

Research Report

Can Florida Become *Like* the Next Florida?

When Metaphoric Comparisons Fail

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ABSTRACT—*Metaphors can be understood in either of two ways: via a comparison process or via a categorization process. What determines which process will be used? According to a recent variant of comparison theory, novel metaphors must be processed as comparisons; only conventional metaphors can be processed as categorizations. We argue that choice of process is determined not by conventionality, but instead by the semantic and referential properties of the metaphor itself. We identified a type of novel metaphor that is indeed understood more quickly as a comparison than as a categorization. We then generated variants of such metaphors to make comparison difficult and found that these new novel metaphors were understood more quickly as categorizations than as comparisons. We conclude that metaphors can be processed as categorizations from the start, depending on their semantic and referential properties.*

Metaphors are ubiquitous in discourse. Pollio, Barlow, Fine, and Pollio (1977) estimated that speakers produce 3,000 novel metaphors every week. Den Boer (1998) found that 19% of the words in a broad sample of texts, ranging from poetry to science, were metaphors. Fully 25% of the words used in his sample of science texts were metaphorical. Clearly, an understanding of how metaphors are understood is critical to any theory of language comprehension, as well as to the development of computational models and of machine language-processing systems (cf. Kintsch, 2000). What kind of theory promises to be most useful?

Theories of metaphor comprehension fall into two broad classes: comparison theories and categorization theories. In the

comparison view, metaphors are understood in terms of their corresponding similes. Thus, a metaphor such as *my lawyer is a shark* is understood in terms of the simile *my lawyer is like a shark* (Ortony, 1979; Searle, 1979). In the categorization view, metaphors and similes are understood in their own right: metaphors as assertions of categorization, similes as assertions of similitude (Glucksberg, 2001; Glucksberg & Keysar, 1990). For example, according to the categorization view, in the lawyer-shark metaphor, the metaphor topic, *my lawyer*, is included in the category of sharks, a category of predatory, vicious, aggressive creatures. *My lawyer* therefore inherits the properties of this metaphorical category of sharks. In the simile form, the topic, *my lawyer*, is likened to the literal marine animals, sharks. People's understanding of metaphors is consistent with this distinction. They understand metaphors more quickly than similes and generate somewhat different interpretations for the two, with metaphors yielding more emergent features, such as "cruel," than do similes (Bowdle & Gentner, 2005; Glucksberg & Haught, 2006; Utsumi, 2005).

Bowdle and Gentner (2005) recently proposed an integration of the two views. In this framework, novel metaphors are invariably processed as comparisons. Over time, however, as metaphors occur in different contexts, "there is a shift . . . from comparison to categorization as [they] are conventionalized." This shift constitutes the career of metaphor: "The initial act of comparison . . . gives rise to conventional metaphoric categories" (p. 197).

Bowdle and Gentner (2005) reported three experiments to support these claims. In their first experiment, people rated their preference for the comparison versus the categorization form for novel metaphors. Ratings were made on a scale from 1 to 10, with 1 representing preference for the comparison form and 10 representing preference for the categorization form. Novel metaphors were rated 2.81, indicating a strong preference for the comparison form; conventional metaphors were rated higher, 4.35. Bowdle and Gentner's second experiment measured

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comprehension times for novel and conventional metaphors in their two grammatical forms. Novel metaphors took more time to comprehend than conventional ones (but see Blasko & Connine, 1993). More to the point, novel metaphors were understood more quickly in comparison than in categorization form, whereas the reverse was true for conventional metaphors. Finally, in Bowdle and Gentner's third experiment, participants were given novel similes, each with two different topics, and were then asked to provide a third appropriate topic; for example, "an acrobat is like a butterfly, a figure skater is like a butterfly" was followed by "(Fill in the blank) _____ is like a butterfly." After experiencing three instances of novel similes like these, participants' grammatical-form preferences for these novel items shifted toward categorization, from a baseline rating of 3.52 to a postexperience rating of 3.87—a modest effect, but reliable. Bowdle and Gentner concluded that the experimental experience produced a minimal form of conventionalization.

How might conventionalization make categorization available as a process? Consider, first, why most metaphors can be processed either as comparisons or as categorizations. Metaphors can be paraphrased as similes and vice versa because of the dual reference function of metaphor vehicles. Metaphor vehicles are polysemous: They have different referents in the two grammatical forms. For example, in the simile form *X is like a shark*, the vehicle term, *shark*, refers to the literal concept (the marine creature called a shark). In the metaphor form *X is a shark*, it refers to an abstract metaphorical category (called "sharks"). In this latter case, *shark* refers to any creature that is vicious, predatory, aggressive, and so forth, including some lawyers and, of course, the literal shark that exemplifies this particular category. Thus, one outcome of conventionalization might be the establishment of dual reference: the literal referent of the comparison assertion and the figurative referent of the categorization assertion. This line of reasoning suggests that some novel metaphors, such as those used by Bowdle and Gentner (2005), may initially have no figurative referent. For example, *butterfly* as a metaphor vehicle does not clearly exemplify any specific category of things that do what acrobats do, or what figure skaters do. Providing two similes with these two different topics and then having participants generate a third simile with a new topic could establish the capacity for dual reference—both a literal category of things that do what both acrobats and figure skaters do and a figurative category that can be described as butterflies.

This analysis raises an important new theoretical possibility. We have thus far considered two kinds of metaphors: those with dual reference, which can be understood either as comparisons or as categorizations, and those with only a literal referent, which can be understood only as comparisons. In principle, there can also be a third kind of metaphor, one that has only one referent, but a figurative rather than a literal one. If such metaphors exist, they should be understood as categorizations rather than as comparisons, even when novel. One way to generate such

metaphors is suggested by novel metaphors that appear initially only in categorization form, and not in simile form. Such metaphors appear to have no literal referents, only figurative ones. Consider the assertion *WorldCom will be the next Enron*. In this case, the categorical form is clearly intended and is clearly appropriate. The simile form, *WorldCom will be like the next Enron*, seems distinctly odd because the literal "next Enron" does not exist. Such examples are quite common, as when concern was expressed for the Florida voting process in the 2004 presidential election. Voting records had disappeared when computer systems crashed after a primary election in Miami-Dade County, where presidential votes had been disputed in the 2000 presidential election. Said the chair of the Miami-Dade Election Reform Coalition, "This shows that unless we do something now—Florida is headed toward being the next Florida" (Goodnough, 2004). The simile *Florida is headed toward being like the next Florida* simply does not make sense, again because the literal "next Florida" does not exist.

Ordinary conventional metaphors can be systematically modified to produce novel expressions that have only figurative referents, such as *my lawyer was a well-paid shark*. Because there is no such thing as a well-paid literal shark, such expressions can be understood only as categorizations (Glucksberg & Haught, 2006; Haught, 2005; Haught & Glucksberg, 2004). We used the method of adding modifiers to generate novel metaphors that have only figurative referents, the direct opposites to novel metaphors that have only literal ones. Each of Bowdle and Gentner's (2005) novel metaphors was systematically modified by adding an adjective that was appropriate only to the metaphor topic. For example, newspapers can be daily, but telescopes cannot, so *a newspaper is a daily telescope* should be easier to understand than *a newspaper is like a daily telescope*. Similarly, billboards can be advertisements, but warts cannot, so *a billboard is an advertising wart* should be privileged in categorical form. In each of these cases, there is no literal referent available. In Gentner and Wolff's (1997) terms, there is no base concept available for alignment with the metaphor topic. Therefore, for such metaphors, comparisons should be more difficult to understand than categorizations.

We tested this prediction by measuring comprehension time for two kinds of novel metaphors—literal-referent and figurative-referent ones—in both comparison and categorization forms. The literal-referent metaphors had a literal but no figurative referent; the figurative-referent metaphors had a figurative but no literal referent. The two sets of items were equally novel.

METHOD

Participants

Sixteen undergraduates participated for course credit. All were native English speakers, and none had participated in experiments on figurative language before.

Materials and Design

The 16 novel metaphors used in Experiment 2 of Bowdle and Gentner (2005) constituted the literal-referent metaphors. They were transformed into figurative-referent metaphors by adding adjectives that are applicable only to the metaphor topics (see Table 1). Each participant saw each metaphor in either comparison or categorization form.

We used two manipulation checks to ensure that the two metaphor types did indeed differ from one another. First, we asked an independent group of 16 participants to rate their grammatical-form preferences for the modified (figurative-referent) metaphors, using Bowdle and Gentner's (2005) rating procedure. These metaphors received a mean rating (on a scale from 1 to 10) of 4.90, comparable to the 4.35 rating for conventional metaphors reported by Bowdle and Gentner. Thus, like conventional metaphors, these novel metaphors should be understood more easily in categorical than in comparison form.

Second, we asked another independent group of 16 participants to provide aptness ratings for the original and modified metaphors in their comparison and categorization forms, using a scale from 1 (*not at all apt*) to 10 (*extremely apt*). Four lists were constructed such that half the items in each list were literal-referent metaphors and half were figurative-referent ones. Half of each metaphor type appeared in categorical (metaphor) form, and half appeared in comparison (simile) form. These lists were assigned such that each participant rated each metaphor only once, in either literal-referent or figurative-referent form and in either categorical or comparison form. This resulted in a 2 (metaphor type) \times 2 (grammatical form) within-subjects factorial design. The results were clear-cut. Literal-referent metaphors were rated as more apt in comparison than in categorization form (4.85 and 4.31, respectively), replicating

TABLE 1
The Metaphors Used in This Study

| | |
|---|---|
| Vacations can be (fun-filled) aspirin | A sailboat is a (luxury) leaf |
| Moonlight is (romantic) bleach | A child is a (young) snowflake |
| Food can be (nutritious) coal | Thought is a (day-dreaming) tumbleweed |
| A rumor is a (an unfounded) mushroom | A fisherman is a (commercial) spider |
| Envy is (self-centered) rust | A newspaper is a (daily) telescope |
| A beach is a (pebble-strewn) grill | An obsession is a (psychological) tumor |
| Science can be a (an empirical) glacier | A billboard is a (an advertising) wart |
| A mind is a (an idea-filled) kitchen | Friendship is (lifelong) wine |

Note. The original metaphors (i.e., without the adjectives in parentheses) are from Bowdle and Gentner (2005, Experiment 2); they have only literal referents. Modified versions of these metaphors were created by adding the adjectives shown in parentheses; these modified versions have only figurative referents. The items are shown in categorical form, but all appeared in both categorical and comparison form (see the text).

Bowdle and Gentner's (2005) results. The reverse was true for figurative-referent metaphors (4.52 and 5.48, respectively). Analyses of variance yielded a reliable interaction with both subjects and items as random factors, $F_1(1, 15) = 4.79$ and $F_2(1, 15) = 4.58$, $ps < .05$.

We expected that comprehension times would follow this pattern of relative aptness, with literal-referent metaphors understood more quickly in comparison form than in categorization form, and figurative referent metaphors understood more quickly in categorical form than in comparison form.

Procedure

The 16 participants were tested individually. They were told that they would see statements presented on a computer screen, one at a time, and that their task was to think of an interpretation for each statement, that is, what someone might intend by uttering the statement. Participants were instructed to look at a fixation cross, which appeared in the center left area of the screen at the beginning of each trial. After 1,500 ms, a statement appeared. As soon as they had an interpretation in mind, participants were to press the response key. The statement then disappeared, and they stated their interpretation aloud. The experiment began with 10 practice trials, followed by the experimental items presented in a different random order for each participant.

RESULTS AND DISCUSSION

We submitted the comprehension-time data to two analyses of variance, one with participants and one with items as random factors. Each was a 2 (metaphor type) \times 2 (grammatical form) within-subjects analysis. The results were clear-cut. For the literal-referent metaphors, we replicated Bowdle and Gentner's (2005) finding that comparisons (similes) are understood more quickly than categorizations (metaphors; 3,318 ms vs. 3,786 ms, a difference of 468 ms; comparable to Bowdle and Gentner's mean times of 2,872 and 3,245 ms, respectively). However, for the figurative-referent items, we found a complete reversal: a difference of 636 ms in the opposite direction, with categorizations understood more quickly than comparisons (4,535 ms vs. 5,171 ms; see Table 2). The crossover interaction of metaphor type with grammatical form was reliable, with both subjects and items as random factors, $F_1(1, 15) = 6.84$, $p < .02$; $F_2(1, 15) = 4.77$, $p < .05$.

We conclude that novel metaphors can be understood as categorizations, depending on their semantic and referential properties. The available evidence suggests that metaphor quality, rather than novelty, is the major determinant of how a metaphoric assertion is understood. If a metaphor is apt, referring to a coherent abstract category via a salient and prototypical member of that category (such as *jail* for the metaphorical category of jails, as in *my job is a jail*), then the metaphor should be understood via categorization (Chiappe, Kennedy, & Smykowski,

TABLE 2
Comprehension Times (in Milliseconds) as a Function of Metaphor Type and Grammatical Form

| Metaphor type | Grammatical form | |
|---------------------|------------------|-------------|
| | Simile | Metaphor |
| Literal referent | 3,318 (272) | 3,786 (260) |
| Figurative referent | 5,171 (272) | 4,535 (323) |

Note. Standard errors are in parentheses.

2003; Jones & Estes, 2006). If a metaphor is not apt because it has no readily available figurative referent, then it can best be understood via a comparison. For example, *a fisherman is a spider* is best understood by comparison because spiders do not readily exemplify a category of creatures to which a fisherman might belong. Fishermen catch fish, something that is not exemplified by spiders, even though both might use nets of a sort. Finally, if the comparison form of a metaphor is not readily interpretable because it lacks a literal referent, as in *a fisherman is a commercial spider*, then it should be understood as a categorization.

Bowdle and Gentner's (2005) career-of-metaphor hypothesis is thus restricted to a specific subset of metaphors: those that do not afford either the immediate retrieval or the immediate creation of an abstract metaphoric category (i.e., a figurative referent). Such metaphors are understood as comparisons by default, but may, with use, acquire the capacity for dual reference and can then be understood either as comparisons or as categorizations. Novel metaphors that do not afford the retrieval of a literal referent behave quite differently. They are understood as categorizations, again by default. Finally, apt novel metaphors, which afford creation of metaphoric categories on the fly, can be understood either as comparisons or as categorizations, just as conventional metaphors are.

One conclusion is clear: Theoretically, one size does not fit all. Neither comparison nor categorization theories can account for how all metaphors are processed. The process used on any given occasion will depend on the semantic and referential characteristics of the metaphor itself, irrespective of its novelty or conventionality. An explicit description of such characteristics has yet to be developed, but this we do know: Different metaphors will have different careers.

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