objects for "goodness-of-example" with respect to the category "furniture,"[20] chairs, sofas, and dressers obtained high ratings while clocks, fans, and telephones received low ratings. In the gray zone between these prototypical exemplars of furniture and objects judged to be 'un-furniture-like' were items such as pianos, cupboards, and televisions. This study revealed a statistically attestable gradation between category examplars and non-category members that reflects radial (center/periphery-oriented) category structure; that is, categories include central exemplars that induce maximal neural response and also peripheral members that evoke a lower or unchanged level of response.

Consequently, radial categories, as characterized by Prototype Theory, represent a fuzzy aspect of cognition in which perceived entities may be described as lying relatively near to or at the periphery of a concept's neural activation 'sweet spot.' If one views conceptualization not in terms of member/non-member category judgments but rather as ongoing neural computation in which a variety of statistical correlations (including but not limited to those displaying prototype effects) interact, then metaphor inferencing and other

types of figurative language processing will naturally lead to certain types of statistically fine-grained results.

With respect to the hypothesis that conceptual domains undergird semantic reasoning in CMT, Warren has difficulty coming to terms with such a lack of clear domain boundaries and the analytical indeterminacy that results from accepting the idea of linguistic categories constantly in flux. She comments, "Generally the theory of domains is difficult to apply since domain boundaries are not observable, nor intuitively self-evident and therefore [. . .] methodologically and theoretically problematic."[21] Warren's observation that domain boundaries are difficult to pinpoint and so conceptual domains are challenging to conduct research on is accurate; nevertheless, the conscious choice to ignore the psychologically complex realities of conceptual domain structure is a strategy that consolidates conventional linguistic theory at the expense of neurobiological accuracy, a tradeoff that may seem attractive in the short term but will ultimately lead to oversimplified theoretical hypotheses that have little hope of being experimentally corroborated.

In fact, statistical features and "fuzzy," difficult to quantify aspects of cognition are in no way limited to the realm of conceptual domains. As Spivey notes, many outcomes of multi-modal cognition cannot be precisely determined because they result from "competition between population codes."[22] In neuroscience, the term "population code," which assesses neural connectivity not in terms of individual neurons but rather by focusing on "populations" of multiple neurons, is useful because it makes allowances for a number of factors that make neural computation complex: in particular, population codes compensate for the fact that "sensory, motor, or cognitive information" is "distributed over a large number of neurons"[23] and that the pathways traversed by cascades of activation patterns are not precisely "hardwired" (as in the case of a computer) but vary over time at the microscopic level due to issues such as the "frequency, spacing, type of neuronal activity, or to the kind of chemical transmitters" present.[24] Consequently, in contrast to computer processing, specific instances of neural activation in the brain in response to a given stimulus are basically unpredictable and unrepeatable. This being the case, while it is certainly challenging to do research on a microscopically unstable system undergoing constant reorganization, this is an inherent quantitative analysis problem that researchers must overcome, not a theoretical inconsistency that causes conceptual domain-related hypotheses to be disproved.

In that these statistically complex phenomena undergird cognition, concepts and categories should not be thought of as "static things in the head that are accessed when queried, but instead as dynamic flexible patterns, or complex structures in state space . . ."[25] This being the case, it may be an

opportune time to reemphasize a previous point: although language ability crucially depends on conceptualization, broadly distributed and continuously updated concepts are in no way reducible to language.

ON THE INTERFACE BETWEEN CONCEPTS AND CONTEXTS

So if conceptualization is characterized by graded levels of response, unrepeatable microscopic activation cascades, and competition between neural population codes, the key question is: do contextual effects function according to the same neural principles or are they facilitated by a different system? Two viewpoints that have strongly influenced present-day linguistic notions concerning context are Grice's proposals about "conversational implicatures" and the ideas presented in Sperber and Wilson's book-length response to Grice, *Relevance Theory*, and its more recent companion volume, Wilson and Sperber's *Meaning and Relevance*.

Grice's inferential model of communication asserts that, when there is ambiguity present in an encoded message, hearers make use of conversational implicatures[26] which allow them to infer the speaker's intended meaning by eliminating any meanings that seem to violate the various "maxims" of cooperative, efficient communication.[27] That is to say, when the coded message by itself is not sufficient to facilitate clear communication, common knowledge and reasonable presuppositions about speaker intentions (logically derived rules) may be brought to bear. While Grice suggests that conversational implicatures may undergird many types of presupposition, he admits that the full range of presuppositions necessary to explain every instance of communication may be too vast to be covered by his conversational implicatures alone.[28] His hesitation to presume that conversational implicatures can explain every communicative eventuality hints at the ultimate poverty of the "maxims" he provides: only by positing a range of yet to be determined "non-conventional implicatures" can his theory hope to resolve all such processing dilemmas.

While Grice's theory of implicatures is narrowly tailored to account for linguistic communication, Sperber and Wilson draw inspiration from inferential models and then expand the range of inquiry to include all types of communicative stimulus[29] that potentially offer evidence for intentional information sharing. Having said this, they still see context-related processing to be governed by "logical implications,"[30] deductive computational rules that recall Grice's implicatures and maxims.

With respect to language processing details, these two theories regard conceptualization and contextual effects as separate and mostly unrelated

phenomena[31] despite the fact that the only way to explain the interaction between the two systems will be to posit some sort of interface between them.[32] Both Grice's ideas about conversational implicatures and Sperber and Wilson's Relevance Theory posit concepts to be simple and "propositional" in nature[33]; for these theories, communication is accomplished as linguistic messages are syntactically decoded and cross-referenced with knowledge concerning relatively rich outside "contexts."

For example, in Sperber and Wilson's propositional view of concepts (the actual term they use is "factual assumptions"), concepts are not highly detailed, multimodal complexes of neural dispositions networked across diverse brain regions but rather locally processed "logical, encyclopaedic, and lexical" items[34] which are beliefs "entertained" as being true[35] and stored in memory as "representations."[36] In contrast to the extreme poverty of their account of concepts ("factual assumptions"), they posit "contextual effects" to be "non-representational dimensions of mental processes."[37]

While Sperber and Wilson's complex, non-representational view of context at least acknowledges the crucial and highly sophisticated role that contextual effects are thought to play in the "decoding" of linguistic utterances, it is difficult to understand how these non-representational contextual factors could successfully coordinate with and influence concepts if the concepts themselves are as structurally austere as Sperber and Wilson make them out to be. Moreover, Spivey, after noting that perceptual processes function according to internal parameters and not "formal symbols," asserts that transmogrifying distributed sensory patterns into "categorical symbolic associations" (mentalese) would create a processing bottleneck to no effective purpose.[38] In other words, Relevance Theory has not one but *two* interface problems: first, explaining how perception meshes with its propositional and encyclopedic "factual assumptions" and, second, accounting for how such representational factual assumptions interact with "non-representational" context-facilitating mental processes. If (as CFT posits) both concepts and contexts are distributed and non-propositional, then there would be no such processing mismatch at any level of cognition.

Another problem with Relevance Theory is that it seems to presume that context pertains primarily to communicative intent (usually the understanding of words in intention-driven discourse) and fails to recognize that contextual inputs can influence inferencing processes even when no communicative volition is evident[39] (as when a person is suddenly forced by circumstances to seek shelter during a heavy rain). Both communicative and non-communicative (that is, intentional and non-intentional) stimuli must be interpreted and responded to in everyday life. By limiting inferential understanding to communicative situations, Sperber and Wilson certainly succeeded in keeping the

focus of their research program squarely on linguistics. In doing so, however, they may have inadvertently cut Relevance Theory off from the reason that humans are so sensitive to communicative intentionality in the first place: the fact that contextual awareness dominates not only human thinking about interpersonal communication but human thinking *in general*. In other words, allowing for the fact that humans can find "relevance" not only in intentionally conveyed messages but in all kinds of task-related situations, it would seem that Sperber and Wilson were content to produce a Theory of Communication when they should have been constructing a Theory of Mind. The key question, then, is: Are human judgments about what is "relevant" based solely on goal orientations detected in intentionally conveyed messages or do goal orientations color virtually every facet of human meaning construal?

GOAL ORIENTATIONS AND THEIR TOP-DOWN INFLUENCE ON CONCEPTUALIZATION

An abundance of research demonstrates that human goal orientations can be activated unconsciously when features related to those goals are perceived in the environment.[40] For example, because goal orientation–stimulating environmental features (such as a sudden downpour) necessitate responses from the cognitive system, it is natural to hypothesize that task-oriented behavioral routines (such as seeking shelter) will overlap extensively with more salience-driven aspects of conceptualization (such as the ability to identify forms of shelter).

In light of the necessity to posit some sort of coordination between perceptual inputs, conceptualization, and goal orientations, contextual effects should not be seen as propositional entities that 'sum up' outside environmental conditions irrespective of the sensory and internal images that facilitate perceptual memory and conceptualization. Rather, goal orientations should ideally be understood to be a sort of differential enhancement of conceptualization leading to decisive action that maximizes the potential for situation-specific goals to be achieved. But is there any evidence that contextual effects exert influence on the conceptual system in this way? Let's review a variety of research on the topic from multiple cognitive and language science-related fields of inquiry.

In their review article on contextual effects and the influence of these on conceptualization, psychologists Yee and Thompson-Schill reviewed numerous studies that point to conceptual processing variance as a function of long-term context, recent context, immediate context, and ongoing context.[41] In their summation, Yee and Thompson-Schill found conceptual

representations to be "fluid, changing not only as a function of context as it relates to stimulus modality and task, but also as a function of the context brought by a particular individual."[42]

While this review article offers extensive evidence that various types of context are capable of 'reweighting' associated aspects of conceptual processing, to gain a greater understanding of how contextual effects actually function in specific modalities, it will be necessary to go beyond generalizations and examine the details of modality-specific experimental results. Working from the premise that neural strategies used in one sensory modality might be mirrored by corollary processes in other modalities, let's survey some of the ways in which processing channel-specific contextual effects influence perceptual processing.

Due to the fact that vision dominates human perception both in terms of complexity of processing and sheer number of neurons involved, contextual effects evident in the visual system have been closely studied and represent prime examples of how conceptualization and contextual effects intermesh. Neuroscientists have recognized two ways in which visual attention responds to incoming stimuli,[43] specifically, exogenous attention ("bottom-up," relatively passive response) and endogenous attention ("top-down," relatively directed response).

For example, with respect to "bottom-up" (exogenous) attention mechanisms, Parkhurst and colleagues note that visual attention can be captured through the function of automatically generated "saliency maps."[44] Specifically, various simultaneously processed, differently scaled feature maps are seen to combine to form a single "saliency map" which privileges certain noteworthy locations in the visual field by selectively incorporating peak activation areas from more specialized maps. Simply put, the visual system uses such rapidly collated overall maps to direct individual attention toward noteworthy perceptions that have been detected in more finely detailed, perception-class specific processing streams.

By way of contrast, "top-down" (endogenous) attention facilitation is seen in Baldauf and Deubel's assessment[45] that relative sensitivity to visual information in perceptual channels is influenced by an individual's preparation for goal-directed action. Of course, directed eye movements are the most obvious case of such "top-down" adjustment but there are more automatic, unconscious processes that may be mentioned, as well. In one experiment, it was observed that when subjects were required to discriminate between displayed written characters, reaction times were facilitated if the targets appeared in the locations in which a sequential reaching movement had been requested of them.[46] The authors point to these results as evidence that attention allocation in the visual system is not simply responsive but

in fact anticipates pre-planned future actions and automatically adjusts perceptual sensitivity to facilitate them. In fact, enhanced sensitivity as a result of goal orientation is also evident in auditory,[47] tactile,[48] and gustatory processing.[49]

According to Ashkenazi, "Endogenous attention enables us to extract relevant information from a rich and complex stimulus environment" with "anticipation" resulting in reduced processing time and greater accuracy than counterpart exogenous attentional strategies.[50] For this reason, we find that in addition to the broad range of relatively passive "bottom-up" repertoires that facilitate feature-discrimination and novelty-detection in the human cognitive system, there are a variety of "top-down" goal-oriented neural strategies that facilitate both conscious and unconscious endogenous attention.

Furthermore, while the various automatic "bottom-up" processing strategies necessarily occur in single modalities, endogenous "top-down" reweighting of sensory channel information is often seen to function across multiple modalities simultaneously, the best attested example being vision and audition.[51] Consequently, if vision and audition are seen to be simultaneously reweighted in response to the same goal orientation, then the recalibrating functionality responsible is not a single, channel-specific adjustment in perceptual sensitivity but a multimodal and (more or less) global reweighting of attention in applicable areas *across the whole system*.[52]

That such a "global" reweighting of parameters should occur in response to situation-elicited goals is less than surprising. Speaking generally with reference to the neural system as a whole, Henson and colleagues note that "[t]ask set-dependent retrieval clearly makes adaptive sense, in that one would not want all previous responses that have been associated with a stimulus constantly to compete with current behavioral goals."[53]

Having made the argument that goal orientations can powerfully affect cognition in a global manner by reweighting multiple perceptual channels so as to rapidly facilitate effective task-specific, organism-wide responses, the big question is this: Is there any evidence that either the production or comprehension of language can stimulate such powerful effects? In fact, there is evidence that highly imageable, goal-oriented linguistic stimulus is capable of exerting just such influence on broader aspects of cognition. In their review article summarizing research on how verbal contextual cues influence the activation of semantically related sensorimotor areas of the brain, Tomasino and Rumiata note extensive neuropsychological evidence indicating that certain types of contextually oriented verbal stimuli result in top-down modulation on sensorimotor areas.[54] In particular, they noted how context-related imageability[55] and task-related feature retrieval[56] are the most likely types of stimuli to lead to the activation of sensorimotor areas.

Given that the global goal-oriented reweighting of the conceptual system is not only certain in particular cases but likely to prove widespread, it may be appropriate to consider whether any difficult to explain local aspects of language processing might be accounted for in terms of global top-down modulation. The most obvious candidate would appear to be the disambiguation of otherwise indeterminate phrasing by way of contextual effects.

GOAL-ORIENTATIONS AND RAPID LINGUISTIC PROCESSING

In fact, various cross-sections of scholarly opinion in response to circumstantial evidence already point in this direction. Many linguists and psychologists have noted the importance of contextual effects in semantic processing.[57] In psycholinguistics, Katz and Ferretti posited[58] context to function as the second of two processes running in parallel: specifically, they hypothesized that the function of "an expectancy-driven contextual mechanism" would follow the processing of an encapsulated lexical access mechanism "in which salient meanings are accessed faster." Giora and Stringaris also mention contextual factors as playing a role in "restricting the possible range of alternatives" during processing.[59]

Additionally, contextual effects are also characterized as one factor that contributes to rapid processing. For example, Kemper summarizes a variety of extant research on the subject by noting, "[C]ontextual factors have been shown to affect how rapidly readers can interpret both figurative and literal sentences."[60] More specifically, Giora's Graded Salience Hypothesis mentions that contextual information greatly speeds processing, so much so that "it may avail meanings even before the relevant stimulus is encountered, fostering the impression of direct access."[61] Taking the previous general characterizations together, it would seem that a cogent explanation of context cannot simply assert that contextual disambiguation happens 'quickly.' To match the data, contextual effects must be shown to speed linguistic processing to such a great extent that an impression of 'foreknowledge' is achieved. This is a tall order.

In the previous section, it was noted that goal orientation effectively reweights incoming perceptions, both in modality-specific processing channels and, in some cases, in multiple channels simultaneously; in general, seen in this way, endogenous attention tends to function globally by exerting top-down influence so as to maximize the chance of processing success relative to situation-specific goals. These neural strategies reflect the fact that adult behavior tends not to occur in an intention-free vacuum but rather comes

about as actions to be undertaken are *anticipated* in light of both conscious and implicit objectives. For just this reason, many language and communication researchers have stressed that a speaker's intended meaning cannot be inferred unless that person's goal orientations have been taken into account.

For example, with respect to the inferential model that underpins Relevance Theory, Sperber and Wilson state, "Communication is achieved by the communicator providing evidence of her intentions and the audience inferring her intentions from the evidence."[62] Consequently, Relevance Theory asserts that "the linguistic meaning of an uttered sentence falls short of encoding what the speaker means; it merely helps the audience infer what she means."[63] Similarly, Tomasello asserts that the linguistic "code" is based on "a nonlinguistic infrastructure of intentional understanding and common conceptual ground, which is in fact logically primary."[64] As evidence, Tomasello gives multiple examples that demonstrate how gestures such as pointing,[65] many aspects of linguistic communication,[66] and especially deictic phrasing[67] crucially depend on situational and goal-oriented cognition for inferencing cues.

From the preceding discussion, it seems evident that Sperber and Wilson's defining of "relevance" in terms of intentionality is, from a communicative point of view, correct. On the other hand, when one considers the fact that goal-orientations are not merely external phenomena that can be attributed to others but also represent internal phenomena that strongly influence one's own cognition, their account of 'relevance' seems, at the very least, incomplete. Could it be that acute sensitivity to the inferred motives of counterpart communicators is possible precisely because one is aware that those motives differ from the baseline of one's own goal orientations? In fact, it is only by way of comparison with some status quo that the motivational differences perceived in the actions and attitudes of others could even become apparent.

In terms of figurative language processing, while it is true that salience plays an outsized role in 'decontextualized' communication, the great majority of natural language is irretrievably embedded in context of one kind or another. In fact, because concepts inevitably include organically instantiated experiential ties to perceived situations and actively pursued goals, contextual effects are perfectly positioned to dominate processing outcomes whenever concepts linked with such situations and goals are accessed.

Holyoak and Thagard note that "[n]o sharp distinction can be made between actions and goals, since what in one context is best described as an action may be best described in another context as a goal."[68] This type of observation shows the futility of trying to pry apart concepts from their situational contexts. With semantic gist being judged according to context and with the operative range of contextual effects being determined by the

concepts in which they are embedded, context represents a hidden layer of communicative grounding, the contributions of which are only noticeable when it is taken away. Saying that using language is difficult without specifying context is akin to saying that walking is difficult without gravity; goal orientation provides the 'friction' and 'resistance' necessary for otherwise underspecified meaning to be practically applied.

While the desire to simplify verbal stimuli and thereby attain highly focused results in psychological experimentation is understandable, constant efforts to offload layer after layer of context as if it were an outside factor not directly related to communication can only result in a zero-G linguistic 'spacewalk' that vacuously mimics the articulations of language to little practical end. For while understanding decontextualized language may be useful as an exercise in philology, in terms of human cognition, positing context to be a non-compulsory feature of language is to get things precisely backwards: in human cognition, contextual awareness is fundamental while language is the optional add-on.

REVISITING THE INDEFINITE DOMAIN PROBLEM

Chapter 3 mentioned that one of the great challenges to theories of metaphor inferencing is the Indefinite Domain Problem which refers to the fact that encounters with metaphor commonly lead to coherent entailments despite an apparent paucity of background information. To demonstrate this problem, the following examples were given:

> She flew to Miami.
> He hopped on his bike and flew home.

It has previously been observed that Ortony's "Salience Imbalance Hypothesis"[69] offers a reasonable explanation of how interpretation initially proceeds: should attempts to recognize a "high-salience" interpretation prove futile, a "low-salience" interpretation[70] that can serve as a compromise choice must be sought after. The positing of salience (defined as the strongly reinforced condition of neural activation pathways stemming from conventionality, frequency, familiarity, and prototypicality[71]) to be a key factor has garnered a broad range of support[72] and would appear to be correct. To the extent that both the literal meaning of "flew" (air travel) and its figurative alternative (single-minded, speedy travel[73]) have been encountered in real-world experience with language, they will both be available as potential salient interpretations for the example sentences above, albeit with the more deeply entrenched

of the two perhaps eliciting somewhat greater activation during the initial phase of First-pass conceptual filtering.

Having said this, while relative salience represents one criterion by which a certain line of inferencing might gain a processing advantage, strictly speaking, the intended meaning of the stand-alone phrase "She flew to Miami" is indeterminate. The person mentioned may have flown to Miami in an airplane or she may have been driving a car at great speed with single-minded purpose. It is impossible to make a firm judgment from this artificially decontextualized example.

It must be stressed that, in CFT terms, the generation of salient inferencing options is only the initial "bottom-up" step in a two-stage disambiguation process; in fact, First-pass conceptual filtering also includes a crucial second step, namely the "top-down" suppression of contextually irrelevant lines of inferencing. With respect to this issue, Rubio-Fernández's cross-modal lexical priming study[74] demonstrated the likelihood that neural mechanisms of lateral inhibition are in play in such situations. Moreover, in her discussion of a follow-up study on the same topic, Rubio-Fernández observed that suppression operates "only on conceptual information that is inconsistent with the mental representation" of the primed stimuli; in her view, suppression routines have the potential to interfere with the interpretation process as a whole precisely because the "scope" of such routines is effectively greater than that of other disambiguation processes like salience selectivity.[75] This observation harmonizes well with the viewpoint that context-attuned suppression eliminates the influence of salient but irrelevant interpretations in a top-down manner.

In contrast to the phrase, "She flew to Miami," the statement "He hopped on his bike and flew home" actually includes subtle goal orientation–enhancing verbal cues. The word "hopped" tends to imply more excitement than if the person in question had simply "gotten onto" his bike. As one relatively salient sense of "flying" is 'single-minded traveling at great speed,' the initial phrase, "he hopped on his bike," strongly infers an 'excited' variety of 'overland travel.' It should be noted that, in this case anyway, the highly imageable goal orientation-related cues which effectively tip the inferencing scales towards the non-literal, apparently less salient connotation actually appear before the word "flew" in the sentence. What we find then is that the reason contextual effects are often observed to influence salient inferencing options so quickly is that unrecognized goal-oriented cues have the ability to subtly recalibrate cognition so as to suppress non-goal-oriented lines of inferencing *before* salient response options have even been generated.

The absence or presence of contextual effects in the previous (otherwise decontextualized) examples are reflected in Diagrams 5-1 and 5-2.

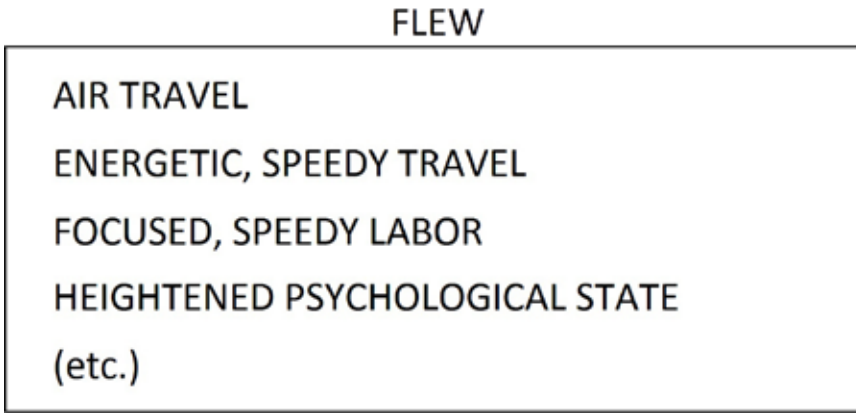

Diagram 5-1. Salient inferencing options for FLEW in "She flew to Miami"

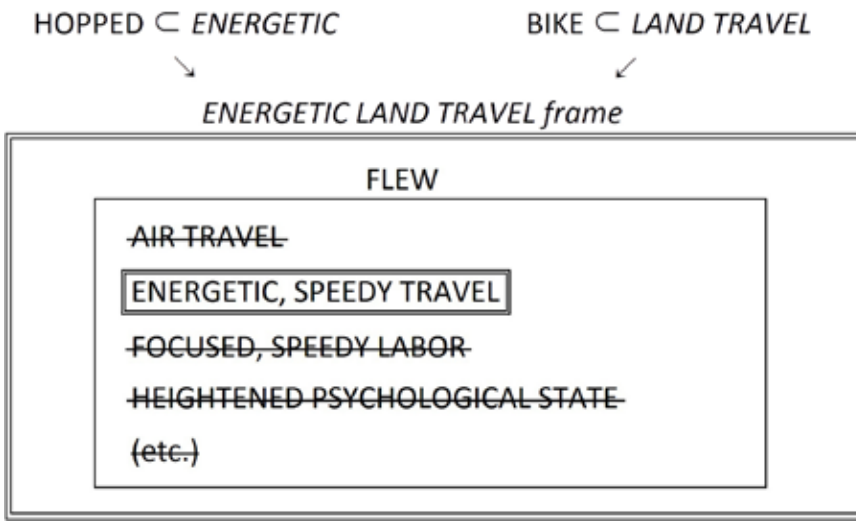

Diagram 5-2. Contextual disambiguation of FLEW in "He hopped on his bike and flew home"

In Diagrams 5-1 and 5-2 above, non-italicized capitalized words and phrases indicate conceptual domains, ordered from most salient to least salient. Box-enclosed words and phrases represent domains associated with the encompassing domain (the conceptual domain indicated above the box). In Diagram 5-2, italicized capital letters indicate not a conceptual domain but a situational frame[76] (a coordinated set of conceptual domains, kinesthetic routines, and orientational dispositions associated with a certain goal-oriented behavior),

the subset icon ⊂ indicates a conceptual domain aspect to associated contextual type relationship in which metonymic conceptual details strongly associated with a specific goal-oriented situational frame metonymically cue the activation of that *FRAME*. Within such a frame, the concepts with a line through them indicate salient inferencing options that have been suppressed due to the intervention of top-down contextual effects, and double-line box-enclosure indicates framing and the disambiguated results produced in response to it. In practice, then, any ambiguity that might normally stem from the polysemous word "flew" (as found in the underspecified phrase "She flew to Miami") may be removed from consideration through the addition of goal-orienting contextual cues (as has occurred in the phrase "He hopped on his bike and flew home").

Accordingly, the rapid contextual disambiguation of a semantically underspecified word can be accomplished through the insertion of sequentially prior goal-oriented cues. For example, the statement, "She packed her suitcase, grabbed her passport, and flew to Miami" now conclusively adopts the *AIR TRAVEL frame* even though no decisive mention of airports or flying has occurred. Metonymic details commonly associated with the situational frame *AIR TRAVEL* as opposed to *LAND TRAVEL* have tipped the scales by stimulating top-down endogenous effects that suppress non-*AIR TRAVEL*-oriented lines of inferencing.[77] While linguists and psychologists are certainly adept at contriving decontextualized statements for experimental purposes, in real-world situations, skilled language users, who generally go out of their way to eliminate ambiguity whenever possible, intentionally enhance contextual cues in just this way so as to pre-empt potential misunderstandings.

In conclusion, this chapter has sought to differentiate "bottom-up" exogenous attention from goal-oriented (endogenous) contextual effects, a kind of global reweighting phenomenon that relies on suppression to eliminate context-antagonistic lines of inferencing. It has also sought to distinguish conceptual domains (generic cognitive structures which garner attention according to their relative salience) from goal-oriented frames (suppression routines which accomplish disambiguation as top-down global effects). To further clarify this distinction, let's review the ways in which concepts can be practically distinguished from contextual effects.

In neural terms, concepts are sets of multimodal neural dispositions entrenched in memory while contextual effects are the coordinated neural reweightings that result when perceived context-associated cues globally adjust context-related concepts in anticipation of future situation-specific incoming stimuli or likely actions to be taken. Perceived contextual cues may or may

not be propositional and need not be complex but the effects they produce have the potential to be complex and multimodal; just as the seemingly simple terms "viewpoint" and "perspective" conceal far-ranging implications in terms of the relative prominence of objects represented in two-dimensional visual media, so lexical items that cue context may result in outsized influence to be exerted on linguistic processing, as well.

Consequently, contextually enhanced conceptualization should be understood not as a generically constituted base system that receives inputs and spits out predictable results according to logical probability in a situational vacuum. Rather, it is a dynamic, context-sensitive system that continually reweights itself so as to rapidly adopt situation-specific responses to contextual cues whether such cues are perceived in the natural environment or by way of verbal communication.

NOTES

1. E.g., Ortony et al., "Interpreting Metaphors," 467, 475; Glucksberg and McGlone, *Understanding Figurative Language*, 22–23.

2. Albert N. Katz and Todd R. Ferretti, "Moment-by-moment reading of proverbs in literal and non-literal contexts," *Metaphor and Symbol* 16, no. 3 (2001): 194.

3. A brief introduction to various historically prevalent theories of conceptualization is provided by Eleanor H. Rosch in her entry, "Concepts," in *The Cambridge Encyclopedia of the Language Sciences*, edited by Patrick C. Hogan (Cambridge: Cambridge University Press, 2011).

4. E.g., Allan M. Collins and Elizabeth F. Loftus, "A spreading activation theory of semantic processing," *Psychological Review* 82 (1975): 407–28.

5. Charles Fillmore, "Pragmatics and the description of discourse," in *Radical Pragmatics*, edited by Peter Cole (New York: Academic Press, 1981), 143–45.

6. Wilson and Sperber, *Meaning*, 5.

7. Hence the ostensibly pragmatics-related research of Fillmore came to be called "Frame Semantics" and not "Frame Pragmatics." Cf. Fillmore, *Frame Semantics*.

8. For an overview of the conception-related issues being debated, cf. Lawrence W. Barsalou, "On staying grounded and avoiding quixotic dead ends," *Psychonomic Bulletin and Review* 23 no. 4 (2016): 1122–42.

9. It is telling that traditional 'propositional' views of context bear a striking resemblance to the static, logic-dependent propositional views of concepts espoused by traditional linguists before the advent of cognitive semantics.

10. Samuel Y. Edgerton, "Brunelleschi's mirror, Alberti's window, and Galileo's perspective tube," *História, Ciências, Saude—Manguinhos* 13 (2006): 151.

11. *Oxford English Dictionary*, 2nd ed., s.v. "perspective."

12. *Oxford English Dictionary*, 2nd ed., s.v. "point of view."

13. *Oxford English Dictionary*, 2nd ed., s.v. "view-point."

14. Giulio Carlo Argan and Nesca A. Robb, "The architecture of Brunelleschi and the origins of Perspective Theory in the fifteenth century," *Journal of the Warburg and Courtald Institutes* 9 (1946): 97.

15. Lakoff, *Women, Fire and Dangerous Things*, 40.

16. Ibid., 39–57.

17. Eleanor H. Rosch, "Natural categories," *Journal of Verbal Learning and Behavior* 4 (1973): 328–50.

18. Brent Berlin and Paul Kay, *Basic Color Terms: Their Universality and Evolution* (Berkeley: University of California Press, 1969).

19. Bear et al., *Neuroscience: Exploring*, 306–9.

20. Eleanor H. Rosch, "Cognitive representations of semantic categories," *Journal of Experimental Psychology: General* 104 (1975): 229; cf. Taylor, *Linguistic Categorization*, 44, 57.

21. Warren, "Alternative account," 126–27.

22. Spivey, *Continuity of Mind*, 130.

23. Bear et al., *Neuroscience: Exploring*, 917; cf. also Edelman and Tononi, *Universe of Consciousness*, 98–99.

24. Edelman, *Bright Air*, 27.

25. Spivey, *Continuity of Mind*, 168; cf. also Edelman, *Bright Air*, 130; Edelman and Tononi, *Universe of Consciousness*, 215–16; Giora, *On Our Mind*, 34–35.

26. H. Paul Grice, "Presupposition and Conversational Implicature," in *Radical Pragmatics*, edited by Peter Cole (New York: Academic Press, 1981), 184.

27. Sperber and Wilson, *Relevance*, 32–36; Wilson and Sperber, *Meaning*, 3.

28. Grice, "Presupposition," 198.

29. Sperber and Wilson, *Relevance*, 29–32.

30. Ibid., 84.

31. Admittedly, Wilson and Sperber's contextualist approach to semantics addresses this gap by expressing skepticism concerning the extent to which semantic decoding alone can account for perceived meaning (cf. Wilson and Sperber, *Meaning*, 10, 23, 26–27).

32. Cf. Richard C. Anderson and Andrew Ortony, "On putting apples into bottles—A problem of polysemy," *Cognitive Psychology* 7, no. 2 (1975): 167–80; Bogusław Bierwiaczonek, *Metonymy in Language, Thought and Brain* (Sheffield: Equinox, 2013), 244.

33. Wilson and Sperber, *Meaning*, 31.

34. Sperber and Wilson, *Relevance*, 86.

35. Ibid., 74.

36. As the meaning of the term "representation" seems to have slightly different connotations according to the cognitive theoretician making use of it, it may be necessary to explain how this term is being used in CFT. Because CFT does not posit a brain internal a-modal "mentalese" code that mirrors language and mediates between language and other brain regions but rather sees concepts as distributed sets of discrete but synchronized activation patterns that are abstractly distilled and collated in higher order processing regions where they become available to conscious attentional processes, CFT posits concepts to be representational. In contrast to Sperber and Wilson's

understanding of conceptualization, however, CFT sees these as non-propositional distributed mental structures. For this reason, CFT's view of conceptualization is compatible with Barsalou's idea of "distributed conceptual representations" which, although non-propositional and abstract, are not reducible to modality-specific representations in somatosensory systems. Cf. Barsalou, "On staying grounded," 1123–24.

37. Sperber and Wilson, *Relevance*, 131.

38. Spivey, *Continuity of Mind*, 166–67.

39. While Wilson and Sperber have updated their basic definition of "Relevance" to at least superficially account for various types of perceived "external stimuli," the fact that their theory still posits such stimuli to be efficacious only through processing by way of "inferential mechanisms" reveals a lack of understanding that "Relevance" is perceived not only in response to the inferred goal orientations of others but also when situations align with one's own explicit or implicit goal orientations. Cf. Wilson and Sperber, *Meaning*, 6.

40. E.g., Henk Aarts and Ap Dijksterhuis, "Habits as knowledge structures: Automaticity in goal-directed behavior," *Journal of Personality and Social Psychology* 78, no. 1 (2000): 53; John A. Bargh and Peter M. Gollwitzer, "Environmental Control of Goal-directed Action: Automatic and Strategic Contingencies between Situations and Behavior," in *Integrative Views of Motivation, Cognition, and Emotion*, edited by William D. Spaulding (Lincoln, NE: University of Nebraska Press, 1994); John A. Bargh, Annette Lee-Chai, Kimberly Barndollar, Peter M. Gollwitzer, and Roman Trötschel, "The automated will: Nonconscious activation and pursuit of behavioral goals," *Journal of Personality and Social Psychology* 81, no. 6 (2001): 1014–27.

41. Eiling Yee and Sharon L. Thompson-Schill, "Putting concepts into context," *Psychonomic Bulletin and Review* 23, no. 4 (2016): 1015–27.

42. Ibid., 1024.

43. Bear et al., *Neuroscience: Exploring*, 725–28.

44. Parkhurst et al., "Modeling the role of salience," 107.

45. Daniel Baldauf and Heiner Deubel, "Attentional landscapes in reaching and grasping," *Vision Research* 50 (2010): 999–1013.

46. Daniel Baldauf, Martin Wolf, and Heiner Deubel, "Deployment of visual attention before sequences of goal-directed hand movements," *Vision Research* 46, no. 26 (2006): 4355–74.

47. Jonathan C. Hansen and Steven A. Hillyard, "Endogenous brain potentials associated with selective auditory attention," *Electroencephalography and Clinical Neurophysiology* 49, nos. 3–4 (1980): 277–90.

48. Kenneth C. Whang, Harold Burton, and Gordon L. Shulman, "Selective attention in vibrotactile tasks: Detecting the presence and absence of amplitude change," *Perception and Psychophysics* 50, no. 2 (1991): 157–65.

49. Amir Ashkenazi and Lawrence E. Marks, "Effect of endogenous attention on detection of weak gustatory and olfactory flavors," *Perception and Psychophysics* 66, no. 4 (2004): 596–608.

50. Ibid., 596.

51. Charles Spence and Jon Driver, "Audiovisual links in endogenous covert spatial attention," *Journal of Experimental Psychology: Human Perception and Performance*

22, no. 4 (1996): 1005; Charles Spence, Francesco Pavani, and Jon Driver, "Crossmodal links between vision and touch in covert endogenous spatial attention," *Journal of Experimental Psychology: Human Perception and Performance* 26, no. 4 (2000): 1298.

52. In that contextual effects seem not to play a prominent role in RH (right hemisphere) processing, "the whole system" in this case should probably be delimited to LH (the brain's left hemisphere).

53. Henson et al., "Stimulus-response bindings," 379.

54. Barbara Tomasino and Raffaella Ida Rumiati, "At the mercy of strategies: The role of motor representations in language understanding," *Frontiers in Psychology* 4, no. 27, (February, 2013): 8.

55. Ibid.

56. Ibid., 10.

57. E.g., Cutler and Clifton, "Comprehending spoken language," 141; Frisson and Pickering, "Obtaining a figurative interpretation," 159.

58. Katz and Ferretti, "Moment-by-moment reading," 214.

59. Giora and Stringaris, "Metaphor, neural substrates of," 491.

60. Susan Kemper, "Priming the comprehension of metaphors," *Metaphor and Symbolic Activit*y 4, no. 1 (1989), 4.

61. Giora, *On Our Mind*, 11.

62. Sperber and Wilson, *Relevance*, 24.

63. Ibid., 27.

64. Tomasello, *Origins of Human Communication*, 58.

65. Ibid., 163.

66. Ibid., 157.

67. Ibid., 233, 272.

68. Holyoak and Thagard, *Mental Leaps*, 142.

69. Ortony, "Role of Similarity."

70. Ibid., 351.

71. Giora, *On Our Mind*, 15–18, 25.

72. E.g., Katz and Ferretti, "Moment-by-moment reading," 214; Giora and Stringaris, "Metaphor, neural substrates of," 491.

73. There is evidence that this second variety of idiomatic expression has long been understood. In the Judeo-Christian tradition, Isaiah 40:31 (NIV) states, ". . . but those who hope in the Lord will renew their strength. They will soar on wings like eagles; they will run and not grow weary, they will walk and not be faint." This is an ancient example of a text in which the idea of flying metaphorically stands in for speed and energetic movement.

74. Paula Rubio-Fernández, "Suppression in metaphor interpretation: Differences between meaning selection and meaning construction," *Journal of Semantics* 24 (2007): 345–71.

75. Rubio-Fernández, "Concept narrowing," 401.

76. In cognitive linguistics, use of the term "frame" is often associated with Fillmore's "Frame Semantics." Cf. Fillmore, *Frame Semantics*. The influence of frame semantics on CFT's understanding of contextual effects will be discussed at length in Chapter 6.

77. In fact, while specific processing stage–related details are not discussed, Chiappe and Chiappe assert that relative adeptness at the production of metaphor interpretations is positively correlated not only with working memory capacity but also *suppression* ability. Cf. Dan L. Chiappe and Penny Chiappe, "The role of working memory in metaphor production and comprehension," *Journal of Memory and Language* 56, no. 2 (2007):172–88. Chiappe and Chiappe further state, "Individuals who cannot adequately suppress irrelevant properties will have difficulty constructing meaningful interpretations of metaphors." Ibid., 184.

Chapter Six

Metonymic Cues and Narrative Framing

The previous chapter has clarified how salience selectivity and contextual cues interact in the processing of compact figurative statements. This chapter will explore a few of the ways in which certain kinds of overarching context contribute to the interpretation and shaping of perceived meaning in more extended varieties of linguistic communication.

One relatively well known technique for enhancing a verbally expressed text's narrative coherence is extended metaphor,[1] a type of metaphor in which multiple FILTER domain references are instantiated throughout a text or verbal discourse so as to explicitly or implicitly enhance overall thematic unity.[2] In such cases, whether overt or functioning surreptitiously, narrative coherence afforded often amounts to a kind of metalinguistic understanding (that is, amounts to a sort of optional, additional line of inferencing). Although there may be certain aesthetic and semantic benefits for readers who fully appreciate such layered meanings in a text, the interpretational costs for readers who concentrate solely on the gist meaning of such a text may go largely unnoticed.

While the potential for extended metaphor to subtly shape the nuances of literary texts and other types of semantically layered linguistic communication should not be underestimated, because metonymic details are often seen to cue psychologically powerful contextual effects, in certain cases, carefully calibrated aspects of extended metaphor can be strategically utilized to exert relatively direct top-down influence on cognition. This chapter will explain how goal-oriented metonymic details facilitate the cuing of powerful contextual effects by way of a technique called narrative "framing." It will also characterize irony as the semantic dissonance that results when situationally elicited lines of inferencing are overridden and will use Critical Discourse

Analysis to explain how frames and surreptitious metaphor can shape public perceptions in political and other kinds of discourse.

ON THE CLOSE RELATIONSHIP OF METONYMY WITH CONTEXT

Contextual effects occur when goal-oriented verbal cues activate task-specific situational frames which, in turn, exert top-down pressure on various modalities of conceptualization to suppress the activity of non-goal-oriented behavioral routines. Because metonymy facilitates the leveraging of broader conceptual structures through the stimulation of partially overlapping structures, metonymy is ideally suited to elicit such goal-oriented contextual effects.

In fact, corpus linguistics has shown that metonymic words are not arbitrarily chosen from among a broad range of interchangeable verbal options but rather tend to be precisely targeted cues embedded in context-rich constructions that facilitate rapid interpretation.[3] Because details of metonymic expression are often found to be closely associated with task-specific behaviors and situational frames, the possibility that they might play a role in the cuing of such behaviors and frames cannot be casually dismissed. In fact, to the extent that individual instances of metonymy are discovered to be aligned with identifiable situational frames, it seems likely that cumulative pressure will be exerted on the conceptual system as a whole to recalibrate in line with those frames.

Classic examples of metonymy mentioned in CMT serve to confirm this pattern despite the fact that these examples tend to be compact and are often found to be lacking in explicit semantic precision. Consider the situation-specific metonymy that informs the following famous example. If a customer in a restaurant were to be casually referred to as a 'ham sandwich' by the server responsible for his table (as in Lakoff and Johnson's iconic example, "The *ham sandwich* is waiting for his check"[4]), this does not mean that he actually is one nor does it mean that the person always orders ham sandwiches (although that might be the case). Neither, however, is calling the customer a "ham sandwich" arbitrary (that is, randomly decided upon). The key issue is that *in the situational awareness of the server* (and in all likelihood *in the situational awareness of the server's conversation partner*) the customer's association with his ham sandwich is the decisive feature that identifies him and distinguishes him from the omelet at the next table. In terms of the goals inherent in the situation, extraneous personal details have been off-loaded, leaving only the most essential information necessary to identify the customer *with respect to the task at hand*.

Of course, goal-oriented situational awareness can change in an instant. If the other server were to respond, "Be careful. That ham sandwich is the manager's brother," then the rather dismissive phrasing used by the first server would be revealed for what it is: individual identity–negating discourteous speech that could potentially interfere with a worker's desire to stay on good terms with the management.

Metonymy typically functions in this way. Metonymy does not consist of random domain elements juxtaposed arbitrarily; rather the domain features selected are those that are representative enough *in a given context* to achieve increased communicative efficiency within that context. Consequently, while metonymy may be accurately described as a technique for leveraging attention towards one aspect of a single conceptual domain by drawing attention to another part of the same domain, the fact that such metonymic leveraging is nearly always tailored to fit a specific *context* is not incidental; as disambiguation relies on the activation of goal-oriented situational frames, metonymic details that guide inferencing by way of specific contextual associations will inevitably seem more relevant to a statement's ultimate meaning than some alternative metonymic associations selected in a haphazard fashion. It would appear that metonymy, until now widely regarded as a primarily conceptual phenomenon, may turn out to play a crucial role in both the contextual disambiguation of meaning and the trimming of cognition for maximally efficient goal-oriented action.

DISTINGUISHING ENDOGENOUS CONTEXTUAL CUES FROM SALIENT INFERENCING OPTIONS

To demonstrate how metonymic associations tend to align with contextual prompts during the interpretation of otherwise ambiguous statements, let's consider the difference between decontextualized and contextualized statements that feature an ambiguous metonymic word. First, read the grammatically sparse, context-deficient statements below:

Washington wins best actor award
Washington edges Chicago in extra innings
Washington refuses request for more troops

The reader will by now realize that the randomly ordered phrases listed above are actually newspaper headlines. Due to the long tradition of captioning news stories with pithy abbreviated phrases, newspaper readers are forced to decide whether to read an article or not based solely upon the limited information offered them by often ambiguous headlines such as the three examples given.

To minimize confusion by enhancing context, newspapers are normally structured topically by section (e.g., "national news" and "sports"). Reading the same headlines after recognizing the newspaper section in which the story would normally be found (and according to canonical newspaper section order) will likely reduce reader processing time as one attempts to disambiguate the underspecified proper noun, "Washington":

[*National News*] Washington refuses request for more troops
[*Sports*] Washington edges Chicago in extra innings
[*Entertainment*] Washington wins best actor award

In the first headline, because Washington, D.C., is the seat of U.S. government and since the president (the military commander-in-chief) typically resides and works there, someone reasonably well acquainted with U.S. affairs would be able to understand the phrase as referring to a U.S. executive branch policy decision (e.g., the Capital City For Head Of State metonymy, Washington For President). In the case of the second headline, due to the fact that there are professional baseball, basketball, football and hockey teams in both Washington, D.C., and Chicago, the reader must further disambiguate which sport is being referred to. Most avid sports fans (the people most likely to be reading the sports pages) will quickly realize that the phrase "extra innings" applies to baseball games but not to basketball, football, or hockey games, so the article may be understood to be referring to the Washington Nationals baseball team beating the Chicago Cubs.[5] The third example requires knowledge of actors named Washington, the most obvious being the Academy Award–winning actor Denzel Washington.

In the case of such newspaper headlines, the influence of genre-specific contextual effects can be decisive.[6] Because the ambiguous word "Washington" might potentially refer to a city, a state, a government, city residents, state residents, government political leaders, a baseball team, a basketball team, a football team, a hockey team, an actor, or even a former president (among many other possibilities), interpretation of precise meaning depends crucially on disambiguation. This can be accomplished either by relying on lexical probability–related clues (as a reflection of salience-induced lexical priming effects[7]) or real or simulated reader goal orientations (such as knowledge of the newspaper section in which the article is found, a type of awareness which implies the presence of endogenous attention in the form of intentional, goal-directed reading).

While both of the above-mentioned disambiguation strategies might be considered types of 'context' if one is not concerned about details of neural processing, they are clearly different when one considers the question of exactly how the disambiguation process proceeds. Although the text-internal

term "extra innings" elicits a salience-oriented bottom-up processing differential by way of exogenous attention, a pre-reading awareness concerning the specific section of the newspaper being read strongly implies that a goal-oriented ("top-down") endogenous attentional strategy is being employed. While these two examples may seem to vary only in that two slightly different types of context are at work, in fact, one process involves relatively passive salience–dependent exogenous attention while the other implies the efficacy of relatively active endogenous "seeking." Specifically, the phrase "extra innings" is not a neural context but rather a feature of the conceptual domain BASEBALL that contributes to the disambiguation of Washington by way of ex post facto salience-induced excitatory activation[8]; conversely, recognition of the newspaper section one is reading (although being cued by a textual prompt in this example), primes readers to anticipate a certain type of news content as goal-oriented contextual effects suppress other salient lines of interpretation.

Such a situation harmonizes well with previous observations about the ways in which salience and contextual effects are thought to interact. Spivey comments, "More strongly constraining contexts can bias lexical access immediately" to the extent that "[i]f the context strongly biases the features associated with one of [an] ambiguous word's senses (. . .) there does not appear to be much effect from the contextually disfavored meaning."[9] In the case of the "Washington" headlines above, while salient textual characteristics evident in the main text of each respective article would eventually bring one possible meaning of "Washington" to attention even in the absence of contextual effects, a reader's conscious decision to look over a newspaper's sports section instantly reweights neural circuits so as to dampen *NATIONAL NEWS* and *ENTERTAINMENT* neural associations thus allowing attention to quickly home in on *SPORTS*-related lines of inferencing. This explicitly goal-oriented processing bias harmonizes with Giora's observation that strong context tends to overpower salience.[10] Practically speaking, what this means is that contextual cues effectively determine the most viable line of inferencing from among the various possible salient senses available.

SITUATIONAL CONTEXTUAL CUES AND THE ELICITATION OF IRONY

To further demonstrate the extent to which the interpretation of metonymy relies on inferred context, here is a notorious quote from former Philadelphia Mayor and Police Commissioner Rizzo:

> The streets are safe in Philadelphia. It's only the people that make them unsafe.[11]

In this particular statement, the irony present in the formulation is due entirely to an understanding of Rizzo's role as police commissioner at the time of the utterance. Listeners naturally judge the "safe streets" predication in this sentence to refer to the ability of people to go about their lives free from criminal victimization. Once Rizzo utters the second sentence, however, the listener realizes that, while the streets themselves (that is, the paved roads in the literal sense) are safe to walk over, there are nevertheless dangerous people milling about on them. Since the role of police commissioner presumably involves keeping the city safe from crime committed by people and does not necessarily involve ensuring pristine pavement conditions, a salience imbalance created by the second sentence overturns the presumed metonymic gist of the first sentence, thereby causing "streets" to revert to its most prototypical 'dictionary-definition' sense. This being the case, the original crime-related metonymic extension of the word "streets" is seen to depend crucially on Rizzo's presumed goal-orientation; it is a sense of the word that the public would expect to hear from a police department representative speaking in an official capacity.

Now imagine if Police Commissioner Rizzo were to make the following observation:

> The streets are safe in Philadelphia. It's only the snow and ice that make them unsafe.

In this case, the statement, no longer ironic, functions as a metonymic allusion to the city's low crime rate accompanied by a disclaimer concerning the responsibilities of the police department. In his capacity as police commissioner, Rizzo will vouch for the general safety of city streets with respect to crime but refuses to accept responsibility for winter driving conditions (over which he may be presumed to have no control) nor for snow removal on thoroughfares.

It becomes apparent that the question of whether the word "streets" should be interpreted according to its literal meaning or its metonymic extension relating to crime depends primarily on the context of the statement and the inferred goals of the speaker.[12] Barring the introduction of irony-inducing inconsistent details that fail to comport with the originally introduced contextual frame, lines of inferencing will always tend to harmonize with contextual precedents. Consequently, metonymy is not simply a case of verbal abbreviation but rather a kind of context-dependent conceptual shorthand that owes its communicative efficacy to the fact that it tends to be grounded in an understanding of a speaker's explicit or implicit motivations.

Stated in neural terms, to the extent that perceived contextual background information aligns with goal-oriented frames, it is top-down contextual ef-

fects that will ensure interpretations are understood in light of those contexts. This bias built into the human deliberative system is a strength when contextual cues are profuse and when they accurately reflect situations encountered in the real world but simultaneously increases susceptibility to instances of artificial context manipulation such as "narrative shaping" applied by news media or the "framing" of an innocent person by corrupt police detectives.

NARRATIVE FRAMING AS THE INTENTIONAL INSTANTIATION OF CONTEXT-ELICITING CUES

In the field of Critical Discourse Analysis, "frames" (alternatively "narrative frames") have been characterized as "structures" related to the conceptualization of "situation types and their expression in language."[13] Despite the term's widespread utilization in academic writing, a popular sense of the word "framing" has been in use for more than a century. What academic practitioners in a variety of fields now regard as a technical term was at one time simply a colloquial expression used by people who felt they had been unfairly associated with criminal activity through the planting of evidence, the first attested example being the U.S. phrase "frame up" dating to 1906.[14]

In fact, this street-slang expression conceals a surprisingly sophisticated set of assumptions. While the "framing" of a criminal by corrupt investigators could at least potentially include the fabrication of multiple types of incriminating evidence, in fact it may only require the 'planting' of a single piece of evidence that links the suspect to the scene of the crime or establishes a motive for committing the offense. In this sense, framing is an attempt to complement known facts about the suspect's character, associations, or actions with carefully contrived details so as to implicate the person in a plausible narrative arc for the purpose of explaining a specific incidence of illegal activity.

While framing in this sense is a type of illegal conduct, there are many areas of life and art where 'artificial' framing is both acceptable and even lauded, at least from a professional point of view. One obvious example is in advertising, a situation in which agencies tasked with increasing the sales of a certain product use strategies like "branding" to frame a product in a way that will increase profits irrespective of actual utility to the purchaser. Another situation in which artificial framing is actively encouraged is in the case of trial lawyers who (at least by reputation) will use any logical or rhetorical means necessary to convict a defendant or have an accused party acquitted regardless of actual innocence or guilt. Booth offers the example of a trial lawyer that felt he had successfully defended his client, a large public

utility corporation, until the prosecuting attorney used a particularly persuasive metaphor when speaking to the jury. By comparing the small company bringing the lawsuit to a catfish about to be gutted by a sadistic angler, the prosecuting attorney introduced an imagistically compelling power imbalance that ended up persuading the jury of the malevolent intent of the large corporation. Booth quotes his lawyer friend as saying that the moment he heard the presentation he knew he had lost the case because his opponent was a "genius of metaphor."[15]

The case Booth mentions, while certainly a metaphor, is also certainly a frame. Because the extended metaphor sets up an intuitively coherent goal-oriented narrative arc that depicts power relations and attributes malicious motives to one party, the facts about the specific case presented earlier in the trial come to seem irrelevant. As such, framing involves the manipulation of contextual details so that, should one accept the premises of the 'story,' the final decision as to whether to convict a suspect or buy a product will be self-evident not so much as a result of careful deliberation concerning the specifics of the issue in question but because the psychologically compelling goal orientation narrative has been understood to be a plausible explanation and internalized.

In cognitive linguistics, the study of frames is generally associated with the frame semantics of Fillmore.[16] In his explanation of frames, Fillmore asserts the necessity to analyze some linguistic utterances and texts in terms of frame semantics (as opposed to conventional "compositional semantics") by noting that the interpretation of meaning often requires types of understanding that go beyond what is explicitly stated; he emphasizes that in order to make sense of the specific words used, it is sometimes necessary to first "understand the social institutions or the structures of experience" presupposed by the words.[17] To do this, one must posit some sort of "structure of expectations" that provides background motivation for the categories observed by way of implicitly understood "roles," "purposes," and "natural or conventionalized sequences of event types."[18] That is to say, the use of particular words hints that verbally unexpressed but nevertheless communicatively relevant behavioral routines are in play, and when they are, understanding these background contexts is essential to decoding the language used.

Moreover, to the extent that language users select words associated with one particular frame as opposed to another, framing becomes a more or less conscious technique. Fillmore states, "In the process of using a language, a speaker 'applies' a frame to a situation, and shows that he intends this frame to be applied by using words recognized as grounded in such a frame."[19] He gives the example of choosing between the English words "shore" and "coast."[20] Generally speaking, in the case of overland travel, one would

journey from "coast to coast" and not "shore to shore" ("shore" being a word that characterizes the boundary between land and water from a point of view situated in the water). Choosing the appropriate word in such cases requires the tacit recognition of one's mode of transportation, a situational frame that will be available to the recipient of the message, as well.

Extrapolating on Fillmore's understanding of framing as an activity crucially related to behavioral routines and goal orientations, CFT will characterize "framing" as the conscious or unconscious use of conceptual domain aspects not only to enhance metaphorical emphasis but more importantly to cue the activation of top-down contextual effects. In the case of extended metaphor, this will be done by arranging metaphorical FILTER domain aspects in a way that aligns the FOCUS domain with goal orientations or behavioral routines that comprise a given *FRAME*.

Consequently, the word frame cannot simply be characterized as the strategic application of conceptual metaphor to a narrative or extended discourse (although metaphor may very well be involved). Rather it should be understood as the informed instantiation of a set of salient conceptual domain-related aspects, lexical associations, and/or grammatical constructions sufficient to cue goal orientations and thereby suppress lines of inferencing unrelated to those short-, mid-, or long-term goals. Put simply, frames are not primarily about concepts and how they interact with one another but rather about how situational awareness exerts decisive influence on interpretation, behavioral orientation, and decision-making.

CRITICAL DISCOURSE ANALYSIS AND THE DECODING OF FRAMES

The framing of political discourse differs from other traditional methods of "message-shaping," "opinion polling," and "spin-doctoring" in very practical if non-obvious ways. While opinion polling and other control group-informed strategies[21] tend to test intuitively selected words and phrases in trial-and-error fashion so as to cast already decided-upon political policies in euphemistic or at least minimally disagreeable terms, framing involves gaining an understanding of how strategically employed metaphorical expression can not only influence public opinion but actually shape the course of substantive debate in a way that causes listeners to understand policy issues not as equally viable options to be considered but as goal-attainment routines that the human cognitive system is psychologically predisposed to satisfy. For example, according to Lakoff, the phrase "tax relief" implies taxes to be oppressive things that people would prefer to be liberated from.[22] Should political opponents

choose to argue against tax relief, they effectively cede the debating point that taxes are bad and thus lose the argument before it begins.

The specific ways in which frames are presented can also have an impact on whether they pass undetected or invite resistance due to relatively prominent profile. Consequently, while it is certainly possible for framing to be either consciously or unconsciously resisted, the most successful frames will shape discourse subtly and thus remain undetected by all but the exceptionally sensitive, those with strongly antithetical preexisting goal orientations, and Critical Discourse Analysis practitioners.

Of course there are situations in which deeply entrenched national experiences can result in almost irresistible FILTER domains that have the potential to influence nearly every policy debate in which reference is made to them. Holyoak and Thagard point out[23] how for a few generations of Americans, the Vietnam War *QUAGMIRE frame*[24] amounted to just such an emotionally compelling and psychologically unsatisfying domain. Because late-20th-century U.S. foreign policy came to be dominated by the distressing Vietnam experience, this broadly applicable cognitive model caused Americans to view the Soviet war in Afghanistan as "Russia's Vietnam" while the Vietnamese 1978 invasion of Cambodia came to be called, with no little irony, "Vietnam's Vietnam." Having said this, because traumatic events inevitably recede in history, not only the psychological immediacy of the Vietnam War itself but the productivity of its accompanying narrative implications have recently diminished.

In some cases, framing can even guide policy-makers by clarifying inconsistent policy aspects or revealing as yet unsuspected preconceived ideas that might potentially limit the appeal of a desired policy outcome. Consequently, CDA-informed message tailoring does not simply involve the selection of words with positive associations but rather the arrangement of verbal cues in ways that cause policy outcome attainment to seem both inevitable and desirable. As such, CDA is not about maintaining a positive public image but about fashioning a cooperation-inducing long-term strategy that makes the achievement of policy objectives more likely. Practical fields in which the application of CDA techniques may prove particularly effective include government and bureaucratic public policy initiatives, company-internal business strategy deliberations, and product development and marketing campaigns that take the explicit and implicit objectives of end users firmly into account.

In CDA terms, frames take on a variety of uses and forms. Frames may be either conscious or unconscious, completely or only partially coherent, expressed compactly in vivid terms that draw attention to themselves or surreptitiously instantiated as unnoticed conceptual cues which subtly guide

inferencing. What unifies them is that frames create expectations that a certain desired and predetermined narrative arc will be both anticipated and cooperated with.

While "frames" are not domains (association-bound conceptual networks based on immediate spatiotemporal contiguity), to the extent that domain aspects can cue behavioral routines and goal orientation, multiple conceptual domains (along with other cognitive subroutines) may be linked together to comprise frames. It should be stressed however, that the cuing of frames does not *necessarily* lead to the activation of endogenous goal orientations and top-down contextual effects; instead, "framing" should be understood as the selection and organization of information in ways amenable to such activation.[25] To the extent that the cognizer receives the framed cues sympathetically and fails to become skeptical about possible ulterior motives of those behind the framing, subconscious frames create the necessary conditions for powerful contextual effects to influence processing.

Although Lakoff has explicitly denied[26] that framing amounts to a form of brainwashing, evidence is available that might lead one to conclude framing to be a mild form of conditioning. Dijksterhuis and Aarts mention an experiment[27] in which researchers "selected behaviors that were pretested as neutral (doing puzzles, studying, going for a walk) and conditioned these activities with positive, neutral, or negative words. This was done subliminally: the participants could consciously detect the valenced words but not the activities that were being conditioned through them. The results showed that participants later wanted to engage in the positively conditioned activities but not in the other activities."[28] If such a result can be achieved simply by artificially linking activities with positive or negative associations, the conditioning potential of framing (in which positive or negative associations with consciously elicited goal-oriented activities are likely to be preexisting and inherent) would seem to be of at least equal if not greater efficacy.

While this previously mentioned study (carried out under experimental conditions) likely has many fundamental differences with the communicative situations in which framing is commonly put to use, ethical questions relating to the use of framing immediately come to mind. Is framing morally wrong as a technique or does the morality of its use depend on one's goals in utilizing it? When framing is successful, does the extent to which it is premeditated and artificially induced increase its moral hazard for the individual or individuals attempting it? In that communication often features not only framing but more or less obvious examples of evasive circumlocution, topic-changing misdirection, metaphorical obfuscation, metonymic euphemism, and outright lies, is communication itself inherently morally dubious? Answering such questions is beyond the scope of this volume.

In any case, just as there are conscious frames that rhetorically sensitive individuals use to exert control over the arcs and outcomes of discourse in which they participate, there are also unconscious frames that artificially constrain one's thinking outside of conscious awareness. For this reason, individuals who fail to recognize their own habitually utilized frames run the risk of being controlled by them. While unconsciously utilized default phrases may have been elicited intentionally (in response to propaganda) or unintentionally (as in the case of unreflectively utilized hackneyed clichés and "fly-blown metaphors"[29] like "leave no stone unturned"), frames continue to function as an often undetected factor constraining conceptualization nonetheless.

At times, undetected default frames unnecessarily delimit response options and thus work against the interests of the cognizer. One situation in which conscious skepticism concerning preconceived frames can lead to obvious benefits is in the area of conflict management and resolution. Augsburger lists and details the implications of a wide variety of metaphorical models of conflict[30] that can either spur or impede conflict resolution. Among the often self-perpetuating conflict models he mentions are duel, boxing match, foot race, soccer or football, auction or sale, bargaining or trade, popularity contest, dividing the pie, arm wrestling, court of law, arbitration, pressure group, and nonviolent protest.[31] He emphasizes that recognizing the cyclical and self-destructive dynamics of competitive conflict scenarios can afford opportunities to break from these scenarios and consciously adopt more cooperative models which allow for the collective renegotiation of shared meaning.[32]

There are times when unrecognized habits of thought can influence and even surreptitiously shape the conceptual profile of public policy statements and thus affect how those statements will ultimately be received. In his unpublished MA thesis,[33] Miyao compared and contrasted the Overseas Development Assistance initiatives of Australia, China, and Japan in Southeast Asia. Using CDA and corpus linguistic analysis methods, he found not only marked policy differences crucially tied to the regional strategy of each country but also underlying conceptualization strategies that in some cases appeared to have little or no direct relationship to the actual policies being described. Specifically, statements concerning ODA program objectives from Australia were judged to have been written from a business administration point of view that emphasized corporate governance-like hierarchical relations between aid donor and recipient, statements from China seemed to be phrased according to a "retail sales" model in which it is predicted that ODA "customers" will be satisfied with their ODA "purchases" from China, while statements from Japan were written in line with an "educational" conception of ODA in which Japan acts as a teacher and the ODA recipient country assumes the role of learner or apprentice.

While it is not impossible that these subtle conceptual framing cues were consciously instantiated to serve some practical purpose, it seems more likely that the differing backgrounds of those writing the policy statements unconsciously determined the specific phrasing used in expression.[34] Judging from the previously mentioned research results, it seems not unreasonable to speculate that the Australian ODA officials who crafted the statement of objectives had likely graduated from MBA programs, their counterparts in China had backgrounds in trade or retail sales, and that the worldviews and linguistic competencies of ODA officials in Japan had been formed mostly in elite educational institutions. As Thomas and Turner so aptly state, "We are trapped by our unconscious styles if we cannot recognize them as styles."[35]

While having previous experience with a certain type of situation is generally considered valuable, there is less recognition that extensive experience in a single field might unnecessarily restrict the range of responses considered when unfamiliar circumstances are encountered. To offer a practical example that might be readily comprehensible to academics, administrative conflicts at public universities often reflect the fundamental viewpoint differences evident between professors hoping to carry out career-enhancing research and promote individual student educational attainment and administrative officials intent on improving organization-wide reputation through emphasis on accreditation standards, institutional rankings, and practical service to society. While both sets of goals are legitimate in the context of higher education, the differing success benchmarks valued by faculty members and administrators respectively ensure that attempts to clarify institutional objectives and the practical means to achieve them have the potential to result in dissatisfaction, distrust, and occasional conflict.

In regard to the ways in which individual values solidify as conscious objectives are practically pursued, Cassirer states, "Language never denotes simply objects, things as such, but always conceptions arising from the autonomous activity of the mind. The nature of concepts, therefore, depends on the way this active viewing is directed."[36] For this reason, while individual viewpoints stemming from situational identity can be expressed propositionally as a kind of shorthand that human language users readily understand, language researchers need always to keep in mind that "being a lawyer" refers not only to a preferred method of making money; rather "being a lawyer" is the embodied result of years of goal-oriented training and conscious attempts to reorder one's character and disposition so as to maximize opportunities for success in the field of law. As such, frames and goal orientations are not simply vague notions that occasionally play a minor role in communication; rather they are powerful goal-facilitating psychological forces that have the

potential to predetermine the communicative outcomes of certain situations whether those communicating recognize their often decisive influence or not.

DISTINGUISHING CFT'S VIEW OF FRAMING FROM TRADITIONAL VIEWS

At this point, it might be useful to point out some problems that have been detected in attempts to explain frames in terms of the traditional cognitive linguistics model of semantics. Taylor understands frames as "a knowledge network linking the multiple domains associated with a given linguistic form" including "commonsense knowledge"[37] but prefaces this loose definition by noting that the terminology is confusing because various scholars use the term in different ways. Along similar lines, Koch notes that the obvious problem of standard definitions of framing is that they imply a frame to include "all the information necessary to explain" every situation that might potentially occur during inferencing, a range of information far too large to facilitate quick processing.[38] He attempts to solve this problem by hypothesizing what he calls "non-accidental" contiguity relations that metonymically link domain aspects as a type of extension of prototypicality.[39]

While Koch's hypothesis represents one way to alleviate theoretical problems related to framing, in fact such a proposal raises two difficult questions of its own: first, practically speaking, by what internal criteria would such "non-accidental" relations be organized? (In other words, what exactly is the "non-accidental" nature that determines the extent of the frame?) And second, if such a broad range of prototypical "non-accidental" relationships is organized and waiting in conceptualization to begin with, why isn't this extensive network activated when a domain is activated and what exactly would distinguish it from a domain? Put differently, if such extensive cognitive structures do exist, why not simply expand the purview of domains and call them frames?

CFT solves these theoretical problems by offering clear distinctions between domains and frames both in terms of processing stage and neural function. In CFT, domains are considered to be networks of salient feature associations that respond automatically and indiscriminately when prompted (that is, generic conceptual responses), while frames (rather than simply being a kind of extended domain) are stimulation and suppression routines that differentially enhance domain activation profiles so that they will align with goal orientations activated in response to perceived contextual cues.

Recall the detailed discussion of contextual effects in Chapter 5. There, contextual effects were defined as top-down global endogenous effects that

shape salient bottom-up exogenous inferencing options. Extrapolating from this, frames do indeed have a "non-accidental" character but not as generic associations; rather, they are orientation-enhancing global recalibrations that have emerged due to previous experiences with similar goal-directed situations. As such, the second step specified in CFT's First-pass conceptual filtering (namely the enhancement of goal-oriented lines of inferencing in response to situational cues) offers a non-accidental account of framing that is not only plausible in linguistic terms but is actually backed up by a wide range of empirical evidence.

In diagram form, the contextual *FRAME* in the CFT processing model may best be understood in terms of the physical bracket used to "frame" a photograph or another work of visual art (see Diagram 6-1).

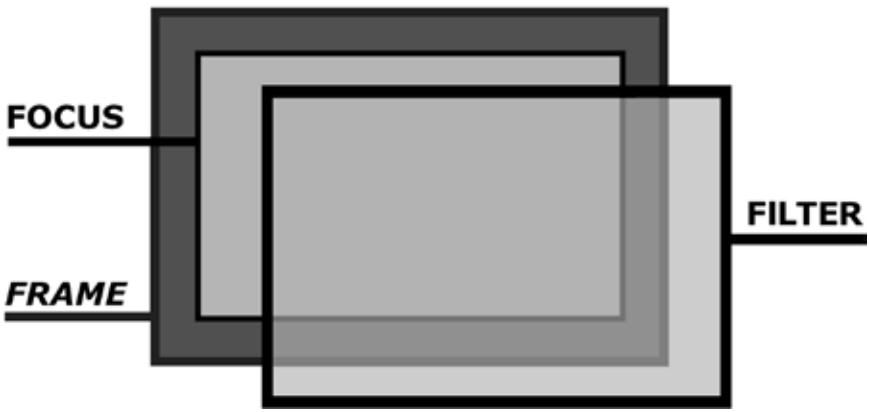

Diagram 6-1. A Visualized Model of CFT Focus-Filter-Frame Processing

Experts in the visual arts will attest to the fact that the color and texture of a frame can actively contribute to the relative strength of perception of compositional elements in two-dimensional representations like paintings and photographs. For example, in the case of a landscape painting in which much of the surface area of the canvas is taken up by earth-tones, a gilded frame will effectively draw attention to an exceedingly small cluster of yellow field flowers that might otherwise have gone unnoticed. Situational frames evident in verbal expressions work in the same way; by taking advantage of various latent contextual associations in conceptual networks, frames can selectively draw attention to FOCUS domain aspects that align with behavioral goals while diminishing attention paid to non-goal-oriented (less relevant) domains.

This being the case, the FOCUS domain in Diagram 6-1 represents the main domain being attended to in a metaphor, the FILTER domain is understood to the be the conceptual domain through which the FOCUS is projected so as to highlight FILTER-consonant domain aspects, and the *FRAME* is understood to be any relevant situational context that will effectively deemphasize task-antagonistic aspects of the FOCUS domain. To the extent that FILTER domain elements harmonize with the *FRAME*, the effect produced is likely to be even more pronounced.

At this point, so as not to oversimplify the temporal dynamics of processing, it will be necessary to make a disclaimer/clarification concerning the processing model visualized in Diagram 6-1. Diagram 6-1 does not represent artificially decontextualized cases in which figurative language results are achieved without the mediation of preexisting contextual effects. Rather, the diagram presumes the fact that most human action is, in one way or another, motivated by goal orientations. Apart from purposefully decontextualized psychological experiments, when humans use language they almost never make or interpret an utterance in a motivational vacuum. The fact that contextual effects both precede language comprehension and continue to be updated over the course of conversation makes the true-to-life authenticity of "decontextualized" statements rather tenuous.

Consequently, characterizing contextual effects as a part of semantic processing that kicks in only after verbal messages have been perceived is to mistake the exception for the rule. While contextual effects may indeed exert decisive influence at a point downstream from salience filtering when viewed in terms of the moment-to-moment processing of a specific set of incoming perceptual stimuli, ever-present contextual effects in real-life situations will normally precede perceptual input and thereby predetermine viable lines of inferencing before salience filtering has even been accomplished. It is for this reason that, when two people know each other well, they are often able to 'finish each other's sentences.' Understanding another person's goal orientation is a great aid not only in understanding what has been said but also in being able to predict what the person is likely to say next.

Once it has been acknowledged that contextual cues precede and inform virtually *all* genuine linguistic communication in one way or another, the "context-last" model of semantic inferencing will need to be fundamentally reconsidered. Additionally, psychologists may need to abandon (or at least deemphasize) decontextualized experimentation methods. While experiment designers almost inevitably choose to remove even the tiniest vestiges of context from purportedly "realistic" verbal stimuli so as to begin psycholinguistic experiments from a contextual "standing start," it may be that offering at least some contextual background information (a "running start") will be the only

way to accurately portray how linguistic communication normally functions. Because context is derived not only from discrete units of perceptual input but also from a continuous flow of linguistic and non-linguistic background information, the tendency for psycholinguists to place their professional faith in artificially decontextualized linguistic stimuli may turn out to be a type of methodological rigidity that positively precludes gaining an accurate understanding of the topic under investigation.

In the final analysis, metaphor and metonymy appear to differ not only in terms of being neurally "mapped" or "bound" conceptual structures, respectively. They also differ in the ways they relate to, or fail to relate to, context. While the understanding of metaphorical implications often involves breaking away from a particular situational context (that of the FOCUS domain) so as to apply insights from an apparently unrelated domain of experience (the FILTER domain), metonymic understanding tends to be firmly grounded in contextual background details. This phenomenon might be called the situational "gravity" of metonymy: while metonymic expressions may seem inconsequential when considered separately, to the extent they function as a binding force that contributes to the cohesion of narrative and other goal-structured information sets, their role in ordering cognition should not be underestimated. As key components of situational frames, the guiding presence of seemingly insignificant metonymy is often sufficient to cue contextual effects and thus tip the scales of cognition in the direction of one line of inferencing or another.[40]

NOTES

1. Extended metaphor (a type of discourse-level metaphor) is a rhetorical technique in which multiple metaphorical inferences from a particular FILTER domain are purposefully instantiated in a single text. Extended metaphor is not an issue of discourse length but of thematic consistency with respect to a single extended FILTER domain.

2. For analysis detailing how such extended metaphor may be practically facilitated in a literary text, cf. Daniel C. Strack, "Reading the terrain: Cultural setting and characterization in *The Sun Also Rises*," *The University of Kitakyushu, Bulletin of the Faculty of Foreign Studies* 132 (2012): 101–25.

3. Martin Hilpert, "Keeping an Eye on the Data: Metonymies and Their Patterns," edited by Anatol Stefanowitsch and Stefan Th. Gries in *Corpus-Based Approaches to Metaphor and Metonymy* (Berlin: Mouton de Gruyter, 2006), 146.

4. Lakoff and Johnson, *Metaphors We Live By*, 35.

5. Unless the game in question was a relatively unusual "interleague game," in which case they would be playing against the Chicago White Sox. Interestingly,

processing at this level of detail can only occur if the cognizer has ready access to relatively detailed 'encyclopedic knowledge' relating to the domains in question.

6. Hoey notes how discourse properties (such as genre) can influence the priming of lexical expressions. Cf. Michael Hoey, *Lexical Priming: A New Theory of Words and Language* (Abingdon: Routledge, 2005), 115.

7. In language psychology, the word "priming" has long been used to indicate an experimentally attestable facilitation effect in which the activation of a particular lexical item results in faster-than-normal responses to an associated lexical item. For example, according to Hutchison, the "semantic priming effect" refers to "the consistent observation that people perform faster to a target word (e.g., cat) when it is preceded by a semantically related prime (e.g., dog) rather than by an unrelated prime (e.g., table)." Cf. Keith A. Hutchison, "Is semantic priming due to association strength or feature overlap? A microanalytic review," *Psychonomic Bulletin and Review* 10, no. 4 (2003): 786; cf. also Stanislas Dehaene, Lionel Naccache, Gurvan Le Clec'H, Etienne Koechlin, Michael Mueller, Ghislaine Dehaene-Lambertz, Pierre-FranÇois van de Moortele, and Denis Le Bihan, "Imaging unconscious semantic priming," *Nature* 395, no. 6702 (1998): 597–600). Other kinds of priming that have been recognized in psychological experiments relating to language include phonological priming (e.g., Lori E. James and Deborah M. Burke, "Phonological priming effects on word retrieval and tip-of-the-tongue experiences in young and older adults," *Journal of Experimental Psychology: Learning, Memory, and Cognition* 26, no. 6 (2000): 1378–91) and morphological priming (cf. Benjamin K. Bergen, "The Psychological Reality of Phonaesthemes," *Language* 80, no. 2 (2004): 296).

8. Or, alternatively, by way of logical inferencing of the type exemplified by Grice's Conversational Implicatures or Relevance Theory's "logical implications." There is certainly room for logical analysis to play a part in mental processing. The important qualification is that, when logic does intercede, it will necessarily occur as a relatively time-consuming, effortful, and (in certain cases) educational training-enhanced type of consciously guided processing.

9. Spivey, *Continuity of Mind*, 184.

10. Giora, *On Our Mind*, 22–26.

11. Richard Lederer, *The Bride of Anguished English* (New York: St. Martin's Press, 2000), 36.

12. Having said this, such contextual biases may be overridden if subsequent statements offer salient evidence that the originally inferred meaning was incorrect.

13. Paul Chilton, *Analysing Political Discourse: Theory and Practice* (London: Routledge, 2004), 51.

14. *Oxford English Dictionary*, 2nd ed., s.v. "frame up."

15. Wayne C. Booth, "Metaphor as Rhetoric: The Problem of Evaluation," in *On Metaphor*, edited by Sheldon Sacks (Chicago: University of Chicago Press, 1979), 50.

16. Cf. Fillmore, "Frame Semantics."

17. Ibid., 378.

18. Ibid., 379.

19. Ibid., 382.
20. Ibid., 383.
21. E.g., Frank Luntz, *Words That Work: It's Not What You Say, It's What People Hear* (New York: Hyperion, 2007).
22. Matt Bai, "The framing wars," *The New York Times Magazine*, July 17, 2005, 43.
23. Holyoak and Thagard, *Mental Leaps*, 164.
24. The *QUAGMIRE* cognitive model presumes an entangling situation in which continuous damage may be sustained but from which no lasting good can result.
25. Tomasino and Rumiati have convincingly asserted that the imageability of context-related phrasing is most likely to result in the activation of sensorimotor simulations in response to the perception of context-dependent "action-related words." Cf. Tomasino and Rumiati, "At the mercy," 4–5, 9.
26. Bai, "Framing wars," 43.
27. Ruud Custers and Henk Aarts, "Positive affect as implicit motivator: On the nonconscious operation of behavioral goals," *Journal of Personality and Social Psychology* 89, no. 2 (2005): 129–42.
28. Ap Dijksterhuis and Henk Aarts, "Goals, attention, and (un)consciousness," *Annual Review of Psychology* 61 (2010): 470.
29. George Orwell, "Politics and the English Language," in *In Front of Your Nose, 1946–1950: The Collected Essays, Journalism and Letters of George Orwell* 4, edited by Sonia Orwell and Ian Angus (Boston: D. R. Godine, 2000), 138–39.
30. David Augsburger, *Conflict Mediation Across Cultures: Pathways and Patterns* (Louisville: Westminster/John Knox Press, 1992).
31. Ibid., 49.
32. Ibid., 17.
33. Shu Miyao, "Bridges of international cooperation: An examination of ODA projects on the Mekong River from a geopolitical perspective" (MA Thesis, University of Kitakyushu, 2008).
34. Ibid., 32.
35. Francis-Noël Thomas and Mark Turner, *Clear and Simple as the Truth: Writing Classic Prose* (Princeton: Princeton University Press, 2011), 12.
36. Cassirer, *Language and Myth*, 31.
37. John R. Taylor, *Linguistic Categorization*, 2nd ed. (New York: Oxford University Press, 1995), 87.
38. Peter Koch, "Frame and Contiguity: On the Cognitive Bases of Metonymy and Certain Types of Word Formation," in *Metonymy in Language and Thought*, edited by Klaus-Uwe Panther and Günter Radden (Amsterdam: John Benjamins, 1999), 145.
39. Ibid., 149–50.
40. Metaphor, on the other hand, often seems to defy the normal laws of "associational gravity" by initiating processing that effectively ignores practical associations (the 'here and now') to posit abstract correlations with far-flung domains.

Chapter Seven

Metaphor Productivity and Dual-mode Instantiation

The previous chapters have introduced Conceptual Filtering Theory, a theory of mental processing that characterizes linguistic communication in terms of salience selectivity and contextual disambiguation. Specifically, Chapters 1 and 2 detailed how sense perception, metonymic binding and metaphoric mapping contribute to conceptualization. Chapters 3 and 4 noted problems with previous theories of metaphor inferencing and then introduced a new theory that not only provided solutions to those problems but also offered a detailed explanation of how conceptual domains combine to elicit salient metaphorical entailments. Chapter 5 clarified the crucial role that contextual effects play in the figurative language disambiguation process. Chapter 6 noted how situational frames can be manipulated to guide semantic outcomes.

This final chapter will address the related issues of analogical creativity and metaphor productivity. After reconsidering the literal/figurative distinction and offering a new perspective on "dead metaphor," some observations will be made concerning how catachresis[1] expands the stock of available metaphoric expressions, and the ways in which analogical thinking aids in the development of scientific models. Finally, two new terms will be introduced to describe the complementary process by which metaphors originate and are disseminated: "organic recognition" and "artificial inducement."

REASSESSING THE LITERAL/FIGURATIVE DISTINCTION

Traditionally, the adjective 'literal,' in denoting the presumed base meaning of a given word, seems to mean 'concrete' or 'practical.' For this reason, it is commonly contrasted with 'figurative,' a word that describes a somehow

non-standard, usually more abstract connotation. Lakoff and Turner characterize the longstanding 'orthodox' view of literal meaning as being conventional and semantically autonomous language that, in forming the basis for metaphor, necessarily stands outside of it[2]; consequently, it is often understood to be a type of language that can accurately reference "objective reality." They dissent from this traditional view of literal meaning for a number of reasons but primarily because it implies that "no ordinary conventional language can be metaphorical in any way."[3] As evidence, they offer multiple examples of how seemingly non-figurative expressions are really metaphorically motivated and, furthermore, they deny the widely held misconception that the world has an objective structure that may be understood apart from the subjective experience of the individual.[4]

Because determining a word's literal sense can at times be very subjective, Lakoff and Turner note that the term "literal," although somewhat useful in an everyday sense, is ultimately vacuous. Consequently, they suggest that the term "literal" be used as "a handy, non-technical term" to denote the concrete domain of a metaphor or to strike a contrast with words like "ironic," "exaggerated," or "understated."[5] In general, the use of 'literal' in this book follows their suggestion.

To deepen understanding, however, it will be useful to reiterate how distinguishing a word's literal sense from an alternative figurative sense so crucially depends on the situation in which the word or phrase is intended to be used. Since real-life (as opposed to purportedly "true-to-life") situations can only occur in specific cases at the individual level, the fact that what is literal to one person in a certain set of circumstances might seem figurative to another person in a different situation cannot be sufficiently stressed. The following examples will demonstrate how context-dependent 'literal' meaning can be.

With respect to the classic literal/figurative distinction evident between ocean waves and sound waves,[6] waves on the ocean would naturally be considered literal waves because humans can see and touch them and 'sound waves' are non-literal waves because humans cannot see or touch them. Because the ear can hear and interpret relative pitch and various other aspects of sound, sound itself may be understood to have a literal existence, but sound 'waves' (being a figurative reference to a type of air pressure modulation[7]) would still be considered a derivative and non-standard type of 'wave' and would therefore be judged non-literal. At first glance, such logic seems airtight.

Upon further reflection, however, if apprehensibility by way of sense perception is a central aspect of traditional 'literality,' what are we to make of experiences resulting from technological extensions of sense perception?

While visual perception cannot normally detect the presence of sound waves, recent versions of computer software for sound editing offer multiple user interfaces that allow sound engineers to visually apprehend various qualities of sound not normally perceptible to the naked eye. To the extent that sound waves are defined by their "frequency" (the "rate of repetition of the changes in air pressure"[8]), don't the 'sound waves' displayed on an oscilloscope have a literal existence, at least within the *context* of sound engineering? If direct perception is a key issue in determining literality or figurativeness, then when technology allows humans to examine certain aspects of sound waves even to the extent of manipulating them (as when sound engineers edit the 'wave-form' of a particular sound), perhaps their existence should be deemed no less concrete than ocean waves which (truth be told) are often only vaguely distinguished and cannot always be intuitively quantified in any precise way.

Of course, a case might be made that the older, original meaning of a word should be seen as the more literal sense (as would be the case when comparing ocean waves with sound waves). Unfortunately, in some cases the original meaning falls into disuse and is replaced by an equally concrete and practical meaning. Let's consider the word "straw." This particular example is especially telling because the arrival of one of the most salient senses of the word in the present day can be determined accurately enough to make a reasonable assessment as to when its metaphorical extension occurred.

Due to the fact that the number of agricultural workers and rural residents who deal with hay-like crops declined precipitously in most nations during the 20th century, a typical early-21st-century English speaker's first awareness of the word "straw" will probably be as a hollow plastic tube for imbibing liquids using a suction technique, the main examples of these being disposable straws provided with soft drinks in fast food restaurants and the washable, flexible plastic straws attached to spill-proof mugs and cups designed for use by toddlers. If one were to casually assume that the word has always been used to refer to such devices, one would be wrong. In fact, the word "straw" as referring to the stems or stalks of stripped grain plants had a much broader application before the advent of the mass-produced artificial sucking device. In pre-industrial times, straw was ubiquitous and had a variety of practical applications; it was used for litter, fodder, to fill beds, as plaited and woven material for hats, etc., with each of these meanings commonly attested in English vernacular.[9]

Of course, the word "straw" also denotes a device used primarily for sucking liquids but this sense did not enter common usage until after 1851. Even here, however, because "glass tubes" were considered not to be straws per se but rather items equivalent in function,[10] the word "straw" itself still indicated not an artificial device but the stem of a plant.

Even after artificial straws were patented in 1888,[11] they did not catch on immediately; in 1892, when Whitman referred to his sucking of apple cider through a "straw"[12] in "Song of Myself," he was undoubtedly still using a piece of hay. Nevertheless, sometime after 1926 (the date of the first attested use of the phrase "soda straw"[13]) the word (in the collective consciousness of English speakers) transformed from 'a type of stripped vegetation with multiple uses' to 'an artificial hollow tube for imbibing liquids.'

While most 21st-century people take for granted the fact that "straws" are for ingesting liquids and not for thatching roofs, the fact that the currently understood sense of the word is metaphorical and narrowly defined compared to the various 'literal' senses used throughout the word's history is irrelevant. At present, drinking straws represent the literal base meaning of the word for most people.

With respect to child language development, Mervis proposed that the most basic level of a word may differ for children and adults[14] with a type of lexical level termed "child basic" being the "level at which language learners prefer to start learning their first nouns."[15] Consequently, even if lexical items do have basic, generic levels of conceptualization (and they probably do, statistically speaking[16]), the question of which level to term the most 'literal' may have a fundamentally different answer for children and adults. This being the case, a word's literal meaning, far from being some universally recognizable core sense against which some other obviously derivative metaphorical sense can be contrasted, in fact displays flexibility and should be expected to vary across age cohorts, subcultures, idiolects, and eras. 'Literality,' although by reputation a predictable and objective standard, is a subjective social construct.

A RECONSIDERATION OF DEAD METAPHOR

As with plastic drinking straws, the world is littered with literal words and phrases of metaphorical origin. Once the original figurative sense ceases to be recognized as such, the word or phrase may come to be considered a "dead metaphor." Generally speaking, a dead metaphor is a type of word or phrase that, despite its metaphorical origins, is not recognized as having a figurative sense. Examples range from "table leg" to more subtle and therefore controversial examples such as "defend your theoretical positions." While few would deny that certain metaphors seem exceedingly 'lively' and stimulate a wider range of figurative implications than others, the criteria for deciding whether a metaphor is sufficiently lifeless to term "dead" have yet to be agreed upon.

With the advent of CMT, the long-held belief that apparently non-metaphorical phrases of metaphorical origin are 'dead' has been called into question. Gibbs states, "Under the CMT view, so-called clichéd expressions, such as 'stay the course' and 'We're spinning our wheels,' are not dead metaphors, but reflect active schemes of metaphorical thought"; he further adds that the systematicity found in conventional expressions "provides evidence for their meanings being motivated by enduring metaphorical mappings."[17] While there are counterexamples like "pedigree" (from the Old French for family tree, "*pied de grue*," literally "crane's foot"[18]) in which the original metaphorical connections have been lost over time or through interlingual transmission, CMT proponents generally assess neglected linguistic motivation to be latent but potentially accessible mappings. Of course, cognitive linguists were not the first to claim that commonly overlooked metaphors need not be figuratively inert. In making such a case, they echo Barfield,[19] Richards,[20] and Lewis.[21]

Svanlund asserts that CMT proponents who claim seemingly dead metaphors to be alive have papered over the fact that there is a gradation between such metaphors in terms of their figurative sense elicitation potential; in fact, certain conventional metaphors do seem marginally more alive or somewhat deader than others. Recognition of such gradation is reflected in the various adjectives metaphor researchers have used to describe metaphors that seem to be functioning at impaired levels compared to more readily accessible examples. While there are various criteria by which such seemingly impaired function might be judged (including "frequency of activation," "intensity of activation," etc.[22]), metaphorical terms which attempt to distinguish relative levels of semantic lassitude include "dead, inactive, dormant, sleeping, adequated, powerless, petrified, frozen, fossilized, bleached, worn out, etc."[23]

When they indiscriminately emphasize the potential for latent metaphorical associations to be recovered, CMT advocates seem to be conflating metaphorical mappings that are theoretically 'possible' to expose (if by way of great mental effort) with metaphorical mappings that are readily noticeable. Unfortunately for such a view, while the existence of at least partial statistical correlation between morphological forms and semantic connotations has been empirically verified,[24] 'experimentally confirmed' does not mean 'universally active for all language users.'

Because broad-based uniformity of understanding is rarely evident, categorizing some metaphors as "dead" and others as "alive but conventional" comes to seem a rather arbitrary activity. Deignan notes[25] that the boundary between innovative and conventionalized metaphors is fuzzy both because linguistic expressions change over time and because individual speakers will often disagree regarding the "newness" of a given metaphor.

For example, while adult native speakers may be unpersuaded by claims that phrases such as "table leg," "clock face," or "head out" are metaphorical, children and non-native-speaking adult language learners may nevertheless be keenly aware of figurative aspects. The idiosyncrasies of personal life experience seem likely to play a role, as well. For phrases like "strike out" or "raise the ante," idiomatic expressions deriving from certain types of sports or modes of recreation may have metaphorical origins[26] that are obvious to those acquainted with the games but completely opaque to those who are not.

So what we find then is that even if a general determination could be made about whether a particular 'conventional' metaphorical expression tends to rely on surreptitious cognitive motivation or not (that is, whether neglected mappings between conceptual domains can be consciously accessed or, at minimum, that unconscious mappings of a given metaphor systematically connect with other metaphors), such a determination might reflect statistical patterns across human subjects in experimental data but would not necessitate the presence or absence of active cognitive motivation at the individual level. While linguists often feel obliged to generalize across idiolects by asserting one type of phrasing to be "conventional" while claiming another not to be, the neural computation of metaphor happens not in socio-linguistic populations (nor in corpora nor in dictionaries) but in the human brain and so metaphor is a question not of statistical likelihood but of presence or absence of active neural connections in the mind of an individual. Metaphoric mappings that are accessible to members of my peer group (in statistical terms) are not necessarily accessible to me.

Furthermore, there has been little recognition of the possibility that people who consistently ignore domain information they consider to be irrelevant effectively suppress metaphorical implications. In the case of conventional idioms of metaphorical origin, one is not normally called upon to verbally account for any subtle nuances that might be available through effortful introspection; it is enough to simply understand the word in context. As figurative idioms are consistently utilized, disregarded metaphorical senses will come to seem irrelevant, with increasing attenuation of inter-domain neural connectivity being the likely result. Such a bias towards least common denominator 'basic gist' understanding amounts to an active selection criterion that will gravitate against the continuing viability of metaphorical mappings, especially in situations in which figurativity is viewed as an obstacle to 'clear and precise' communication.

To the extent that metaphorical implications are consistently ignored (that is to say, consciously suppressed), connections will atrophy, thereby ensuring that such implications progressively garner less and less attention. Furthermore, because "tacit knowledge" of conceptual metaphors[27] probably

includes mappings that function at an unconscious level,[28] people in the habit of suppressing extraneous senses of words they are conscious of would only be left with types of motivation they are not conscious of. Consequently, the understanding gap between 'no-nonsense' literalists and those who are open to actively probing the figurative roots of linguistic expression is likely to be profound in the long term.

This being the case, many 'dead metaphors' may turn out to be dead not in the sense of having meanings that are unrecoverable due to an utter deficiency in morphological associations or etymological background information, but rather because they have been consistently perceived as inert by sophisticated language users who tend to ignore metaphorical nuances. If this is the case, we are not dealing with properties of words as commonly understood but rather with habituated responses in the minds of those that choose not to perceive metaphorical implications. To the extent that one views language as a conceptual access strategy and not as a definition-oriented reference technique, 'dead metaphor' should be understood not as a term describing a property attached to a word or phrase itself but rather as a reflection of the deadened sensitivities of those who fail to notice metaphorical nuances.

DISTINGUISHING METAPHORICAL CREATIVITY FROM MUNDANE USE

The modern-era scholar who, more than any other, exposed the metaphorical implications hidden in everyday language was Richards. In his 1936 speech (later published in book form as *The Philosophy of Rhetoric*[29]), he attempted to reinvigorate the study of metaphor by contrasting his ideas with those of the ancient Greek philosopher Aristotle.

While it is certainly possible that Richards consulted Aristotle's ideas in the original Greek, at the very least it can be confirmed which translation of *The Poetics*[30] his quotations of Aristotle were drawn from. The italicized phrases in the following commentary by Richards exactly follow Fyfe's English translation:

> *. . . but by far the greatest thing is the use of metaphor. That alone cannot be learnt; For the right use of metaphor means an eye for resemblances*. But we all live, and speak, only through our eye for resemblances.[31]

Richards's point of contention, "But we all live, and speak, only through our eye for resemblances," is eminently reasonable. When people employ metaphor in the course of everyday activities and communication, it is not

a sign of genius but rather a basic skill that the broad majority of people make use of.

Nevertheless, while Richards's observation is legitimate in and of itself, there are problems with his critique of Aristotle stemming from weaknesses in the English translation he was consulting. Although Fyfe's translation asserts "the right use of metaphor" to be indicative of an "eye for resemblances," the original Greek phrase, "*eu metapherein*" ("εὖ μεταφέρειν"[32]), might better have been translated "proper application of metaphor." In fact, had the sentence as a whole been rendered, "For the proper application of metaphor depends on the ability to consider similarities," the following crucial misunderstanding might have been avoided: because Fyfe translates "*metapherein*" [μεταφέρειν] as "use of metaphor," Richards fails to notice that, understood in context, Aritstotle's original Greek statement refers to the strategic creation of novel metaphor during composition (for Aristotle, a sign of genius) rather than the interpretation and use of garden-variety metaphor in everyday linguistic communication (a phenomenon that Aristotle seems not to have been concerned with). Consequently, Richards's critique of Aristotle for simplemindedly asserting that metaphor "cannot be learnt" has little to do with the point Aristotle was attempting to make.

While the observations made by Aristotle and Richards are quite different, they are not in any way at odds with each other. In effect, Aristotle is concerned with the skill level on the production side of metaphor (rhetorical creativity) while Richards is focusing on the skill level of the end-users (basic linguistic production and interpretation). Consequently, Richards's critique of Aristotle is unfair. It is as if an architectural engineer were to stress the great expertise necessary to construct a sturdy bridge only to be scolded that crossing such a bridge takes no skill at all. To such a reproof, the engineer might reply, "Yes, if the bridge has been skillfully designed it will take no effort at all to cross over." In other words, Richards's misunderstanding of Aristotle, while effective in revealing the tremendous ubiquity of inconspicuous metaphorical expression in everyday language, demonstrated his own surprising inability to differentiate between metaphor creation and metaphor use.

In fact, because there have been few consistent attempts to distinguish made-to-order metaphor creation from mundane metaphor use, Richards's own neglect of the issue places him squarely in the long tradition of rhetoricians and language scholars who failed to recognize that novel metaphors worthy of propagation must be created before they can be disseminated and popularly deployed. The judgment that the origins of commonplace figurative expressions may be taken for granted precisely because the metaphors and metonymies themselves seem so commonplace is proved false by the fact that

foreign languages often use entirely different concepts to express the same commonplace ideas. For example, in English-speaking culture, to "break bread" with someone means to share a meal with them; in Japanese culture, however, the very word for meal is *go-han* (literally, "rice"). Even apparently 'basic' figurative expressions that seem like inevitable linguistic outcomes in one language may be discovered to conflict with phrasing adopted by another language, a situation that reveals many basic lexical choices in language to be arbitrary or culturally determined rather than inevitable.

Of course, few scholars have tried to verify details concerning the ontogenesis of specific metaphors. One reason for this is that it is difficult to confirm evidence for the spontaneous generation of particular metaphors using only information gleaned from (often ancient) historical records compiled without such a goal in mind. Even still, scholars including Gentner[33] and Holyoak and Thagard[34] have made a variety of intriguing if narrowly focused solitary attempts. A more likely reason for the lack of attention being paid to the issue of metaphor ontogenesis is that the time-consuming examination of such instances produces no data that is directly applicable to other cases. In that every origin story is unique, most ontogenesis narratives seem destined to remain unknown. Whatever the reasons for neglecting this avenue of inquiry, however, metaphor theoreticians ignore creative aspects of the metaphor phenomenon to the detriment of balanced linguistic understanding and the advancement of conceptual science as a whole.

CATACHRESIS AND CROSS-LINGUISTIC METAPHOR PRODUCTIVITY

In traditional rhetoric, catachresis refers to the intentional juxtaposition of obviously mismatched words or phrases. Everyday language reveals many examples in which seemingly inconsistent or contradictory concepts have been productively linked. In the case of 'land-shark,' 'water taxi,' and 'corporate jungle,' the seemingly adjectival words preceding the respective nouns do not function as typical adjectives do. While adjectives normally qualify a noun or noun-phrase by describing the noun further or highlighting a specific feature (as in the phrases 'space junk' or 'guard dog'), these pseudo-adjectives do not modify the post-positional noun so much as hint that the implied conceptual domain of the word in the adjectival position will be filtered through the conceptual domain of the noun following it.[35]

Until one becomes accustomed to such grammatically anomalous combinations, open-ended conceptual juxtapositions of this type are likely to be misinterpreted. Children asked to explain what the term "land-shark" means

will posit the existence of a (heretofore unknown to them) type of shark that lives on land. While such a 'fish-out-of-water' explanation is not *logically* precluded, mature language users, having encountered such counterfactual grammatical constructions before, will know to treat the mysterious expression as a riddle. If sharks were land animals, what kind of land animals would they be? The answer: "highly aggressive, predatory ones." Rephrased in CFT terminology, the term "land-shark" evokes the relatively vague metaphor LAND ANIMAL THROUGH SHARK not by modifying shark but by eliciting LAND ANIMALS that are in some way similar to sharks. Once the ad hoc category HIGHLY AGGRESSIVE PREDATORY LAND ANIMAL has been brought to the forefront of cognition, various candidate animals that more or less fit the description will likely come to mind.

Over time, neologisms that feature the juxtaposition of seemingly inconsistent conceptual domains may gradually cease to be understood as figurative compounds altogether, coming to seem more like commonplace expressions with simple literal meanings. Such a process has undoubtedly taken place for various terms in present-day use such as the English language designation "water taxi" (which, if strictly defined, ought to be a 'taximeter-equipped cabriolet that travels over the water'), hippopotamus ('river-horse') in Greek, and *hǎitún* in Chinese (meaning dolphin but literally 'ocean-pig'). According to Bréal, "[i]f [metaphor] be accurate or picturesque, or even if it merely fill a gap in the vocabulary, its adoption is assured."[36] The fact that glaringly obvious examples of catachresis routinely transform themselves into mundane literal expressions explains the unnoticed but irresistible 'glacial' power of metaphoric meaning "expansion."[37] New metaphorical terms that appear fresh and creative or even markedly discordant at the moment of their unveiling are destined to be maligned as clichés or ignored altogether as conventional literal expressions.

While Bréal is quick to recognize the contribution of metaphor in enlarging "the intellectual inheritance of humanity,"[38] it is no less true that this enrichment through cross-linguistic borrowing often creates hidden redundancies in the recipient language, as an examination of the English language expressions 'galaxy' and 'Milky Way' will attest. While the apparent scientific precision of the word "galaxy" strikes a vivid contrast with the antiquated and obviously figurative impression made by 'Milky Way,' a quick glance at galaxy's etymological roots reveals it to be derived from *galakt-*, the Greek word for "milk."

In fact, when foreign loan words are used side by side with vernacular equivalents sprung from the same ancient root, it is almost always due to the fact that the borrowed expression features some kind of subtle metaphoric or metonymic added value: trusty English words with basic meanings like 'count,' 'sure,' 'gentle,' and 'feast' are unobtrusively paralleled by more ab-

stract or slightly more metaphorical recent additions like 'compute,' 'secure,' 'genteel,' and 'fete.' Similarly, the geometrically literal word 'crescent' is echoed by its gastronomic relative, 'croissant.' Languages being naturally acquisitive, the nuances provided by differently spelled and pronounced words of synonymous origin eliminate the need to distinguish actual synonyms while effectively expanding the range of what can be precisely communicated.

Although certain abstract metaphorical connotations travel well and sustain themselves in novel linguistic contexts, the literal base meanings of these metaphorical words do not. The best example of this intercultural 'literal sense-dropout phenomenon' is the word "metaphor" itself. In fact, the first historical reference to "metaphor" was not figurative but literal; moreover, it was not a noun but a verb. In his drama *The Phoenician Maidens*, Euripides (ca. 484-ca. 406 BC) used the word "*metapheron*" [μεταφέρων][39] to describe a charioteer "goading his team"[40] of horses in alternation [πώλοις μεταφέρων ἰθύνει[41]]. Consequently, the etymological root of metaphor involves the physical 'carrying across' or 'transfer' of an object from one spatial location to another. Because the goad manipulated by the charioteer functions equally well no matter the horse, the word "*metapheron*" refers to the simple physical movement of the implement from the flanks of one horse to the other.

In fact, the modern Greek word "*metaphero*" [μεταφέρω] is still used to express the intentional changing of location. Modern Greek bilingual dictionaries[42] feature very practical English definitions for the word "metaphor" including "carry," "transport," "convey," "transfer," and even "move house." In the present day, when non-academic native Greek speakers hear the word "metaphor," the abstract figurative language sense of the word tends to be the very last connotation that comes to mind. In the final analysis, then, the modern Greek word corresponding to "metaphor" has retained multiple more or less literal connotations (indicating various types of 'transfer') despite the fact that, as a foreign loan word in languages the world over, only its most abstract figurative language sense has been adopted into common usage.

Origination details notwithstanding, once firmly rooted in their new linguistic settings, formerly figurative words like "hippopotamus" and "galaxy" come to be treated as literal designations. Regarding such conventionalization of metaphor, Bréal remarks that the impression of catachresis "exists only in an early stage"[43] and persists only among philologists. For the vast majority of people, such expressions will quickly come to be regarded as "natural and legitimate." Consequently it might be said that, insofar as they opportunistically occupy the unproductive gaps between more concrete colloquial terminology, evocative metaphors effortlessly cross sociolinguistic boundaries and in so doing further enhance a gradually accreting global stock of literal expression.

ORGANIC RECOGNITION AND ANALOGICAL REASONING IN SCIENTIFIC INVESTIGATION

Although some have asserted that one prerequisite of metaphorical understanding is lexicalization,[44] CFT posits that metaphors may be understood intuitively after similarities between non-identical conceptual domains have been perceived whether such understanding is preceded by lexicalization or not. In CFT, such spontaneous noticing of correlation between perceptually apprehended phenomena will be termed "organic recognition." Many simple image metaphors including "firefly" and "whale song" would appear to have been produced in response to organic recognition. Of course, more complex types of analogical reasoning can be explained in terms of organic recognition, as well. Consider Franklin's hypothesis that lightning is a form of electricity.

Although Franklin was apparently unaware of them, a few continental scientists had previously noticed similarities between lightning and electricity[45]; having said this, due to the fact that both phenomena were so poorly understood, no practical experiments could be designed to move such observations of similarity beyond the realm of speculation. Franklin, who had been thoroughly "engrossed" in developing new types of electricity-related experiments since 1746,[46] first wrote of his realization of the similarity between electricity's "vivid flame" and lightning in a letter dated September, 1747.[47] Franklin's personal scientific journal[48] reveals that by November 7, 1749, he had noticed no less than 12 similarities between lightning and electricity (including light emission, swift motion, "sulphureous" smell, etc.) which led him to propose a practical experiment by which his working hypothesis that lightning is a form of electricity would eventually be tested and confirmed.[49]

Holyoak and Thagard note that it seems unlikely Franklin arrived at all of these similarities at once; rather the list was probably "compiled over time as a result of reflection and recollection."[50] That is to say, while the possibility of identity may well have occurred to him spontaneously in a moment of epiphany, this realization was made possible by the fact that he had been doing a variety of original experiments involving electricity and so his understanding of the phenomenon was more extensive than that of anyone else on the planet.[51] Consequently, Franklin's "discovery" was not an incidental occurrence spurred by a random juxtaposition of ideas, but rather a case in which prior conceptual buildout relating to the conceptual domain ELECTRICITY resulted in a knowledge base of detail sufficient to make generalized correlation possible.

Most intriguing about this episode is what it hints at concerning the role of analogy in scientific hypothesis and verification. In noticing the many similarities between lightning and electricity (neither domain being well

understood at the time), Franklin's comparative study likely began with the metaphorical hypothesis "Lightning is like electricity" (LIGHTNING THROUGH ELECTRICITY), an observation not very different from the realization that the behavior of sound waves traveling through the air is in some ways similar to the way in which waves travel through water. Until a certain point, the comparison only amounted to a scientific analogy in which a relatively unknown FOCUS domain was being likened to a relatively known FILTER domain so as to reveal as yet unverified properties of the FOCUS domain based on observed properties of the FILTER domain. After realizing that the domains LIGHTNING and ELECTRICITY held multiple features in common, however, Franklin came to suspect that the two phenomena initially believed to be merely analogous were in fact two forms of the same phenomenon, thereby spurring him to create a comprehensive list so as to verify identity rather than merely attest similarity. This mental leap forward from scientific analogy ('Lightning is like electricity') to identity supposition ('Lightning is electricity') appears to have occurred at some point between September of 1747 and November of 1749.

What we find then, is that scientific analogy works in two ways that at times amount to stages of discovery; perceived similarities in seemingly disparate natural phenomena result in a scientific analogy that posits a mutually efficacious underlying principle as the sufficient cause of the similarities. Should the number of these perceived similarities turn out to be extensive, then a provisional judgment for identity may be posited, which then goes on to be either empirically corroborated or disproved.[52]

Just because scientific models currently in use have proved illuminating in certain ways does not necessarily mean that they should be retained. Holyoak and Thagard note that there are three options concerning the adoption of analogy-based theoretical models: application, non-application, or application with modifications.[53] Of course, this second "non-application" option carries with it the obvious implication that certain analogical models should not be adopted in the first place. It also suggests that when extant models prove to be obviously inferior to newer alternatives, they may be replaced.[54]

One of the best examples of a seemingly solid conceptual model being overturned once an alternative model with more explanatory power became available is the long-revered belief that human illnesses were due to imbalances in bodily "humours" and its closely associated all-purpose treatment method, "bleeding," both of which remained prevalent until the early 19th century. Considering how this conceptual model of physical ailment led to countless fatalities stemming from both injurious treatment of existing illnesses and misguided prevention measures, the "humours" theory of illness is a classic case of mistaking the physical manifestations of an illness for its efficient causes.[55]

In particular, malaria, which eventually came to be understood as a primarily mosquito-borne viral infection, was long thought to result from the inhalation of marsh gas "miasmas."[56] In this case, initial resistance to the virus-based view of infectious diseases owed much to the reluctance of respected scientists and physicians to abandon the "humours" model that they considered to be confirmed science. In retrospect, it is remarkable that such a fundamentally flawed theoretical model should have held so much sway for such a long period of time, but such is the power of vivid metaphorical imagery in the face of dire consequences when no better working hypothesis is available.

Boyd, noting Kuhn's characterization of the establishment of new theories in the history of science[57] in terms of "persuasion, recruitment, and indoctrination,"[58] explains the role of "theory-constitutive metaphors" as follows: theory-constitutive metaphors, at least temporarily, serve as "irreplaceable" linguistic machinery that not only effectively paraphrase more complex ideas but practically introduce terminology that by its very presence invites newly indoctrinated scientific apprentices to "explore the similarities and analogies between the features" of the conceptual domains being compared and thereby identify new attributes that have not yet been confirmed but the existence of which seems probable.[59] In this sense, analogy in science serves less as a fact-conveying communication medium than as a way to keep working hypotheses concerning scientific belief systems active in memory as inquiry proceeds.

For the skeptic, an examination of how analogical thinking undergirds the scientific process will naturally lead to doubts about the reliability of human knowledge stemming from science's well-concealed reliance on metaphorical insights gained by way of sense perception; if supposedly stable scientific 'knowledge' is sparked by intuitions, driven forward by analogical guesswork, and confirmed only provisionally, then its epistemological status has more in common with notoriously unreliable individual sensory impressions than is commonly acknowledged.

ON DUAL-MODE INSTANTIATION AND CREATIVITY

Through the first six chapters of this book, analysis has centered on explaining metaphor inferencing with specific reference to the intentional presentation of language-embedded metaphors in interpersonal linguistic communication. Assessed only in such terms, metaphors seem to function like 'verbal viruses': metaphorical phrases such as "clock face" are used in conversation and hearers who have not encountered such a phrase before will quickly come to understand the phrase's gist if not its metaphorical implications. If they become

aware of figurative aspects from the outset, then the phrase's metaphoricity has contributed to its memorability. If not, then the phrase's metaphorical connotations may come to be understood in a moment of clarity at some later point in time. In either case, however, for the recipient of such a 'verbal virus,' the realization of a visually detectable structural similarity between the conceptual domains CLOCK and HUMAN FACE did not happen spontaneously as a consequence of individual perception and recognition but rather was artificially induced by way of language.

While such "artificial inducement" situations are exceedingly common, seeing metaphor as a phenomenon that propagates solely by way of elicitation during verbal exchange ignores the fact that metaphorical cognition both originates in and derives its ongoing psychological grounding not from language but from the perceptual system. While it is certainly possible that some metaphors may have originated not through any kind of noticing but by way of fortunate accidents during linguistic transmission (e.g., metaphorically freighted malpropisms), there are many historically documented examples in which individuals have perceived correspondences between two seemingly unrelated domains and expressed those perceived correspondences in metaphorical terms. In fact, an examination of the etymological roots of seemingly literal foreign loan words often reveals obviously metaphorical connotations. This brings up the distinct possibility that much of the language we nonchalantly perceive to be 'literal' is (like a coral reef composed of countless generations of dead organisms) made up almost entirely of thoroughly calcified dead metaphor and dead metonymy. In any case, the mostly unexamined possibility that "organic recognition" lies at the root of many if not most metaphors we use and encounter would seem to be a glaring oversight that has only been sporadically addressed.

One historical episode that exemplifies such "organic recognition" is Vitruvius's observation that the behavior of sound waves is akin to the movement of waves in water.[60] This seems to be a case in which metaphor, rather than being communicated from one individual to another, was apparently intuited by a given person (Vitruvius) due to his extensive experience designing amphitheaters. In this SOUND WAVES THROUGH OCEAN WAVES metaphor, detection of a feature overlap (the ability of sound waves to travel around corners) was sufficient to result in conceptual elaboration despite the fact that the similarities between the two domains are not obvious. That is to say, when an individual's aggregate experiences with respect to a given domain or domains are sufficiently detailed, to the extent that shared domain aspects are noticed, the apprehension of further structural similarity becomes more likely. Consequently, one prerequisite to the organic recognition of metaphorical similarity is the sufficiently detailed elaboration of relevant conceptual domains.

In the end, any theory of metaphor that hopes to reflect the totality of metaphorical understanding cannot ignore the fact that the spontaneous recognition of metaphorical similarity and the linguistic expression of conventional metaphor are two related but ultimately different matters. CFT will term this bifurcated view of metaphorical ontogenesis and propagation the Dual-Mode Instantiation Hypothesis.

Of course, in the context of individual cognition, organic recognition and artificial inducement are not separate, alternative cognitive strategies but rather mutually reinforcing processes that will often function in tandem. While certain types of metaphorical understanding may be recognized organically (in the absence of overt communicative cues) and other metaphorical expressions will be transmitted verbally, in either case, as the cognizer continues to reflect on perceived similarities or hypothesized mappings, the end result will be an increasingly detailed elaboration of connectivity within the conceptual system: artificial inducement spurs conceptual buildout in the mind of one person which in turn may lead to new insights (organic recognition) which can then be repurposed to induce metaphorical understanding in the minds of others.

With respect to conceptual metaphor's proliferation over historical time, it is through this individual recognition and interpersonal inducement cycle that the world's stock of apt metaphors accumulates. Consequently, despite metaphor's obvious linguistic value, the true benefit of using metaphor goes beyond the efficient transmission of situation-specific information; as metaphors are recognized and shared across sociolinguistic boundaries, humanity's collective store of useful figurative language insights is both expanded and enriched.

NOTES

1. Catachresis refers to the intentional juxtaposition of obviously mismatched words or phrases.
2. Lakoff and Turner, *More Than Cool Reason*, 114–15.
3. Ibid., 115.
4. Ibid., 116–17.
5. Ibid., 119.
6. The first mention of sound as a "wave" was in a passage on amphitheater construction principles by Roman Empire architect and engineer Vitruvius (Holyoak and Thagard, *Mental Leaps*, 10–11).
7. Cf. Holyoak and Thagard, *Mental Leaps*, 11–12.
8. Peter Ladefoged, *Vowels and Consonants: An Introduction to the Sound of Language* (Malden, MA: Blackwell, 2001), 6; cf. also Bear et al., *Neuroscience: Exploring*, 370–72.

9. *Oxford English Dictionary*, 2nd ed., s.v. "straw."
10. Ibid.
11. Derek Thompson, "The amazing history and the strange invention of the bendy straw," *The Atlantic*, Nov. 22, 2011, http://www.theatlantic.com/business/archive/2011/11/the-amazing-history-and-the-strange-invention-of-the-bendy-straw/248923/.
12. Walt Whitman, *The Works of Walt Whitman: The Collected Poetry* (New York: Funk and Wagnalls, 1968), 91.
13. *Oxford English Dictionary*, 2nd ed., s.v. "straw."
14. Carolyn B. Mervis, "Child Basic Categories and Early Lexical Development," in *Concepts and Conceptual Development*, edited by Ulric Neisser (Cambridge: Cambridge University Press, 1987).
15. Tomasello, *First Verbs*, 195–96.
16. Cf. Lakoff, *Women, Fire and Dangerous Things*, 49; Joseph E. Grady, "Foundations of meaning: Primary metaphors and primary scenes" (PhD diss., University of California, Berkeley, 1997).
17. Raymond W. Gibbs Jr., "Evaluating Conceptual Metaphor Theory," *Discourse Processes* 48, no. 8 (2011): 532.
18. Cf. Lakoff and Turner, *More Than Cool Reason*, 129.
19. Cf. Owen Barfield, *Poetic Diction* (Middletown: Wesleyan University Press, 1973), first published 1928 by Faber and Gwyer.
20. Cf. Richards, *Philosophy of Rhetoric*.
21. Cf. C. S. Lewis, *Studies in Words* (Cambridge: Cambridge University Press, 2013), first published 1960 by Cambridge University Press; cf. also C. S. Lewis, "Bluspels and Falanspheres: A Semantic Nightmare," in *Selected Literary Essays* (Cambridge: Cambridge University Press, 2013), first published 1969 by Cambridge University Press.
22. Jan Svanlund, "Metaphor and convention," *Cognitive Linguistics* 18, no. 1 (2007): 55.
23. Ibid., 47–89. Interestingly, these various terms taken together are reminiscent of the multiple criteria Giora uses to explain "salience." Cf. Giora, *On Our Mind*, 15–18.
24. E.g., Benjamin K. Bergen, "The psychological reality of phonaesthemes," *Language* 80, no. 2 (2004): 290–311.
25. Alice Deignan, *Metaphor and Corpus Linguistics* (Amsterdam: John Benjamins, 2005), 40.
26. To the extent that a language derives idiomatic expressions from games and sports (such as "poker face," "strong suit," "stack the deck," "show one's hand," "overplay one's hand," and "raise the ante" from card games like poker, and "curveball," "out in left field," "touch all the bases," "hit a home run," and "strike out" from baseball), fully understanding the metaphorical connotations of such phrases probably requires active participation in the popular modes of recreation from which they are derived.
27. Gibbs, "Evaluating Conceptual," 534.

28. For an extended discussion of conceptual processing issues including abstraction, compression, and reuse, cf. Barsalou, "Staying Grounded," 1122–28.

29. Richards, *Philosophy of Rhetoric*.

30. Aristotle, "Poetics," translated by W. Hamilton Fyfe, in *Aristotle: The Poetics, "Longinus" on the sublime, Demetrius on style*, 4–118 (Cambridge, MA: Harvard University Press, 1932).

31. Richards, *Philosophy of Rhetoric*, 89; italics added.

32. Aristotle, "Poetics," 90.

33. Dedre Gentner, "Are Scientific Metaphors Analogies?," in *Metaphor: Problems and Perspectives*, edited by David S. Miall, 106–32 (Brighton: Harvester Press, 1982).

34. Holyoak and Thagard, *Mental Leaps*, 186–88.

35. Such cases tend to involve an implied FOCUS domain being modified by salient aspects of an explicit FILTER domain.

36. Michel Bréal, *Semantics: Studies in the Science of Meaning*, translated by Nina Cust (New York: Dover, 1964), 122. Originally published as *Essai de sémantique: Science des significations*, 3rd ed. (Paris: Hachette, 1904).

37. Ibid.

38. Ibid., 131.

39. Euripides, "The Phoenician maidens," translated by Arthur S. Way, in *Euripides* 3 (Cambridge, MA: Harvard University Press, 1912), 359.

40. Ibid., 357, 359.

41. Ibid., 358.

42. *Oxford Dictionary of Modern Greek*, s.v. "μεταφέρω."

43. Bréal, *Semantics*, 120.

44. E.g., Svanlund, "Metaphor and Convention," 51.

45. Benjamin Franklin, *Benjamin Franklin's Experiments: A New Edition of Franklin's Experiments and Observations on Electricity*, edited by I. Bernard Cohen, (Cambridge: Harvard University Press, 1941), 107–109.

46. Ibid., 57–61.

47. Ibid., 111.

48. Ibid., 112.

49. Ibid., 100–103,113; cf. also Holyoak and Thagard, *Mental Leaps*, 185.

50. Holyoak and Thagard, *Mental Leaps*, 193.

51. Franklin, *Benjamin Franklin's Experiments*, 76–77, 112–13.

52. In fact, Dunbar and Fugelsang's detailed study of analogy in the field of science "found that scientists use both relational and superficial features when they make analogies" depending on whether the goal at hand is to formulate hypotheses or address experimentation problems. Cf. Kevin Dunbar and Jonathan Fugelsang, "Scientific Thinking and Reasoning," in *The Cambridge Handbook of Thinking and Reasoning*, edited by Keith Holyoak and Robert G. Morrison (Cambridge: Cambridge University Press, 2005), 714; cf. also Kevin Dunbar, "How scientists think in the real world: Implications for science education," *Journal of Applied Developmental Psychology* 21, no. 1 (2000): 49–58.

53. Holyoak and Thagard, *Mental Leaps*, 133.

54. In his essay "Ernst Mach," Einstein makes the case that scientific concepts should not be casually assented to but should rather be scrutinized and summarily replaced if models with greater explanatory power present themselves. Cf. Albert Einstein, "Ernst Mach," *Physikalische Zeitschrift* 17 (1916): 102.

55. Various types of painful swelling were considered to be causes rather than symptoms of illness. Eg., James Boswell, *Life of Johnson*, edited by R. W. Chapman (Oxford: Oxford University Press, 2008), 838, 1379.

56. David McCullough, *The Path Between the Seas* (New York: Touchstone, 1977), 142–43.

57. Thomas S. Kuhn, *The Structure of Scientific Revolutions*, 2nd ed. (Chicago: University of Chicago Press, 1970).

58. Boyd, "Metaphor and theory change," 486.

59. Ibid., 489.

60. Holyoak and Thagard, *Mental Leaps*, 10–11.

Conclusion

Invariance and Beyond

The stated goals of this book were to develop a theoretical framework that would both resolve some of the inconsistencies evident in Conceptual Metaphor Theory and cross-reference CMT with recent developments in neuroscience and psycholinguistics so as to more accurately account for the cognitive processes that facilitate the comprehension and production of metaphor and metonymy. While the idea of creating a 'grand unified theory' of figurative language processing was never considered, in retrospect, there appears to be a structure in place that might be elaborated upon to accommodate a somewhat broader range of conceptual and communicative phenomena.

Although unintended, the potential for Conceptual Filtering Theory to facilitate the analysis of cognitive phenomena beyond metonymy and metaphor should not be seen as accidental. If CFT is judged to have both internal coherence and broad explanatory power, it will be due in no small part to the fact that the principles undergirding metonymy and metaphor are so fundamental to cognition that even a modest attempt to accurately define them and characterize their roles in cognition must inevitably have implications for many seemingly unrelated aspects of thought and language.

Having said this, the ambitious scope of this volume (reflecting the great complexity of the neural system) makes it likely that the processing explanations proposed include a certain number of theoretical holes and inaccuracies, the nature of which I cannot even begin to guess. Resolving such issues will be a challenge for my own future research and for any who might attempt to confirm or follow up on certain aspects of this study. In any case, this Conclusion will attempt to summarize the main contributions of Conceptual Filtering

Theory, comment on CFT's relationship to Embodied Simulation theory, and offer a few brief closing observations on the likelihood that metaphor and metonymy, rather than being peripheral 'literary' phenomena, in fact play central roles in the facilitation of human cognition.

ON THE PRIMARY CONTRIBUTIONS OF CONCEPTUAL FILTERING THEORY

Figurative language processing is crucially influenced by genetically hard-coded sensory capabilities and the ways in which the inputs of sensory perception are stored for later recall. Because all sentient organisms incrementally update neural dispositions so that relevant aspects of the environment can be identified and responded to, the most fundamental aspects of Conceptual Filtering are not unique to humans. Having said this, because human conceptualization develops in tandem with language, language affords humans the ability to manipulate their own attention and the attention of others, more thoroughly comprehend their surroundings, and formulate sophisticated responses to complex social and environmental concerns. Consequently, the power of Conceptual Filtering with respect to figurative language processing results from the synergy observed between language and the conceptual base system, not the function of the base system itself.

Making use of the apparatus of sensory perception, activation patterns relating to new experiences both reinforce and incrementally update conceptual networks of entrenched neural dispositions distilled from previous experiences. Within this recognition system, metonymy represents the strategic leveraging of conceptual network structures while metaphor amounts to the elicitation of new insights by way of the identity-detection apparatus of sense perception. Consequently, because both metonymy and metaphor have no function apart from the conceptual system that facilitates them, they are not narrowly defined linguistic competencies but rather non-linguistic associational capacities that have been opportunistically coopted for use in language. As counterintuitive as it may sound, one of the foremost contributions of this linguistics-inspired and linguistics-oriented book may be the proposal that, because conceptualization rather than language is primary, the best way to understand language in cognitive terms is to examine it as an auxiliary aspect of cognition rather than as cognition's essential and most representative form.

With respect to the time-course of activation in a metaphoric statement's comprehension, CFT hypothesizes a 'mapping then matching' model that initially corresponds with the idea of unidirectional mapping as proposed by Conceptual Metaphor Theory but thereafter features a few crucial points of

departure. Specifically, the processing phases posited to account for metaphor in compact linguistic settings include First-pass Conceptual Filtering (accomplished as the results of salience-driven unidirectional mapping are disambiguated through the intervention of top-down contextual effects), Sustained Conceptual Filtering (an iterative mapping phase enabled through the application of effortful conscious attention), and Ongoing Conceptual Filtering (resting state processing). To the author's knowledge, the hypothesis that metaphor processing might be carried out in multiple partially overlapping phases has never before been proposed.

In the mapping phase of First-pass conceptual filtering, the FOCUS domain of the metaphor is projected through the FILTER domain thus activating a partially subtractive combination of domain elements. Even as the timing offset of stimulus presentation in First-pass filtering results in peak semantic response among covalent aspects, unshared aspects of the FOCUS domain are filtered out. Because the salience selection stage of this initial First-pass filtering phase (completed in perhaps the first 400 ms after FILTER stimulus onset[1]) 'sets the terms of debate' for the ensuing stage of processing, this unidirectional feed-forward mapping phase (formulaically expressed as FOCUS THROUGH FILTER) constrains metaphor processing in a way similar to that proposed by Lakoff's Invariance Hypothesis, although CFT posits subsequent processing phases less influenced by Invariance. While the practical advantages of positing a unidirectional mapping phase have been provisionally confirmed over the years through practical application in scores of CMT-inspired research projects, CFT's detailed explanation of how specific inferencing results are achieved through the sequential presentation of stimuli probably represents the most interdisciplinary and thoroughly cross-verified theoretical defense of the idea of unidirectional mapping to date.

Disambiguation through the application of contextual effects likely occurs globally across multiple modalities in the brain's left hemisphere sometime between 400 and 1000 ms from FILTER stimulus onset.[2] As contextual cues spur goal-oriented processing through top-down multimodal suppression, activation levels in lines of inferencing that conflict with the achievement of such entertained goals are dampened with the result that only salient inferencing options that harmonize with explicit or implicit goals remain in an excitatory state. While the idea that metaphors often need to be disambiguated in light of context is not new, the hypothesis that global top-down contextual effects eliminate the influence of non-goal-oriented lines of metaphoric and metonymic inferencing by way of verbally cued suppression routines is an original contribution in the area of metaphor research.[3]

When no obvious interpretation is immediately forthcoming by way of salience-based conceptual filtering, there are alternative resolution processes

available. Processing gradually begins to segue from the mostly unconscious First-pass inferencing phase to a conscious attention–based phase of processing at some time before 1000 ms. Sustained Conceptual Filtering reflects the role played by conscious directed attention in metaphor processing. This late-unfolding strategy is the result of conscious effort to actively attend to phonetic access points associated with covalent FOCUS domain elements or novel FILTER domain elements so as to bring the activation levels of additional undetected domain elements up to the threshold of conscious attention.

Sustained filtering activates mapping in an iterative manner by using inner speech as a relay station. Because of neural resource depletion and the fact that activation pathways necessarily vary at the microscopic level, cascading activation patterns will naturally flow in unpredictable ways, thereby gradually leading to unfocused processing that generates ever greater numbers of increasingly less salient inferencing outcomes. Simultaneously, this recursive process gradually strengthens links between conjunctive FOCUS domain elements and FILTER domain elements, this gradually emerging mutual calibration resulting in a vague apprehension of bidirectional association. Within this explanation, both the observation that inferencing results come to conscious attention by way of inner speech and the related hypothesis that effortful sustained attention is facilitated by way of inner speech are ideas that have never before been proposed with respect to metaphor inferencing.

Following unsuccessful attempts to elicit links between disparate metaphorical domains by way of the First-pass and Sustained Conceptual Filtering phases, resting brain-state Ongoing Conceptual Filtering (afterthought) accounts for the ways in which inferencing results break the surface of conscious attention at unexpected moments long after directed mental effort has been curtailed. With ample anecdotal evidence pointing to the decisive influence of afterthought in stimulating novel scientific discoveries, the possibility that such insights might be generated passively during resting brain-state conditions seems likely. The recruitment of RH capabilities in Ongoing Conceptual Filtering during afterthought allows correlations between highly complex or semantically distant domains to be identified.

Aside from offering a practical account of how metaphor and metonymy are processed, another valuable contribution of CFT is its demonstration of how global contextual effects exert top-down influence on language and other aspects of conceptual processing. Citing evidence for context-oriented suppression routines functioning in a top-down, coordinated manner in multiple sensory modalities, CFT hypothesizes that contextual disambiguation occurs relatively late in the information processing stream precisely because such endogenous mechanisms can only suppress non-goal-oriented salient lines of inferencing after salient options have been generated. Contextual effects

rapidly intervene to shape more generic activation patterns so that current situational awareness and behavior will offer the greatest chance of responding to the needs of the moment.

In linking top-down endogenous attention to contextual disambiguation in language processing, a heretofore unelaborated point of contact has been established between semantics and pragmatics. In redefining Relevance in terms of goal orientation (as opposed to communicative intentionality), CFT has broadened the explanatory potential of Relevance Theory and clarified its relationship to conceptualization so that its claims may be empirically investigated. Additionally, by linking Fillmore's explanation of frames to the activation of top-down contextual effects, this volume has not only detailed why framing is such an effective rhetorical technique but has also redefined framing in a way that differentiates it from run-of-the-mill conceptual processing.

Echoing and amplifying the ideas of Lakoff and Turner,[4] the impression that some words are unambiguously 'literal' was characterized as a very convincing mirage. In particular, an effort was made to expose the flawed logic behind the pervasive belief that the absence of obvious figurative connotation in a particular word somehow signifies the presence of semantic precision; the fact that the metaphorical motivations undergirding a wide range of conventional expressions are not commonly perceived shows metaphor to be no different from a variety of other cognitive functions that are processed largely outside the scope of conscious awareness.

Moreover, it was asserted that while failure to recognize dead metaphor in one's own everyday language is no certain proof that metaphoric mappings are not active at a subconscious level, a dogged unwillingness to acknowledge alternative senses apart from those commonly perceived as being literal may amount to a consciously implemented type of figurative sense suppression. When language users valorize the literality of their own terminology by portraying metaphor as fundamentally aberrant or regrettably poetic, they run the risk of becoming insensitive to the fact that many apparently literal terms can trace their etymological origins back to explicitly metaphorical language.

CFT posits the elaboration and continuing development of conceptual domains in human cognition to be occurring through two types of instantiation: artificial inducement and organic recognition. Specifically, this Dual-mode Instantiation Hypothesis explains artificial inducement as the directed (usually verbal) elicitation of metaphorical understanding while organic recognition is characterized as the spontaneous awakening of metaphorical insight that occurs once the conceptual buildout of domain details has become replete enough to spur noticing. While CFT distinguishes these two modes of metaphor instantiation and propagation, artificial inducement and organic recognition should not be seen as competing alternative metaphorical processes but

rather as mutually reinforcing phenomena that work in tandem to augment conceptualization and enhance the brain's integrative capacities. CFT's emphasis on the need to distinguish the organic recognition of metaphor from its artificial inducement by way of language is an attempt to remedy a longstanding shortcoming of metaphor theory: the inability to recognize metaphoric creativity as one of the driving forces behind the proliferation of literal language through the gradual accretion of conventionalized metaphorical terms.

ON EMBODIED SIMULATION

One question that remains to be addressed is how CFT relates to Embodied Simulation.[5] The short (and perhaps oversimplified) answer is that the CFT and Embodied Simulation perspectives seem to be two legitimate ways of interpreting the same data. For this reason, the growing body of evidence to support the general idea that Embodied Simulation plays a key role in cognition is encouraging because such findings augment CFT views concerning the precise ways in which certain contextually cued aspects of conceptualization interface with relatively volitional aspects of the visual and motor systems, in particular.[6] Having said this, Embodied Simulation research has little to say about the earliest phases of linguistic comprehension. CFT, because it represents an attempt to account for the entire inferencing chain from initial perception to comprehension to embodied response, offers a 'big picture' view of mental processing that Embodied Simulation can surely contribute to but cannot wholly replace.

Whereas CFT stresses conceptual structures and networks to be the primary building blocks of cognition and sees language as a crucial way of manipulating concepts to accomplish rational and communicative purposes, Embodied Simulation is more of an account of how a broad variety of modalities of sense perception and memory are synergistically bound together so as to allow sentient organisms to anticipate and successfully navigate challenges in the environment. In this sense, Embodied Simulation seems closely related to goal orientations and contextual effects.

To the extent that Embodied Simulation theories are not exclusively dependent on language but may be used to describe non-linguistic aspects of cognition that enhance behavioral performance[7] and allow impending actions to be imagistically premeditated,[8] Embodied Simulation is unlikely to prove a mental strategy utilized solely by humans. On the other hand, because the facilitation of metonymic and metaphoric conceptual processing often depends on the manipulation of language, CFT seems to illuminate aspects of cognition that are more or less unique to *homo sapiens*.

Why is language such a valuable add-on to Embodied Simulation? Judging from the ample extant research on the nature of conceptualization and also from certain CFT-related ideas mentioned in preceding chapters, there would appear to be (at least) two reasons that linguistic ability allows humans to utilize their genetically endowed Embodied Simulation skill set in ways unimaginable to other species.

First, language allows for particular ideas to be differentiated and concentrated on in sustained ways. Lexical recall offers a real-time strategy for leveraging attention away from the tyranny of the situated present so as to incline attention toward abstract ideas and other linguistically partitioned mental phenomena, thus freeing up the ability for 'rational' thought. There are a number of ways this may be accomplished. Written language allows one to recreate verbal performances that lead successively from one given brain state to another so as to achieve some hoped for mental outcome. Spoken language allows conversants to artificially attend to the inferred brain states of others. Recalling words to mind by way of inner speech allows one to attune one's own mind to relevant episodes in previous experience. While these behaviors may be said to exemplify slightly different types of language-enhanced attention, in each case the manipulation of linguistic attention depends on or stimulates embodied simulations of one sort or another. Whether rehearsing verbal performances, attempting to infer the likely reactions of others, or remembering patterns observed in previous experiences, the ability to verbally characterize the typical flow of a particular event or lexically cue the mental rehearsal of a given kinesthetically learned repertoire affords the cognizer the ability not only to react but to evaluate possible actions and closely calibrate responses to match the needs of the moment.

Second, by way of figurative processes like metaphor, language goes beyond simple factual information exchange by affording the discovery and imagistic communication of non-obvious similarities between otherwise unlike agents and entities in the real world. In some cases, this amounts to an almost magical ability to intuit the nature or inner workings of a natural or social phenomenon without having direct experience with the aspect of that phenomenon being considered. Extrapolation efforts of this kind will often depend on various types of mental simulation. For example, without the ability to mentally recreate the fleeting impression caused by lightning, the realization that electricity and lightning are two formally different reflections of the same natural phenomenon would not have been possible. In fact, both an individual's ability to recognize such commonalities between disparate phenomena and the ability to impart them to others crucially rely on simulation. At its most basic, education is nothing if not a highly ritualized, socially sanctioned form of artificially induced simulation.

In retrospect, the consistent falterings of metaphor research over the last few decades may partially be attributed to researcher preoccupation with the inferencing of compact metaphorical statements. While a valuable subject of inquiry in and of itself, excessive concentration on this topic seems to have kept metaphor theoreticians from being able to distinguish spontaneous metaphorical awareness from linguistically induced metaphorical understanding. Consequently, while explaining the inferencing details of compact phrase-level propositions was a stated objective of this book, if one gives proper weight to the fact that it is conceptualization which guides language and not vice-versa, it would appear that examining the time-course of linguistic metaphor processing has offered important hints about how to 'decode' metaphorical language but tells researchers very little about how metaphor really works and the extent to which it facilitates cognition. In the end, arguing over syntactic and grammatical minutiae and their correlation to processing time differentials while completely ignoring the basic neural architectures and strategies that underpin general cognition represents a less than ideal way to approach a very complicated topic. Due to the fact that conceptualization is neither primarily linguistic nor essentially communicative, it seems fair to assert that, so long as the study of metaphor and metonymy is considered a sub-category of linguistics, the full range and value of both phenomena will continue to be underestimated.

Additionally, there is the problem of recognition. Because figurative language processing is a subjective meaning-oriented mental phenomenon, the results of processing seem intuitively obvious to the individual apprehending them even as the processing details that determine such results lie (tantalizingly) just out of reach. Consequently, when figurative language is noticed, it strikes one as a rather distracting ornamental flourish. On the other hand, when figurative language fails to attract attention, its relative invisibility belies the crucial role it plays. Taking these two observations together, we find that the efficacy of metaphor and metonymy in thought and language often has little to do with the relative strength of the impressions received from them. It is precisely for this reason that conceptual science is a discipline that cannot be based solely upon spontaneous insights and fleeting impressions; while metonymy and metaphor may seem like peripheral linguistic phenomena, in reality they may turn out to be two fundamental building blocks not only of language but of cognition in general. Insofar as some of the most distinctive aspects of human cognition would be impossible without the contribution of these two basic conceptualization strategies, a balanced appraisal of figurative language processing can only be accomplished if investigation proceeds *from the ground up*.

NOTES

1. Cf. Rubio-Fernández, "Concept narrowing," 394.
2. Ibid. Cf. also Rubio-Fernández, "Suppression in metaphor."
3. While the research of Rubio-Fernández is a definite precursor with respect to the decisive role of suppression in the contextual disambiguation of metaphor, CFT represents the first time that a detailed explanation of salience filtering has been coupled with the idea of top-down global contextual effects to explain the overall outcomes of figurative language processing. Cf. Rubio-Fernández, "Suppression in metaphor."
4. Lakoff and Turner, *More Than Cool Reason*, 116–19.
5. E.g., Rolf A. Zwaan, "Situation models, mental simulations, and abstract concepts in discourse comprehension," *Psychonomic Bulletin and Review* 23, no. 4 (2016): 1028–34.
6. Tomasino and Rumiati, "At the mercy," 7.
7. Benjamin K. Bergen, *Louder than Words: The New Science of How the Mind Makes Meaning* (New York: Basic Books, 2012), 76.
8. Raymond W. Gibbs, Jr., *Metaphor Wars: Conceptual Metaphors in Human Life* (Cambridge: Cambridge University Press, 2017), 201–03.

Glossary

Anthropocentric Entailment Effects. HUMAN domain-oriented processing biases. Due to the fact that metaphors relating to human concerns tend to be processed as HUMAN THROUGH NON-HUMAN, over time, consistently metaphorized NON-HUMAN domains become disproportionately elaborated in ways that reflect maximal human interest.

Applicability. The situation in which incoming activation patterns from stimuli elicit a heightened response in a particular neural parameter or conceptual node. In metaphor, the presence of nodes in the FILTER domain that overlap with corresponding nodes in the FOCUS domain.

Artificial Inducement. A mode of metaphor instantiation in which analogous aspects of differing conceptual domains are elicited to conscious attention by way of language or some other form of intentional communication. (Artificial inducement is one of two instantiation modes posited by the Dual-Mode Instantiation Hypothesis.)

Binding. The associative connections that facilitate mutual access between domain elements in a single conceptual domain. The neural processes that establish such links.

Catachresis. The willful juxtaposition of obviously mismatched words or phrases.

Concepts. Multimodal sets of networked neural dispositions derived from the accretion of somatosensory and other experiential inputs. Concepts are not propositional factual assumptions but rather partially accessible emergent states of neural networks.

Conceptual Domain. An associated set of conceptual aspects bound to a particular lexical item or some other type of perceptually discriminable point of access.

Conceptual Filtering Theory (CFT). A theory of conceptual formation, leveraging, integration, and communicative transmission that posits single-domain conceptual association to undergird metonymy and cross-domain mappings to facilitate metaphor.

Contextual Effects. The complex changes that result when perceived cues globally reweight the conceptual system in anticipation of future goal attainment-related stimuli. Contextual cues may or may not be propositional but the effects they produce are non-propositional and multimodal.

Covalent Nodes. Groups of neurons related to conceptual aspects that are shared by two differing conceptual domains.

Discourse level metaphor. A type of extended metaphor in which multiple inferences from the FILTER domain are diffused to give thematic unity to a text and enhance its narrative coherence.

Domain elaboration. The extent to which the multimodal details of conceptualization associated with a given conceptual domain have been developed through lived experience or informative communication.

Dual-Mode Instantiation Hypothesis. A proposal concerning the development of human analogical reasoning capabilities that asserts two modes of metaphor ontogenesis and propagation within the conceptual system: spontaneous realization of analogous details by way of sense perception (organic recognition) and cued elicitation of metaphor as a result of communicative intent (artificial inducement).

Extended metaphor. A type of metaphor in which multiple entailments are expressed and sustained over an extended discourse.

FILTER domain. In metaphor, a domain which filters out non-shared aspects of the FOCUS domain thus causing metaphorical entailments to become available to conscious attention.

First-pass Conceptual Filtering. In metaphor processing, a unidirectional mapping phase in which the salient results generated by conceptual projection are disambiguated through the intervention of top-down contextual effects.

FOCUS domain. In metaphor, the topic domain which is projected through the FILTER domain so as to make metaphorical entailments available to conscious attention.

Frame. A correlated group of conceptual domains, kinesthetic routines, and situational dispositions associated with a goal-oriented behavior sufficient to align global cognition with task-set specific contextual effects when cued.

Framing. The conscious or unconscious linking of domain aspects to goal orientations or behavioral routines so as to cue the activation of top-down contextual effects and thereby suppress otherwise salient but contextually antagonistic lines of inferencing.

Homunculus Problem. In the philosophical tradition, invalid appeals to the existence of 'little people' (homunculi) within the human mind that purportedly carry out certain difficult to account for mental operations. With respect to the question of how metaphor inferencing is practically accomplished, the criticism that certain metaphor theories use technical jargon to disguise their lack of specific proposals for how feature attribution occurs.

Image schemas. Experience-enhanced fundamental patterns of neural association. Non-propositional, analog mental structures that are posited to organize somatosensory experiences and coordinate complex sensorimotor responses mostly outside of conscious awareness. In handling routinized aspects of perception and behavior, the function of these experience-attuned neural processing elements frees up conscious attention to execute more directed types of mental activity. One strong candidate for image schematic status is the Medial Superior Temporal's role in the visual detection of circular motion phenomena (cf. discussion of MST in Chapter 4).

Inner Speech. Lexeme-associated phonetic images in the sub-vocal rehearsal system of Broca's area that 'echo' into conscious awareness when stimulated.

Irony. The dissonance perceived when conceptually derived salient meanings fail to harmonize with cued contextual background information.

Mapping. In neuroscience, the unidirectional correlated projection of activation patterns. With respect to metaphor processing, the serial activation of the correlated results of somatotopic projections. Mapping should be distinguished from binding (the entrenchment of neural connections between associated elements) and spreading activation (a basic type of diffused activation typical of such associative connections). Well-attested types of neural mapping include "priority maps" and "saliency maps" and are exemplified by retinotopy in visual processing.

Metaphor. A phenomenon comprising the various comparison-oriented cognitive strategies that facilitate a broad range of analogical thought. In CFT parlance, the temporary hybrid conceptual state produced when a primary topic of inquiry (the FOCUS domain) is differentially processed through an unrelated domain (the FILTER domain).

Metonymic binding. A type of neural association that may be leveraged to draw attention to a particular aspect of a conceptual domain through the stimulation of an associated aspect within the same domain.

Metonymy. A technique for leveraging attention towards one aspect of a single conceptual domain by drawing attention to another closely associated aspect of the same domain.

Neural Node. A group of neurons at a point of intersection within a conceptual network that accomplishes their function as a population rather than by way of the targeted activation of individual neurons.

Ongoing Conceptual Filtering (afterthought). In metaphor processing, right hemisphere–inclusive resting-state brain activity that results in spontaneous analogical insights by way of diffused rather than focused attention.

Organic recognition. A mode of metaphor instantiation in which analogous aspects of differing conceptual domains are spontaneously intuited either through sense perception or by way of mental simulation after conceptual buildout. (Organic recognition is one of two instantiation modes posited by the Dual-Mode Instantiation Hypothesis.)

Priming (psychological). A facilitation effect resulting in faster-than-normal response time.

Salience. The strongly reinforced condition of neural activation pathways stemming from conventionality, frequency, familiarity, and prototypicality and resulting in relatively faster processing.

Scientific analogy. An overt analogical comparison in which a relatively unknown FOCUS domain is likened to a relatively known FILTER domain for the purpose of hypothesizing and then verifying properties of the FOCUS domain based on observed properties of the FILTER domain.

Sustained Conceptual Filtering. In metaphor processing, an iterative mapping phase enabled through the application of effortful conscious attention.

Temporary hybrid conceptual state. In response to internal thought processes or the perception of outside stimuli, a permutation of heightened conceptual activity sufficient to capture the focus of attention. Awareness of 'meaning.'

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