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On Reversing the Topics and Vehicles of Metaphor

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Class inclusion theory asserts that one cannot reverse the topic and vehicle of a metaphor and produce a new, meaningful metaphor that is based on the same interpretive ground. In 2 experiments we test that claim. In Study 1 we replicate the procedures employed by Glucksberg, McGlone, & Manfredi (1997) that provided support for the assertion. However we now add experimental conditions in which the target metaphors, either with the topic and vehicle in its canonical order or reversed, are placed in discourse contexts that provide support for a meaningful interpretation based on the same ground. In contrast to the prediction of class inclusion theory, fully 72% of the cases the reversed metaphors were rated as interpretable and interpretation was based on the same ground used in interpreting the metaphors in their canonical order. In Study 2, the online processing of the metaphors in context are examined in a word-by-word reading task. We find that canonical and reversed order metaphors were read at the same rate throughout and both sets exhibited the same reading patterns: increased reading time of the noun-phrase (NP) that contains the metaphoric vehicle and of the first word in the text that follows the metaphor. We take these data to indicate that nonreversibility cannot be taken as a necessary condition of metaphor.

In a metaphor, the meaning of one concept (the vehicle or source) is used to inform or create the meaning attributed to a second concept (the topic or target). As such, meaning could be transferred to the topic that might not be considered when the topic is presented by itself. Thus in the nominal metaphor, *my job is a jail*, the vehi-

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cle ("jail") provides characteristics such as "confining," "punitive," and "isolating" that might not otherwise be salient to the concept of "job".

Metaphor is perceived as being characteristically directional or asymmetrical, inasmuch as there is a canonical order or preference for one concept to play the role of metaphoric topic and the other the role of metaphoric vehicle. Consequently the received wisdom is that reversing the topic and vehicle terms (e.g., "*my jail is a job*") will produce items that are either meaningless or produce a metaphor in which quite a different set of meaningful characteristics have been made salient. For instance in the reversed metaphor, characteristics of "jobs," such as "boring," "poorly-paying," and "frustrating" might be appropriate characteristics to apply to the concept of "jails."

ASYMMETRY AND THEORIES OF METAPHOR UNDERSTANDING

Virtually all theorists of metaphor comprehension have attempted to explain the asymmetry of metaphor as a consequence of the basic theoretical principles they espouse. Within psychology, the directionality issue was brought to the fore by Andrew Ortony (e.g., Ortony, 1979; Ortony, Vondruska, Foss, & Jones, 1985) who claimed that asymmetry is especially problematic to the then-major psychological processing models of metaphor. These models were based on finding a similarity shared by topic and vehicle. For instance, in Malgady and Johnson (1980) it is argued that a set of features shared by topic and vehicle emerge from comparing feature lists elicited by topic and vehicle. In Levin (1977) it is argued that a set of common features results from a process wherein features of the vehicle incompatible with features of the literal sense of the topic are cancelled. Ortony rightfully pointed out that such theories would lead to the prediction that because the same set of features are employed as the means of interpreting metaphor of the form "an A is a B" as in "a B is an A," neither sentential anomaly nor a change in meaning should result by reversing topic and vehicle.

Ortony (1979) proposed that one could maintain the similarity-based comparison assumption but still obtain topic-vehicle asymmetry by assuming further that in metaphor (but not with literal statements) comprehension occurs by finding a highly salient or accessible feature of the vehicle which is a nonsalient or accessible feature of the topic. That is, a feature common to topic and vehicle is found but has a different status in the topic and vehicle concept. This so-called salience imbalance theory, as in other comparison theories of metaphor comprehension, cannot explain how feature attribution (rather than mere shared feature identification) occurs and has difficulty in explaining a set of empirical findings, such as failures to find that salient imbalance is unique to metaphor (e.g., Shen, 1989).

Despite the problems with Ortony's specific theory, his emphasis on explaining the asymmetry in meaning created by reversing topic and vehicle within a cohesive theoretical framework has been adopted by all subsequent researchers. Some (e.g., Shen & Cohen,1998) posit a basic conceptual constraint in which it is more natural to map from a highly accessible concept to a less accessible one than it is to map its inverse. Proponents of conceptual metaphor argue also that directionality is an inherent aspect of their model. As Kövecses (2002) puts it: "The metaphorical process typically goes from the more concrete to the more abstract but not the other way around" (p. 6). Thus the canonical order tends to have concrete vehicles and more abstract topics; we compare "theories" to "buildings" or "ideas" to "food" and not the reverse (see Katz, 1989). Indeed, Kövecses argues that when a reversal leads to meaningful metaphors they tend to be "literary or formal" (p. 25) and not everyday expressions. In a related vein, Chiappe, Kennedy, and Smykowski (2003) argue that reversals play different pragmatic roles when two concepts are compared as a simile (e.g., *my job is like a jail*) than as a metaphor. They observed that reversing the metaphoric version of the comparison led to a decrease in comprehensibility ratings and "were also more likely to be regarded as uninterpretable, were more likely to retain their original interpretation than reversed similes" (p. 98). They argue that this difference is due to the fact that metaphor and similes have different pragmatic functions, with similes inviting one to employ a search for comparisons whereas metaphor invites one to find a categorical relation.

METAPHOR AS CATEGORIZATION

The point made by Chiappe et al. (2003) that metaphor comprehension involves a categorization process echoed a theoretical argument made earlier by Glucksberg and Keysar (1990) and elaborated by Glucksberg (2001). Glucksberg and his associates proposed that metaphors should be understood in terms of what they assert, namely as class inclusion statements. In essence, they argue that in understanding a metaphor such as "*my job is a jail*" one proceeds in a manner analogous to what one does in understanding "my cousin is a barber": situating the topic as a member of a superordinate category. Unlike so-called literal statements, in which classification is fairly direct, with metaphor the vehicle term is used to allude to the nature of this category. That is in the job–jail example the vehicle term would stand for an ad hoc category that has features such as "confining, punitive, isolating." The later elaboration of this theory proposed that identification and the appropriateness of the ad hoc category is based on the degree to which the vehicle term is a prototypical exemplar of these features and the degree to which the category is consistent with dimensions of relevance suggested by the topic (for instance salient aspects of one's job include, in addition to characteristics such as financial re-

wards, characteristics such as flexibility of workload, freedom from supervisory control and the like, all of which are dimensions relevant to certain aspects of life in a jail).

Of especial interest to the position that we will advance presently, Glucksberg and Keysar (1990) argued that reversing topic and vehicle from its preferred or canonical order does not merely lead to asymmetry in meaning. They argued instead that, as is the case with literally true class assertion statements, *one cannot reverse the topic and vehicle and still maintain the same grounds for interpretation.* That is, whereas a given instance (such as the concept "robin") inherits the features of a superordinate category (e.g., birds) the opposite is not true (features of robins are not necessarily true of, or applicable to, birds in general). The same logic, they argue, is true of metaphor considered as class inclusion statements. Thus, on this basis, the directionality in metaphor is an inescapable consequence of categorization: violation of the exemplar-category hierarchical structure means that metaphor cannot be reversed and still be meaningful in the same way.

Glucksberg and his colleagues argue that meaningful reversals, when they appear to occur, are due to one of two factors: first, the reversal is actually re-reversed mentally back to the canonical "A is a B" order or , second, the reversed vehicle (when constrained by dimensions suggested by the topic) elicits an appropriate category but a category different than that identified in the canonical case. As an example of this latter case, a metaphor such as *"My butcher is a surgeon"* is typically understood as being a positive comparison whereas the reversal, *"my surgeon is a butcher,"* is not only an apt metaphor but one based on a very different set of features, now negative ones. In summary, according to this theory, one cannot reverse a metaphor and get a meaningful statement based on the same interpretative ground: reversing topic and vehicle concepts will only produce anomaly, re-reversals, or, in some cases, meaningful metaphors but based on a different ground.

Glucksberg et al. (1997) tested the reversibility implications of class inclusion theory. In this study, participants were asked to read a set of sentences, rate each sentence on a 8-point understandability scale and, of greatest theoretical importance, then were asked to paraphrase what they thought each sentence meant. To measure reversibility, one half of their participants were presented with nominal metaphors in their canonical order ("A is a B") whereas the other half of the participants received the same concepts but now reversed ("B is an A"). Naturally, within any list half of the critical items were in the canonical and half in the reversed order. The findings were completely consistent with predictions of the theory. Reversed items were rated as less understandable and analysis of the paraphrases of the reversed items revealed that most reversals were either re-reversed or were anomalous. When a sensible reversal occurred, the paraphrase indicated that it was understood according to a different set of features. The aim of the research reported here is to examine the reversibility prediction in more depth.

METAPHOR COMPREHENSION AND THE ROLE OF DISCOURSE CONTEXT

Although the data presented by Glucksberg et al. (1997) is a strong confirmation of class inclusion theory, one can question the generalizability of these findings to the more ecologically valid situation in which metaphors are encountered in everyday speech, namely as embedded within a discourse context. Glucksberg et al., as do most metaphor researchers, employed as stimuli metaphors presented out of any context. In everyday use, one rarely finds a decontextualized metaphor and, moreover, in many cases the metaphoric sense only emerges due to the context. Consider sentences such as: "The countryside is being overrun by insects" or "Sam is a pig." In both cases one cannot determine whether the descriptions are metaphorical or not. Sam might be literally true as the name of a pet pig or used metaphorically to describe a person considered rude, dirty, disrespectful, or possessing other negative attributes. Similarly the countryside may be overrun literally by ants or, as learned once on a trip to Cornwall, England, the term "ants" could be used to describe an influx of people considered too numerous, pesky, and unwelcome (i.e., tourists). In either case, the metaphorical sense emerges as a consequence of processing within a discourse or cultural context, an observation made over 20 years ago by McCabe (1983). She observed that the rated quality of a metaphor presented within a discourse context was unrelated to that same metaphor presented out-of-context. In the latter case, but not when presented in a discourse context, metaphor quality was related to how similar the topic and vehicle were rated. Although McCabe did not explicitly examine reversals of topic and vehicle, her findings strongly suggest that information elicited by context is important in determining which semantic characteristics will be used to create metaphoric understanding and, in principle, metaphors that are directional when presented out of context may not be directional, asymmetric, or nonreversible when placed within a discourse context.

There is by now a substantial literature on the effects that discourse context (e.g., see Gibbs, 1994) and a growing literature on the effects of social and cultural context (e.g., Katz & Pexman, 1997; Pexman, Ferretti, & Katz, 2000) plays in metaphor comprehension. Among the most celebrated findings is that the metaphors presented out of context are processed more slowly than appropriate literal sentence controls whereas the same items presented within a discourse context are processed often at the same rate (see Giora, 2003 and Glucksberg, 2001 for reviews). These and other data have been taken as evidence that metaphor processing does not depend on an obligatory stage of literal meaning analysis before one can access a metaphoric sense. Information presented in the discourse provides for metaphoric interpretation of a given statement at the earliest moments of processing, even for "poor" or difficult to understand metaphors (see Gildea & Glucksberg, 1983)

The previous review of the literature suggests two arguably incompatible sets of findings. On the one hand, we have literature that argues that topic–vehicle directionality is an essential characteristic of metaphor. Reversing topic and vehicle, it has been argued, leads to an item that is at best not as apt and at worst anomalous. Class inclusion theory even posits that metaphor are by nature nonreversible: Even if a reversal produces an acceptable metaphor it does so by evoking a different interpretative ground in the two cases. On the other hand, we have a corpus of findings indicating that, with context, metaphoric meaning can be automatically and immediately accessed, even for items that are poor or difficult to interpret when presented out of context. These latter findings suggest that with an appropriate context, one should be able to reverse topic and vehicle and produce acceptable metaphors that, *in both cases,* are based on the same interpretative ground, in contrast to the strong version of class inclusion theory which claims that cannot occur. We test these contrasting predictions in two studies.

In Study 1, we replicate the important study of Glucksberg et al. (1997) but add conditions in which the same items (in their original and in their reversed orders) are placed within a discourse context. According to class inclusion theory, even when reversals do occur, they will not be based on the same interpretive basis in the two cases. However, if metaphor processing is driven by the same processes that govern processing of any sentence within context, there is no reason to expect that nonreversibility should be created when the preferred order of topic and vehicle is altered, if the context invites use of the same interpretative grounds. To anticipate the findings slightly, we find support that we take to show that one can reverse metaphor and still base one's interpretation on the same interpretative ground. In study 2, we extend these findings to an online reading task. We examine whether one has greater difficulty reading the vehicle term of a metaphor when it is in its reversed compared to its canonical form (as predicted by class inclusion theory) or whether there is no difference in reading the vehicle whether reversed or not (as suggested by the alternative approach that metaphor comprehension is guided by information made available by the preceding context).

STUDY 1

Method

Participants. One hundred and ten undergraduates (58 females, 52 males) from the University of Western Ontario participated in this study. There were four sets of items, with 26 to 30 people tested on any one set.

Materials and Procedure. Twenty-four target metaphors were used in this study. Since the aim was to mirror the materials and stimuli employed by

Glucksberg et al. (1997) as closely as possible to the items chosen for inclusion, the rating scale for understandability and the scoring of the paraphrases here were all similar to those employed in that study. The target items consisted of 24 nominal metaphors selected from the pool used by Glucksberg et al.; 12 in their canonical order (as determined by Glucksberg et al.) and 12 in the reversed order. We also employed the same 8-point rating scale in which a score of 0 indicated a statement made "no sense" at all and a score of 7 indicated that the participant believed the statement made "perfect sense." Finally we employed a scoring scheme for the paraphrases of the reversed items taken from Glucksberg and associates. Discussion of scoring will be deferred until the results section.

Participants were given one of four booklets to complete. In two of the booklets the set of target items were metaphors presented without context whereas in the other two booklets the same target items were embedded in a short discourse context. Each booklet consisted of 12 target metaphors, half of which were in the original or canonical order whereas the other half were the reversals of the other 12 metaphors. Thus a person never saw the same two concepts compared in its original and reversed order. For instance, the metaphor, "*Chronic crime is a disease*" if in one booklet, its reversal, "*Disease is chronic crime*" would be in another. Each page of each booklet consisted of an item, followed by a rating scale, followed by space for the participant to write their paraphrase of the target item. The target item was always in bold face. In addition to the target items, there were pages in each booklet consisting of filler items, that is, literal or nonsensical items of the form "an A is a B," as was also done in Glucksberg et al. (1997). For these items the same rating and paraphrasing tasks were demanded. To try to ensure participants understood the tasks, each of the four booklets also contained four "practice items" similar to what would be encountered in the main task.

For the two booklets in which the items were placed in context, the discourse was written so as to invite use of the same features to interpret the metaphor. That is, the two authors analyzed each metaphor in its canonical "A is a B" order. For instance, the salient characteristics of the vehicle "disease" (as constrained by the concept "chronic crime") would be features such as "widespread," "invasive," and "dangerous." We then wrote two passages in which those features, while never explicitly used in discourse, were suggested. To use the disease–crime example again, in one passage the topic of the short passage would be about disease (and for the vehicle about crime) whereas in the other, the topic would be crime and the vehicle disease. Example passages are as follows:

> Sam had spent 17 years as a police chief. Over those years he had dedicated himself in trying to find ways to bring crime rates down. He had made it his mission to try and put a stop to repeat offenders. It seemed to be a losing battle though. Nothing he did seem to help. *Chronic crime is a disease.* Sam was getting ready for retirement.

> Sam had spent 17 years as a police chief. Over the years he had dedicated himself in trying to find ways to bring the crime rate down. He was never able to do it though. And now he has to retire because of lung cancer. He has undergone chemo and radiation, everything, and the cancer won't go away. He thought to himself, *The disease is chronic crime.* Sam was getting ready for retirement.

Participants were instructed to read each passage provided (in the context groups) or each sentence (in the no-context groups) and, on completion, were asked to rate how understandable they found the target sentence to be on the 0–7 understandability rating scale. In the context groups, participants were explicitly instructed to rate the understandability of the target sentence and not of the entire passage. After the participants had rated the statement, they were asked to write down what they thought that particular statement meant.

Results and Discussion

Recall that the participants in this study were asked to do two tasks: First, rate the metaphor on an understandability scale and, second, to paraphrase what they thought each metaphor was conveying. Each task is analyzed and is reported separately. The results are organized as follows: First there is a section on scoring and coding, followed by analysis of the participants paraphrases. The paraphrase analysis determined whether or not the target grounds or meanings were maintained when the topic and vehicle were reversed. Finally, the analysis of the understandability ratings is reported.

Scoring and coding of paraphrases. The analysis of most importance involved the interpretations given to the paraphrase data for the reversed items because it was with these data one can most directly observe the basis for understanding the metaphor. To this end, and following the procedures employed by Glucksberg et al. (1997), the interpretive grounds for each of the canonical "A is a B" items were agreed on by the two authors. These predetermined target grounds were employed as the basis for which discourse context was written. A difference from the earlier study by Glucksberg and his colleagues but similar to the procedure employed by Chiappe et al. (2003) was that we confirmed what grounds were used to interpret the metaphors in their canonical order. We thus had these grounds available as the basis for determining whether the reversed items employed the same grounds or not.

Scoring proceeded initially by keeping a running tally of the various explanations given to each paraphrase. Thus the number of occurrences across participants were calculated for use of the term "vicious" (or its synonyms) given for the metaphors, "*lawyers are sharks*"/"*sharks are lawyers*": Naturally other responses for the same metaphor pair were also tallied. These tallies were done for two reason. First, it provided the frequency with which each response was given across partici-

pants and allowed us to examine whether our a priori expectations of the modal interpretation of each metaphor was justified, and second, it was used to categorize each response into one of the four categories described in the following. The paraphrases were scored by the first author and an independent scorer blind to the purposes of the study. After training, there was 100% agreement on the categorization of participant responses by the two scorers.

Following the procedure of Glucksberg et al. (1997) the responses provided on the paraphrase task were scored and placed into one of four separate categories: Participant responses that matched the predetermined grounds were placed into the *acceptable* category. Recall that according to class inclusion theory, this category should be null or near null because one should not be able to interpret the reversals using the same features or ground used for the original metaphors. This was in fact what was observed in Glucksberg et al. (1997), where only 3.5% of the paraphrases fell within this category. An item was placed into the *uninterpretable* category if the participant gave a rating of 0 on the understandability scale and left the paraphrase section blank or gave responses such as "I don't know" or "Makes no sense to me." According to class inclusion this is a viable alternative and indeed, Glucksberg et al. found that 8% of their reversals could not be interpreted. An item was categorized as a *re-reversal* if participants either explicitly or implicitly used the vehicle as the topic in their paraphrase. An example of an explicit re-reversal would be, if given the reversed metaphor "*Sharks are lawyers*" the participant answered: "Should be lawyers are sharks" or "Lawyers are sharks because . . . ." An implicit re-reversal occurs when the participant answered the question as if the metaphor's vehicle was actually still the topic. Keeping with the "*Sharks are lawyers*" example, an implicit response was something like: "Lawyers are vicious." That is, although vicious may be an acceptable ground for this metaphor, the participant only referred to lawyers, consequently treating the concept "lawyers" as the metaphoric topic rather than its vehicle. Glucksberg et al. (1997) argued that this would be the modal response and in fact, they observed that just over 70% of the paraphrases were re-reversed. If the participants provided an interpretation for the reversed metaphor but the grounds provided by them differed from what the predetermined acceptable grounds were, then these were put into the *new grounds* category. For example, if given the reversed metaphor "*Sharks are lawyers*" and the participant wrote down, "sharks are intelligent," this would be considered a viable interpretation, however, one that differs from the target grounds and would therefore be classified as new grounds. In Glucksberg et al. this category was observed 18% of the time.

Classification of paraphrases. The percentage of responses classified here to the four options are presented in Table 1, as a function of whether or not the metaphors were in context or not. The columns labeled O represent classification of the metaphors in their original, canonical order and the R columns represent these same items with topic and vehicle reversed.

TABLE 1
Percentages of the Grounds in the Four Paraphrase Categories for the Reversed Metaphors

	With Context		*No Context*	
	O	*R*	*O*	*R*
Acceptable (same ground as original)	85	72	77	25
Uninterpretable	2	8	10	24
Rereversals	6	4	1	39
New grounds	7	17	12	12

Original metaphor classification. These data are presented mainly as a manipulation check that our intuitions about the modal interpretation given items in the "A is a B" form used to create the discourse context were shared by the participant pool. When out of context, over 3/4 of the time the characteristics used as grounds in interpreting the metaphors are those we had a priori decided would be the case, and on which basis the discourse contexts had been constructed. With contextual support, the percentage rose slightly, to 85%. In addition to confirming that our materials were working as expected, these numbers provided a rough indication of the maximum "acceptable" score likely to be found with the reversals.

Reversed metaphor classification. Recall that Glucksberg et al. (1997) emphasized these data as a means of testing an implication they drew from class inclusion theory. Basically, their claim was that interpretive ground employed in interpreting the original metaphors (so-called "acceptable" responses) would not be used but rather one should see large numbers of reversal. A chi-square test of independence of the reversed items, $\chi^2(3, N = 591) = 185.54$, $p < 0.01$, showed that allocation to category was dependent on whether or not context was provided.

As can be seen in Table 1, the reversed metaphors presented out of context generally supported the notion that, when reversed, the metaphors were not likely to be interpreted with the same ground employed in understanding the canonical order but more likely to be re-reversed, anomalous or understood with a different interpretive ground. In fact, three out of every four paraphrases were in one of these three categories. Nonetheless, unlike the prediction from the class inclusion approach, nor the findings of Glucksberg et al. (1997), we find that an appreciable number of the paraphrases given to the reversed items employed the same interpretive ground used for the metaphors presented in their canonical order, approximately 25% of the responses. It should be noted that Chiappe et al. (2003, Table 3)[1] who examined metaphor out of context also found that reversed metaphors were

[1]We thank Dan Chiappe for making these data available to us.

substantially interpreted with a meaning similar to that found in understanding the same concepts in their original form. In their case they actually found a larger proportion of responses classified to this category (36%) than we do, although they too employed the same materials used by Glucksberg et al.

When we examined the same metaphors placed in a discourse context, we saw a completely different set of results. Now, in fully 72% of the time, the same interpretive grounds were used to explain the canonical and reversed-order metaphors. Roughly three times as many acceptable categorizations were given for reversed metaphors in context than when not in context. We examined the number of acceptable categorizations given by each person and, not surprising given the large difference observed, found a highly reliable difference between the context and no-context conditions, $t(108) = 11.1$, $p < 0.001$.The findings were clear: relative to the no-context conditions, when placed in an appropriate discourse context, participants were reliably more likely to interpret the reversed metaphors with the same interpretative ground used to interpret metaphors in their canonical order.

Understandability ratings. These data are less important theoretically because the basis for the understandability ratings is underdetermined. Nonetheless, because Glucksberg et al. (1997) and Chiappe et al. (2003) presented data for out-of-context items similar to those obtained here, we wished to directly compare our findings with those in the comparable literature. Our data are presented in Table 2. It should be noted that in the no-context conditions presented here, the observed mean understandability ratings are quite similar to those presented in Glucksberg et al., who found a mean understandability rating of 3.1 for the reversed and of 5.7 for the original items, compared to the respective means of 3.6 and 5.3 observed here. These two data sets are also comparable to the appropriate comparison in Chiappe et al. who observed mean comprehensibility ratings of 3.2 and 4.5 for metaphors in their reversed and original orders respectively.

The appropriate analysis of our data-set is a factorial 2 (metaphor order: original vs. reversed) × 2 context (present vs. not present) analysis of variance (ANOVA).

TABLE 2
Understandability Ratings With and Without Contextual Information

	Metaphor			
	With Context		*No Context*	
	O	*R*	*O*	*R*
M	5.94	4.96	5.29	3.64
SD	0.47	0.64	1.02	0.81

The two main effects were reliable. Overall understandability ratings were higher for metaphors in their canonical than in their reversed order, $F(1, 108) = 81.69$ by subjects and $F(1,11) = 53.3$ by items, both ps $< .001$ and when presented in context, $F(1, 108) = 24.97$, $F(1,11) = 53$ both ps $<.001$. As can be seen, the difference in understandability ratings between metaphors in their original and reversed orders are less when these items are placed in context (a difference of 0.98 rating unit points) than when presented without discourse context (a difference of 1.68 points). This interaction was reliable by items, $F(1,11) = 5.12$, $p < .05$ and approached significance, $F(1, 108) = 2.72$, $p <. 0.11$, in the subject analysis. Thus, when we examine the exact metaphoric comparisons the difference in "understandability" ratings between the canonical and reversed order is appreciably reduced when presented in a discourse context than when presented out of context.

Taken together, these data indicate that people can employ the same interpretive ground for metaphors in their canonical and reversed orders, in contrast to the strong assertion to the contrary by Glucksberg and his colleagues. In those earlier studies, metaphors were presented without any discourse context. As pointed out long ago by McCabe (1983) and others, the understanding and processing of a metaphor differs markedly when presented out of context, as is the case in much of the psycholinguistic literature, than when presented in a discourse context, as is the case in everyday communication (see Gibbs, 1994 for a review of this literature). Our data also indicate this difference.

In this study, the grounds for interpreting a metaphor presented out of context differs when it is presented in its canonical order than when presented with topic and vehicle reversed. The out of context data are most analogous to those presented for the reversed metaphors by Glucksberg et al. (1997) and one of the conditions in Chiappe et al. (2003). We find that, out of context, the reversed metaphors were significantly less understandable than when in their canonical form, a finding reinforced by data indicating that 24% of the paraphrases to the reversed metaphors (but only 10% when in the canonical order) were classified as being not interpreted at all. Chiappe et al. found quite comparable numbers, 35% and 13% respectively. In contrast, Glucksberg et al. reported that only 8% of their responses were "unacceptable."

There are other similarities between our out of context data and Chiappe et al.'s (2003) data on the classifications given to reverse-order metaphors from that reported by Glucksberg et al. (1997). The most theoretically relevant is that whereas Glucksberg et al. found that only 3.5% of their reversed metaphors were interpreted with the same ground used for the metaphors in their canonical order we find that fully 25% of our cases were so classified and Chiappe et al. observed an even larger percentage of such classifications than we did, 36%. Moreover, whereas Glucksberg et al. classified about 71% of participants' grounds to be re-reversals we could assign only 39% in this category (and Chiappe et al. found even fewer reversals, 16%).

In summary, for metaphors presented out of context, relative to the critical study by Glucksberg et al. (1997), we (and Chiappe et al., 2003) find fewer reversals and more acceptable descriptions. One can only speculate why these differences occur. Because we and Chiappe et al. employed independent scorers blind with respect to aspects of the respective study and empirically determined the grounds employed by participants in understanding the canonical metaphors (and did not make this determination merely on the basis of the authors' intuitions, as was the case in Glucksberg et al.), a workable hypothesis is that we and Chiappe et al. considered a less restrictive range of appropriate characteristics when considering the acceptability of the paraphrases given to the reversals.

When presented in the appropriate discourse context inviting use of the same interpretive grounds for the canonical and reversed orders of the metaphor, we now find a substantial increase in the proportion of our participants interpreting the metaphors with the same ground, whether in the canonical (85%) or reversed order (72%). The most marked increase is with the reversed metaphors, of course. Thus, in conclusion, these data are inconsistent with a strong version of any theory which argues that one cannot reverse a metaphor from its canonical order and maintain the same interpretative ground.

STUDY 2

In Study 1 we employed a methodology similar to that employed by Glucksberg et al. (1997) to test as directly as possible the assertion that reversed metaphors cannot employ the same interpretive grounds used in understanding the original metaphor. In Study 2 we addressed this question with an online reading task. Based on assumptions on how one theorizes about metaphor processing one can infer different patterns of reading.

The model of metaphor processing implicit in Glucksberg and Keysar's (1990) theory of class inclusion is one in which metaphor comprehension is initiated at the metaphoric vehicle with attempts to identify or create an ad hoc superordinate category to which the vehicle can be assigned. Once assigned there is a mapping to the topic. In the later elaboration of this model, the attributive category model, Glucksberg et al. (1997) gave the topic a more prominent (and temporally earlier) role in metaphor processing. In our understanding of the elaborated model, processing of the topic and vehicle occur early, with each providing different types of information. The vehicle proceeds as before in identifying an appropriate category with which the topic can be characterized and the topic provides the relevant dimensions or constraints to the category. In both cases, the theoretical prediction would be for an advantage to processing metaphors in their original or canonical order because, when in that form, the ad hoc category is easier to access and integrate with the dimensions made available by the topic. Indeed, according to

Glucksberg's doctrine of nonreversibility, when topic and vehicle are reversed there should be a massive problem in finding an appropriate interpretation. Online this difficulty should be expressed by slower reading times in one or several of the following locations: at the vehicle (due to difficulties in finding an appropriate category consistent with the dimensions suggested by the topic), at the end of the sentence (where sentence "wrap-up" effects occur), and even possibly when reading into a subsequent sentence ("spill-over" effects taken to suggest that processing of the sentence has not yet been completed).

In contrast to these predictions are those that would argue for finding the usual effects observed when one processes sentences in context, namely "wrap-effects" at the last word of the sentence but no differences in the magnitude of this effect when processing metaphors in their original or reversed order. These predictions follow from models that argue nonliteral sentence comprehension can be explained by the same processes used in comprehending so-called literal sentences, such as those based on constraint satisfaction models (e.g., see Katz, Blasko, & Kazmerski, 2004; Katz & Ferretti, 2003; Pexman, Ferretti, & Katz, 2000). The same predictions would also arise from Gentner's structure-mapping model (e.g., Gentner & Wolff, 1997) who argue that the initial processing of metaphor, involving an alignment process, is symmetrical and that any observed topic–vehicle asymmetry is a consequent of temporally later processes.

In Study 2 we will test the two alternatives predictions in the online reading of metaphors in a discourse context. The items will be the same ones employed in the contextual conditions in Study 1.

Method

Participants. Eighty undergraduates (51 females, 29 males) from the University of Western Ontario participated in this study. None of these participants had been employed in Study 1. Forty participants tested on one of two experimental lists.

Materials and procedure. The identical 24 target metaphors presented in context from Study 1 were used again. Recall that there were 24 target metaphors embedded in a discourse context. Two lists were created consisting of 24 metaphors in context: 12 of these target metaphors were presented in their canonical order and 12 in their reversed order. Items presented in the canonical order in List 1 were presented in the reversed order in List 2, and vice-versa.

The items were displayed, one at a time, on a 17-in. Apple monitor controlled by a MacIntosh G3. They were presented using PsyScope (Cohen, MacWhinney, Flatt, & Provost, 1993) in a one-word-at-a-time self-paced moving windows format. That is, each passage was presented on screen so that each dash represented a word in the passage. For a word to be exposed the participant pressed the space bar.

After reading each word the participant pressed the space bar to expose the next word and so on until the passage was complete. Participants read each passage in this manner. Reading latencies for each word was recorded by the computer and were measured as the time interval between successive button presses.

Testing commenced with participants instructed on the details of the task and then completed 10 practice items. They then read the 24 experimental passages plus filler passages employed in Study 1, with the order of passage presentation randomly selected by the computer program. Each passage was followed by a basic "yes or no" comprehension question pertaining to the passage read just prior. These questions were simple queries about a fact presented in the passage and were presented to ensure that the participants processed the information while reading through each passage.

RESULTS AND DISCUSSION

The critical data are the reading times for the metaphors presented in their canonical and reversed orders. The time taken to read the word preceding each target item was analyzed as a baseline of premetaphor reading and the word of the sentence following the metaphor was analyzed to see if there was evidence of processing of the sentence even after the sentence was no longer in view (so-called "spill over" effects). The major analyses involve the reading times of the words in the target metaphors, either in an original or reversed order. Recall that each target item consisted of nominal metaphors (in either canonical or reversed order) of the form "An A is a B," where A and B refer to topic and vehicle noun phrases (NPs).

The following analyses will be presented. In each case the analysis will be over items so that we will be making the direct comparison of each metaphor when presented in its canonical (e.g., "*billboards are large warts*") and its reversed order ("*large warts are billboards*"). First, we will examine the reading time over five regions (for the word before the target metaphor, for the NP-topic, for the verb, for the NP-vehicle, and for the word following metaphor). The analysis will thus be a 5 (region) × 2 (metaphor order) repeated factors ANOVA. Finally, because the NPs in many cases involve the mean reading times for the head noun plus adjectives or other modifiers, we will also examine the speed with which the head noun in each NP was read in a 2 (metaphor order: reversed or canonical) × 2 (topic vs. vehicle) ANOVA.

The overall reading times of each region for the canonical and reversed metaphors are presented in Figure 1. As can be seen the overall reading patterns are somewhat similar for the canonical and reversed metaphors, namely that the NP-topic is read at about the same rate as found with the last word of the discourse context before the metaphor and that reading time in both forms of the metaphor is slower for the NP-vehicle. The ANOVA confirms these observations. The only reliable effect is that of region, $F(4, 44) = 4.91$, $p = .002$. The overall difference in

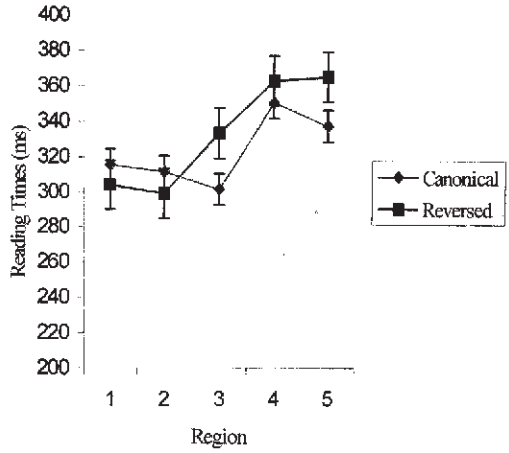

FIGURE 1 Reading times for metaphors in their canonical and in their reversed order for five regions (word before target metaphor, NP-topic, verb, NP-vehicle, and the first word following metaphor)

reading time for items in their canonical or reversed order was not significant, $F(1, 11) = 0.176$, and neither was the interaction of Region by Order, $F(4,44) = 1.70$. Post hoc analyses of the main effect of Region indicated that the times taken to read the NP-vehicle, and the times taken to read the word following the metaphor were significantly longer than the times taken to read the word before the metaphor, the NP-topic or the verb, none of which differed from one another. The difference in reading time between the NP-vehicle and the word following the metaphor also did not differ in reading time.

Because it is important that any reading speed difference in the target metaphors is not due to a carry forward of reading differences that was present in reading the preceding context, a separate analysis was done on the Reading Time (RT) for the region before the metaphor; the 9 msec difference between the context for the canonical and the reversed metaphor conditions was not significant, $t(22) = 0.486$. Because the difference in reading time for the word that followed the reversed metaphor was a substantial 28 msec longer than for the word that followed reading the metaphor in its canonical order, a separate analysis was performed in that region as well. Consistent with the overall ANOVA, this difference was not reliable, $t(22) = 1.046$, $p = .31$. As a final test to determine whether reading times differed for metaphors read in their canonical or reversed orders, a separate repeated measures 3 (region: NP-topic, verb, NP-vehicle) × 2 (metaphor order: canonical, reversed) ANOVA was conducted and, once again, no significant differences emerged for the main effect of order, $F(1,11) = 0.691$, or for the interaction of order × region, $F(1,110) = 1.91$.

Because a NP in our stimuli sometimes consists of a single noun (e.g., "*lawyers* are *sharks*") and sometimes were more elaborate as in the following NP-vehicle, "salesmen are *high-powered bulldozers*"), the results reported earlier might in part be due to variability created by the elaborated NPs. Accordingly, a final analysis examined the reading times for just the head noun in each NP in a 2 (metaphor order) × 2 noun (topic vs. vehicle head noun) repeated measure ANOVA. There was a marginal effect so that it took longer to read the vehicle noun (mean RT = 401 msec) than it did to read the topic noun (mean RT = 317 msec), $F(1,11) = 3.57$, $p = .085$. There was no difference in the time taken to read the topic and vehicle in their canonical or reversed order, $F(1,11) = 0.071$, nor was there an effect of Order by Noun Position, $F(1,1) = 0.118$.

There are two quite clear findings from this study. First, the time taken to read a metaphor in context does not differ when the context supports the canonical order or a reversal of the canonical order. There were no differences found at any of the regions examined. These results do not support the contention that one cannot reverse a metaphor without producing an anomaly. If the reversed metaphors were anomalous one would expect, compared to the canonical order, a much longer reading time at the NP-vehicle or for the vehicle head noun or for the time to read the first word of the sentence following the metaphor. This did not occur. Recall also that discourse contexts in which the metaphors were embedded were constructed so that the grounds to interpret the target sentence were the same for the canonical and reversed order metaphors. The failure to find reading time differences here suggests that it was equally easy to integrate into the discourse structure the reversed and canonical metaphors. Taken with the findings from Study 1, these data indicate that not only can one reverse metaphors using the same interpretive grounds but that the interpretive process proceeds at the same speed in the two cases, at least in the initial moments of comprehension.

The second finding is the increase in reading time for canonical and reversed items at the NP-vehicle region and in reading the first word following the metaphor. The reading time at these two regions did not differ from one another but did differ from all other regions examined. There are two, not necessarily independent, explanations for the increased RT at the NP-vehicle region. One argument would be that understanding a metaphor depends critically on understanding the vehicle and the increase in RT reflects the extra effort required to understand the metaphor (e.g., Paivio & Clark, 1986). Another argument would be that in the simple nominal metaphors employed here the NP-vehicle always includes the last word(s) of the target sentence and it is a well-known phenomenon that there is an increase in reading time that occurs at the end of sentences, the so-called "wrap up" effect. Wrap up effects are usually taken as "a search for referents that have not been assigned, the construction of interclause relations … and an attempt to handle any inconsistencies that could not be resolved within the sentence" (Just & Carpenter, 1980, p. 345). Naturally all of the factors noted earlier for wrap up effects would be

involved in resolving in the comprehension of a metaphor. However, the relative contribution to the increased RT at the NP-vehicle region due to metaphor comprehension and more general sentence completion effects remains to be determined.

Finally, we observed an increased RT in reading the first word of the sentence following the metaphor, whether in its canonical or reversed order. In the online reading literature one often finds that following sentence end wrap up, reading times return to baseline, that is, the RT found in reading the word that had proceeded the target sentence. In our laboratory we often find a return to baseline, even for metaphor (Pexman et al., 2000) and other forms of nonliteral language (e.g., Katz & Ferretti, 2003). Failure to find a return to baseline is taken as evidence that processing of the sentence has not been completed by the time one finishes contemplating the last word in the metaphor and the continued processing is influencing the processing of later sentences. As applied to this data, this continued processing is found equally for the canonical and reverse order metaphors. These findings are quite in line with the structure-mapping approach taken by Dedre Gentner and her colleagues who argue that the initial stage of metaphor processing is a symmetric alignment process, and that directional inference projection does not occur until this stage is completed. As applied to our online data, the equivalence in reading time for the canonical and reversed metaphors is consistent with an initial symmetric process; the continuation of processing after sentence end would, arguably, not be inconsistent with processing efforts of a later directional inference stage (see Gentner, Bowdle, Wolff, & Boronat, 2001 for a review of this approach).

GENERAL DISCUSSION

The results support the notion that one can reverse topic and vehicle and still have meaning based on the same interpretive grounds employed when the topic and ground are in their canonical order. This is especially true when the metaphors are placed in discourse contexts which make salient the interpretive ground (Study 1). Moreover, examination of the online processing of these metaphors indicate that there is no difference in reading times for the items in their canonical or in reversed order, although processing of both metaphor orders are not completed by sentence end (Study 2).

These findings do not support the axiom from class-inclusion theory that topic–vehicle nonreversibility is a defining characteristic of metaphors. In Study 1 here and in Chiappe et al. (2003) one can find instances in which topic and vehicles are reversed from their canonical order and are still understood with the same interpretive ground used in the canonical order. We extend these findings to show this is especially true in the more ecologically valid situation in which metaphors are embedded in the relevant discourse context. We do not make the argument that sometimes metaphor does not involve the classification of a concept to a category al-

luded to by a vehicle term nor that the appropriate category in such cases might be limited by characteristics of the topic term. We argue, rather, that nonreversibility should first, not be treated as a necessary condition of metaphor and second, that the processing of metaphor proceeds in a manner similar to that found with other language.

Our position on the continuity in processing literal and nonliteral language is based on research in our laboratory indicating online processing similarities between proverbs and their literal counterparts (see Katz & Ferretti, 2003), between sarcastic and sincere language (see Katz, Blasko, & Kazmerski, 2004) and sentences used metaphorically or sarcastically (Pexman et al., 2000). These processing similarities are based in part by the nature of the context, discourse and social–cultural, in which the target items are presented. The finding here that discourse context equally supports the online reading of metaphors in their canonical and reversed orders is an extension of this line of research.

Our argument is that there is no need to argue for special mechanisms to comprehend metaphor, a position in opposition to that of Ortony (1979) and others who have argued that the "problems" associated with comprehending metaphor in its canonical and reversed orders requires operations not found with so-called literal language. However, even a cursory examination indicates that asymmetries are not limited to metaphoric language but can be found in a wide range of linguistic forms and structures and, as in the studies reported here, these asymmetries can be reduced or eliminated when the item is placed in an interpretive context. Consider for instance a noun phrase such as "Kings of Spain" or the noun–noun conceptual combination "dog collar" or the sentence "man chops tree." In these cases there are canonical interpretations that are preferred in which the reversal of terms appears linguistically awkward or anomalous. Nonetheless, as with metaphor, when placed in context one can readily create a sense in which the reversal is sensible, such as when a dog wearing 10 collars is called a "collar dog" or when a tree falling in a certain manner hits a man or when a historian talks of the period in Spain following the ouster of the Moors.

The theoretical question that remains, of course, is: How do we process language, metaphoric or literal, metaphoric or sarcastic, or as demonstrated here, metaphor in its canonical versus its reversed order? Although this article is essentially empirical in nature with the aim of demonstrating that one cannot attribute nonreversibility as a defining characteristic of metaphor, one can nonetheless speculate on the type of processing models that might encompass the data presented in this article. We will consider two such theoretical approaches to the processing of language in context.

Both approaches assume that we actively construct interpretations during discourse processing, rather than retrieving entrenched meanings from semantic memory. Both approaches also assume that the same basic processes are found in processing so-called literal and nonliteral language. One class of theories are identified with computational models of language based on Parallel Distributive Pro-

cessing assumptions. For instance, Coulson (2001) argues that the construction of meaning online depends on assembling utterance meaning in response to linguistic cues. In her view, the basic components that have to be considered are not isolated predicates but rather activation of integrated frames, blends, and other concepts found in cognitive linguistics and computer science. Another alternative approach compatible in many ways to that of Coulson is based on constraint satisfaction processes (e.g., Spivey-Knowlton & Sedivy, 1995) . In essence, such models argue that different sources of information compete for activation in parallel over time. Information sources would include syntactic, pragmatic, and, as we have argued elsewhere, social and cultural beliefs (Katz et al., 2004). These sources of information constrain which interpretations are plausible at any given time, with the relative strength of these constraints varying as additional information is accumulated.

As applied to the data presented in Study 2, it would be argued that the constraints engendered by the discourse processed by the time the target metaphor was encountered would be used to eliminate some and support other plausible interpretations. In this tradition, the length of time taken to read a given word or NP is an indication of the difference in strength of competing alternative interpretations. As such, compared to the NP-topic region, the greater RTs found here at the NP-vehicle and word-after regions indicate that at least two alternative (plausible) interpretations are competing for cognitive supremacy that will end only when one of the alternatives reaches some criterion. From this perspective, the equivalence in reading times for canonical and reversed items would thus be seen as support for the notion that it is equally easy to comprehend and integrate into the context both types of metaphor.

An alternative theoretical approach but one also based on the idea of continuity between so-called literal and nonliteral language can be found in the linguistic literature. Relevance Theory (Sperber & Wilson, 1995) posits that an input is "relevant" to a person when it connects with available background (an initial context) to yield conclusions of personal importance, such as occurs when new information strengthens a weakly held assumption, causes an existing assumption to be eliminated, or works to derive a novel implication. Extending the initial context in these ways involves processing effort. The basic principle of this theory is that there is a natural human tendency to achieve the greatest cognitive effect (the maximization of relevance) for the smallest amount of processing effort.

In stimuli such as those employed here it can be assumed that the expressed message conveys the presumption of its own relevance (otherwise, why is it being presented?). The task of the reader is to select a context that confirms this presumption. Thus on encountering a metaphoric statement when reading a passage such as those employed here, the reader has available an initial context (assumptions in memory based, in part, on knowledge developed in reading the passage to that point) and is motivated to find maximal meaning (relevance) by expanding the initial context with the least amount of processing effort. Thus, given a statement such as "Salesmen are high-powered bulldozers " relevance is established by finding a range of weak implicatures which could extend the initial context engendered

by the discourse or social environment. Such implicatures would include beliefs about salesmen: their persistency, obstinacy, insensitivity, refusal to be deflected, and the like. As extended to the data in Study 2, the increased RT over baseline found at the NP-vehicle and next word regions would represent the additional effort required to interpret the metaphor. Of more importance, the lack of RT differences for the metaphor in its canonical and reversed orders would be taken to indicate that the same amount of cognitive effort is required to optimize relevance in the two situations.

Arguably other theoretical approaches can also be applied to the data we present here. The theoretical examples we use are merely intended to show that our contention about the reversibility of metaphor can be demonstrated empirically (as we have done in the two studies described here) and, furthermore, can be encompassed within well-established theoretical traditions. Moreover, each theoretical tradition suggests testable hypothesis. For instance, constraint satisfaction type models would predict that one should change the likelihood that a given interpretation would emerge by judiciously changing the constraints presented in discourse, as was done by Katz and Ferretti (2003) for a study on the processing of proverbs. In principle this approach predicts that one might in fact produce contexts in which the reversed metaphor is easier to process than the same metaphor in its canonical order. Similarly, because Relevance Theory posits "that communicated information comes with a guarantee of relevance" (Sperber & Wilson, 1995, p. vii), one should be able to manipulate relevance by manipulating the belief that a given sentence was an intentional act of communication and not a mindless production by an automaton. Research examining that specific prediction is now underway in our laboratory.

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REFERENCES

Chiappe, D., Kennedy, J., & Smykowski, T. (2003). Reversibility, aptness, and the conventionality of metaphors and similes. *Metaphor and Symbol, 18,* 85–105.

Cohen, J., MacWhinney, B., Flatt, M., & Provost, J. (1993). PsyScope: An interactive graphic system for designing and controlling experiments in the psychology laboratory using MacIntosh computers. *Behavior Research Methods, Instruments and Computers, 25,* 257–271

Coulson, S. (2001). *Semantic leaps*. New York: Cambridge University Press.

Gentner, D., Bowdle, B., Wolff, P., & Boronat, C. (2001). Metaphor is like analogy. In D. Gentner, K. Holyoak, & B. Kokinov (Eds.), *The analogical mind: Perspectives from cognitive science* (pp. 199–253). Cambridge, MA: MIT Press.

Gentner, D. & Wolff, P. (1997). Alignment in the processing of metaphor. *Journal of Memory and Language, 37,* 331–355.

Gibbs, R. W. (1994). *The poetics of the mind*. Cambridge, MA: Cambridge University Press.

Gildea, P., & Glucksberg, S. (1983). On understanding metaphor: The role of context. *Journal of Verbal Learning and Verbal Behaviour, 22,* 577–590.

Giora, R. (2003). *On our mind: Salience, Context and figurative language*. New York: Oxford University Press.

Glucksberg, S. (2001). *Understanding figurative langauge: From metaphors to idioms*. New York, Oxford University Press.

Glucksberg, S., & Keysar, B. (1990). Understanding metaphorical comparisons: Beyond similarity. *Psychological Review, 97,* 3–18.

Glucksberg, S., McGlone, M. S., & Manfredi, D. (1997). Property attribution in metaphor comprehension. *Journal of Memory and Language, 36,* 50–67.

Just, M., & Carpenter, P. (1980). A theory of reading: From eye fixation to comprehension. *Psychological Review, 87,* 329–354.

Katz, A. (1989). On choosing the vehicles of metaphor*:* Referential concreteness, semantic distances, and individual differences. *Journal of Memory and Language, 28,* 486–499.

Katz, A., Blasko, D. & Kazmerski, V. (2004). Saying what you don't mean: Social influences on sarcastic language processing. *Current Directions in Psychological Science., 13,* 186–189.

Katz, A., & Ferretti, T. (2003). Reading proverbs in context: The role of explicit markers. *Discourse Processes, 36,* 19–46.

Katz, A. N., & Pexman, P. M. (1997). Interpreting figurative statements: Speaker occupation can change metaphor to irony. *Metaphor and Symbol, 12,* 19–41.

Kövecses, Z. (2002). *Metaphor.* Oxford, England: Oxford University Press.

Levin, S. (1977). *The semantics of metaphor.* Baltimore: Johns Hopkins University Press.

Malgady, R., & Johnson, M. (1980). Measurement of figurative language: Semantic feature models of comprehension and appreciation. In R. Honeck & R. Hoffman (Eds.), *Cognition and figurative language* (pp. 239–258). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

McCabe, A. (1983). Conceptual similarity and the quality of metaphor in isolated sentences vs. extended contexts. *Journal of Pyscholinguistic Research, 12,* 41–68.

Ortony, A. (1979). Beyond literal similarity. *Psychological Review, 86,* 161–180.

Ortony, A., Vondruska, R. J., Foss, M. A., & Jones, L. E. (1985). Salience, similes, and the asymmetry of similarity. *Journal of Memory and Language, 24,* 569–594.

Paivio, A., & Clark, J. (1986). The role of topic and vehicle imagery in metaphor comprehension. *Communication and Cognition, 19,* 367–387.

Pexman, P., Ferretti, T., & Katz, A. (2000). Discourse factors that influence online reading of metaphor and irony. *Discourse Processes, 29,* 201–222.

Shen, Y. (1989). Symmetric and asymmetric comparisons. *Poetics, 18,* 517–536.

Shen, Y., & Cohen, M. (1998). How come silence is sweet but sweetness is not silent: A cognitive account of directionality in poetic synaesthesia. *Language and Literature, 7,* 123–140.

Sperber, D., & Wilson, D. (1995). *Relevance: Communication and cognition* (2nd ed.). Oxford, England: Blackwell.

Spivey-Knowlton, M., & Sedivy, J. (1995). Resolving attachment ambiguities with multiple constraints. *Cognition, 55,* 227–267.