When Dogs Can Fly:
Level of Abstraction as a Cue to Metaphorical Use of Verbs

Lisa A. Torreano
Department of Psychology
Princeton University

Cristina Cacciari
Dipartimento di Scienze Biomediche
University of Modena-Reggio Emilia, Italy

Sam Glucksberg
Department of Psychology
Princeton University

How do people recognize metaphors? In nominal metaphors, such as “My lawyer is a shark,” the metaphor vehicle “shark” refers to an abstract category of predatory creatures, not to the basic-level concept, the literal fish we call “shark.” People can use the level of abstraction of the metaphor vehicle (shark) as a cue that the expression is intended metaphorically rather than literally (Glucksberg & Keysar, 1990). Can the metaphorical use of verbs, as in “he hopped on his bike and flew home” be recognized in the same way? We investigated whether the level of abstraction of a verb’s referent provides a cue that the verb is used metaphorically rather than literally. We varied level of abstraction of verb use, and obtained judgments of metaphoricity as a function of abstraction level. As with nouns, verbs that are understood at a higher level of abstraction are rated as more metaphorical than when the same verbs could be interpreted at the basic (literal) level. Furthermore, this effect is graded: the higher the level of abstraction, the higher the rated metaphoricity. These findings suggest that people use level of abstraction as a cue to metaphoricity for both nominal and predicative metaphors.
When someone says “The car flew through the intersection,” it is perfectly clear that what she or he means is that the car sped, rather than traveled airborne, through the intersection. How do people recognize that such verbs are intended metaphorically, and how are such expressions understood? Although very little work has been addressed regarding how people understand predicative metaphors (expressions that involve the metaphorical use of a verb), a great deal of attention has been paid to nominal metaphors (expressions that involve the metaphorical use of a noun). Can we generalize the analysis of nominal metaphors to predicative metaphors?

In this article we address the recognition question: How do people recognize when a verb is used metaphorically? One candidate might be semantic or syntactic anomaly, but anomaly per se is patently insufficient. Nominal metaphors can be well formed, yet still be recognized and interpreted metaphorically, for example, “Despite the stereotype, many lawyers are not sharks.” Similarly, predicative metaphors can also be well formed, yet still be recognized and interpreted metaphorically, for example, “After years of dutifully being subservient to her bullying husband, she woke up and realized that she had become his slave.” In this example, note that the verb–phrase woke up and the noun slave are interpreted metaphorically, even though neither is semantically nor syntactically anomalous. However, neither the noun nor the verb in this example would be pragmatically acceptable, that is, would make sense if interpreted literally. The expressions make pragmatic sense only when interpreted metaphorically.

For many years the received view was that any apparent violation of selectional restrictions should signal a metaphorical intent (Katz & Fodor, 1963). However as Wilks’s (1975) preference semantics makes clear, the picture is more complex and the very notion of what constitutes a selectional restriction violation remains unresolved. Consider Wilks’s examples of the verb to drink. Such verbs prefer an animate actor as an agent, so in any given context in which, for instance, a person is available, it would be preferred to any nonhuman actor. But, in “My car drinks gasoline,” the verb would accept the automobile sense with no violation whatsoever, because no animate actor is available to be preferred (see Martin, 1990, for a detailed discussion). Thus, on this view it is not the selectional restriction violation per se that signals a metaphorical intent but also (or instead) the availability of a plausible alternative agent.

Similarly, in traditional generative approaches, selection restrictions would be considered to be a subset of semantic and syntactic information specified by a main verb. A verb such as to put, for example, would be classified as a three-argument verb, and so can appear in expressions such as Mary put the ball on the table. However, as Goldberg (1995, 2003) pointed out, putatively single-argument verbs such as to sneeze can also appear in expressions with three arguments, such as “He sneezed his tooth right across town.” From the viewpoint of construction grammar, this is not a violation of selection restrictions, but instead a well-formed example
of a standard construction, the *caused motion* construction. The surface syntactic form of this construction is SUBJECT VERB OBJECT₁ OBJECT₂(loc/path). Any verb that can be construed in terms of a manner or type of motion can be used in this construction regardless of its’ putative argument structure. A prototypical motion verb, such as *to send*, clearly fits well, but so do idiosyncratic motion verbs such as *to sneeze, to belch, or to cough*. Whether such uses are judged as metaphorical remains an open question, one which this article begins to address: What cues do people use to recognize and expression as metaphorical?

One cue to metaphoricity may be the level of abstraction at which a verb is interpreted. Verbs, especially action verbs, can be used at different levels of abstraction. The higher the level, the fewer of the properties typical of literal–basic use are preserved. For example, in “*The rumor flew through the office,*” the verb *to fly* does not take its usual arguments in the subject position, namely, a physical entity that is airborne. At its basic-default level, the verb *to fly* requires subjects in the agent position to be physical entities capable of air travel (e.g., birds, airplanes, some insects, etc.). In its metaphorical sense, however, it is used at higher levels of abstraction to refer to speed and not to being airborne.

Our line of argument suggests that certain kinds of context should lead people to interpret verbs metaphorically. What kind might these be? When a sentence context leads people to interpret a verb at a more general level of abstraction than usual, then the expression should be interpreted metaphorically. For example, the verb *to fly* usually refers to a physical entity that is airborne or air-adapted as it travels speedily. These properties of flying are included in literal expressions, such as *The bird flew across the back yard* or *The jet plane flew across the sky*. When the context makes the property of being airborne unlikely or impossible, as in “*The dog flew across the yard,*” then the verb can be interpreted as referring at a higher, or more general, level of abstraction—an entity that is now included in the category of things that move swiftly, but not necessarily through the air. When used to refer at a still higher level of abstraction, as in “*The rumor flew across town,*” then it might be considered as even more metaphorical because it is not a physical entity that travels, but it does travel swiftly. In the dog and rumor examples, a component of the semantics of the verb *to fly*, referring to speed, is abstracted out and used to predicate a manner of speedy motion of whatever topic can sensibly change location.

The notion of level of abstraction can be couched in various theoretical terms. From one linguistic point of view, violating one or more of a verb’s preferred argument structures renders that verb’s referents less specific or constrained. If the verb *to fly* refers to a rumor, then at least two restrictions, in standard terminology, are violated: Rumors are not physical entities and they do not travel airborne. The process is not totally unconstrained: A verb’s referent that violates one or more preferred arguments must pragmatically make sense to serve as a candidate metaphor. In terms of Glucksberg and Keysar’s (1990, 1993) concept of dual reference,
nouns used metaphorically can refer at several levels of abstraction. In expressions such as “my lawyer is/is like a shark,” the word shark can refer either to the marine creature (literal basic-level referent) or to the category of creatures that the literal shark exemplifies, that is, a category of creatures that are predatory, vicious, aggressive, and so on. Because this category has no name of its own, the name of a prototypical exemplar—in this case, “shark”—is used as the name for that category (Brown, 1958, Glucksberg, 2001). Verbs can also be used in this way: The verb to fly can refer to the physical action of traveling through the air (literal basic-level use) or to the superordinate category of speedy travel (abstract level use).

Perhaps the most theory-neutral notion of level of abstraction derives from distinguishing between the default context-free argument referents of a verb and the ones that are plausible only at a higher level of abstraction. Literal flying includes the specifics of airborne and physical entity. The more of such features omitted, or abstracted out, the higher the level of abstraction. In operational terms, when a verb’s subject or object is incapable of taking on that verb’s preferred arguments, then that verb is being used at a higher level of abstraction (see Wilks, 1975, for a related line of reasoning). We tested the hypothesis that, as the level of abstraction referred to by a verb increases, the more metaphorical it will be.

METHOD

Participants

Twenty-six male and 34 female undergraduates at Princeton University participated for credit in a psychology course. All participants were native English speakers and none had previously participated in studies on metaphor.

Materials and Design

Fifty-four six-sentence sets were created by selecting a pair of verbs from the same semantic domain for each set. In each set, the level of abstraction of one verb was higher than that of the other, that is, to travel is a hypernym of to fly, to open is a hypernym of to uncork. By definition, the level of abstraction of a hypernym is always higher than any of its subordinate exemplars in that all of its properties are included in its exemplars, but the exemplars will always have additional, more specific properties that are not included in the superordinate concept. Thus, to fly will include the property of being airborne, but to travel will not (but could, depending on the context of use).

In any given context, the more specific of the two verbs would be more likely to be pragmatically implausible if taken at the literal, basic level of abstraction. For example, many physical entities can travel. However, only certain kinds of physi-
cal entities can fly, which is a specific manner of traveling (i.e., through the air). Thus, there are more contexts in which to fly, if taken to refer to its literal referent of airborne travel, would be pragmatically implausible than its more general counterpart to travel. In addition, the more specific verbs of each pair, such as to fly, were chosen because, in our judgment, they epitomized a manner of action. The more general verbs of each pair, such as to travel, were chosen so that, in our judgment, they did not seem to epitomize any specific manner of action, at least in the sentence contexts in which they appeared. Thus, these more general verbs were more likely to be interpreted at the literal level.

Each verb pair (i.e., specific–general, e.g., to fly–to travel) was used with a different set of three nouns to create six short sentences for each set. Each triad of nouns was selected so that, in the sentence context, the level of abstraction referred to by each verb varied systematically: A basic level with no literal properties abstracted out (L0), an intermediate level in which one literal property was abstracted out (L1), and a higher level where two literal properties were abstracted out (L2). One noun resulted in sentences in which the two verbs from the same semantic domain could be plausibly interpreted at their most specific levels, L0 (e.g., bird–fly, boy–travel). A second noun resulted in sentences in which the general verb could be interpreted without resorting to a more abstract interpretation, hence an L0 sentence (e.g., boy–travel). However, the other, more specific verb would make sense only if interpreted with one literal property abstracted out, i.e., an L1 sentence (e.g., boy–fly). Finally, a third noun resulted in sentences in which both verb types had to be interpreted more abstractly to make sense, producing L1 and L2 sentences. With this third noun, general verbs would make sense only if interpreted with one literal property abstracted out, i.e., an L1 sentence (e.g., boy–fly). Finally, a third noun resulted in sentences in which both verb types had to be interpreted more abstractly to make sense, producing L1 and L2 sentences. With this third noun, general verbs would make sense only if interpreted with one literal property abstracted out, i.e., an L1 sentence (e.g., boy–fly). Finally, a third noun resulted in sentences in which both verb types had to be interpreted more abstractly to make sense, producing L1 and L2 sentences. With this third noun, general verbs would make sense only if interpreted with one literal property abstracted out, i.e., an L1 sentence (e.g., idea–travel), whereas specific verbs would make sense only if additional literal properties were abstracted out (L2 sentences, e.g., idea–fly; see Table 1). L0 sentences were thus expected to be interpreted literally. L1 and sentence types were candidate metaphors, expected to be interpreted metaphorically. In addition, L2 sentences should be rated as more metaphorical than L1 sentences.1

The aforementioned noun–verb pairings produced six sentences for each pair of verbs: For the more general verb of a pair, two of the three sentences would be type L0, because the verb could be interpreted at its default, zero level of abstraction, for example, the bird/the boy traveled; see Table 2. The third sentence would be type L1, and thus a candidate metaphor because it required the same verb, for example,

---

1Note that in these sentences the abstraction process occurs with the verb. As demonstrated by Gentner and France (1988), in sentences in which verbs and nouns mismatch, or create a semantic strain, the verb, as opposed to the noun, is typically the locus of meaning change. For example, in a paraphrase task “The lizard worshipped the sun” was interpreted as The lizard stared unblinkingly at the sun.
traveled, to be interpreted at a higher level of abstraction, in this case to refer to a nonphysical entity such as an idea traveling.

For the specific verb in each domain, only one of the three sentence types should be a type L0, when the verb could be interpreted at its default zero level of abstraction (e.g., the bird flew). In the two other types (e.g., the boy flew and the idea flew), the verb had to be interpreted at a more general level of abstraction to make sense, in the former case to not include being airborne (L1), in the latter to not include being airborne and being a physical entity (L2). Both of these sentence types are metaphor candidates: They should be rated as metaphorical, with the latter rated more metaphorical than the former.

Finally, for half the item sets the subject noun phrase was the candidate metaphor topic (e.g., The boy grabbed his bike and flew across town); for the other half the object noun phrase was the candidate topic (e.g., The politician garnished the truth). Because there is no principled reason for subject or object noun phrases to differ in metaphoricity, we did not sample these two types of sentences systematically, and indeed did not expect any main or interactive effects of this variable. We include it only in the interest of generalizing whatever results we obtained.

---

**TABLE 1**

Types of Materials at Different Levels of Abstraction

<table>
<thead>
<tr>
<th>Level of Abstraction</th>
<th>Topic + Verb Vehicle Combination</th>
<th>Type of Sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero level (L0)</td>
<td>Concrete nouns + specific verbs</td>
<td>Literal sentences</td>
</tr>
<tr>
<td></td>
<td>Concrete nouns + general verbs</td>
<td></td>
</tr>
<tr>
<td>One level (L1)</td>
<td>Concrete nouns + specific verbs</td>
<td>Metaphor candidates</td>
</tr>
<tr>
<td></td>
<td>Abstract nouns + general verbs</td>
<td></td>
</tr>
<tr>
<td>Two levels (L2)</td>
<td>Abstract nouns + specific verbs</td>
<td>Metaphor candidates</td>
</tr>
</tbody>
</table>

**TABLE 2**

Examples of Sentence Sets

<table>
<thead>
<tr>
<th>Subject Noun Phrase Set</th>
<th>Object Noun Phrase Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific verb</td>
<td></td>
</tr>
<tr>
<td>L0 The <em>bird</em> grabbed the worm and <em>flew</em> across town.</td>
<td>He garnished the meal.</td>
</tr>
<tr>
<td>L1 The <em>boy</em> jumped on his bike and <em>flew</em> across town.</td>
<td>He garnished the war hero.</td>
</tr>
<tr>
<td>L2 The <em>idea</em> flew across town.</td>
<td>He garnished the truth.</td>
</tr>
<tr>
<td>General verb</td>
<td></td>
</tr>
<tr>
<td>L0 The <em>bird</em> grabbed the worm and <em>traveled</em> across town.</td>
<td>He decorated the meal.</td>
</tr>
<tr>
<td>L0 The <em>boy</em> jumped on his bike and <em>traveled</em> across town.</td>
<td>He decorated the war hero.</td>
</tr>
<tr>
<td>L1 The <em>idea</em> traveled across town.</td>
<td>He decorated the truth.</td>
</tr>
</tbody>
</table>

*a*Indicates superordinate-level of abstraction.

*b*Indicates two levels of abstraction in superordinate condition.
Procedure

The 324 sentences (54 sets of six sentences each) were counterbalanced across six lists so that two sentences from every item set, representing each verb type, appeared in each list. For each list, the sentences were presented in a unique randomized order with the constraint that no more than seven metaphor-candidate sentences or seven literal-candidate sentences appeared consecutively. Three sentences were presented per page of the list packet with three 7-point rating scales for each one. The three rating scales were as follows:

1. Ease of comprehension: How easy was it to understand the sentence? A rating of 1 indicated not at all comprehensible and 7 extremely comprehensible.
2. Degree of metaphoricity: How metaphorical was the sentence? A rating of 1 indicated not at all metaphorical and 7 extremely metaphorical.
3. Degree of aptness: How well or poorly did it express its meaning? A rating of 1 indicated not at all apt and 7 extremely apt.²

Participants were tested individually in a quiet room. They were given a packet with instructions on the cover sheet. The participants were asked to read each sentence carefully, and to rate each one on the three scales printed below each sentence. Each packet took about 30 min to complete.

RESULTS AND DISCUSSION

Comprehensibility Ratings

The sentences were generally easy to understand, as reflected by an overall mean comprehensibility rating of 6.08 (SE = .054), with the average rating per sentence ranging from 3.3 to 7. The sentences with subject noun phrases serving as candidate metaphor topics were rated about equally comprehensible to those with object noun phrases as topics, M = 6.24 (SE = .053) versus M = 5.92 (SE = .061). Because we have no principled interest in differences between noun phrases, the data were collapsed across this variable. These pooled data are presented in Table 3.

Sentences with the verb interpretable at the specific level (literal sentences) received a mean comprehensibility rating of M = 6.43 (SE = .029), whereas those interpretable at an abstract level (candidate metaphors) were rated at M = 5.74 (SE = .049), t(322) = 9.36, p < .001. This difference is reliable, indicating that, for this sample of materials, metaphor candidate sentences were rated as less comprehen-

²The aptness ratings were obtained for use in another study, and so will not be reported or discussed here.
sible than literal ones. Within the set of metaphor candidates, sentences with the more general verb in each pair of verbs were rated about equally comprehensible as those with the more specific verb, $M = 6.2$ ($SE = .049$) versus $M = 5.97$ ($SE = .063$). Taken together these data indicate that our materials were sufficiently comprehensible for the purpose of assessing whether or not a verb’s level of abstraction influences ratings of metaphoricity.

### Metaphoricity Ratings

We turn now to the major data of interest: What kinds of sentences were considered to be metaphorical? Before we calculated the mean metaphoricity ratings, we examined the comprehensibility ratings to identify any items that were rated low on this scale. The data were trimmed to exclude the sentences, and their corresponding sets, which were rated 2.5 $SD$ below the mean, which included a total of seven sets (six object and one subject noun phrase sets). A total of 47 item sets (26 subject and 21 object noun phrase item sets) were thus included in the analyses of the metaphoricity ratings (they are reported in the Appendix). Table 4 presents the mean metaphoricity ratings as a function of item type.

Although metaphor candidate subject-noun phrase sentences were rated as more metaphorical than object-noun phrase sentences ($M = 5.51$, $SE = .10$ vs. $M = 5.13$, $SE = .12$), this variable did not interact with any of the other variables of interest. Thus, we pooled across noun phrase and subjected these pooled data to $2 \times 3$ (Verb $\times$ Noun) analyses of variance, with both subjects and items as random factors. Analyses revealed significant main effects of both verb type, $Fs(1, 59) = 530.19, p < .001$; $Fi(1, 276) = 90.67, p < .001$, and noun type, $Fs(2, 118) = 720.49, p < .001$; $Fi(2, 276) = 265.38, p < .001$, as well as a significant interaction of verb by noun, $Fs(2, 118) = 284.72, p < .001$; $Fi(2, 276) = 55.67, p < .001$. As expected,

### Table 3

Mean Comprehensibility Ratings as a Function of Item Type

<table>
<thead>
<tr>
<th>Noun</th>
<th>General (e.g., to travel)</th>
<th>Specific (e.g., to fly)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SE$</td>
</tr>
<tr>
<td>Basic level: L0 (e.g., $bird$ travel/$bird$ fly)</td>
<td>6.36</td>
<td>.05</td>
</tr>
<tr>
<td>Alternating level: L1 (e.g., boy travel/boy fly)</td>
<td>6.47</td>
<td>.05</td>
</tr>
<tr>
<td>Superordinate level: L2 (e.g., idea travel/idea fly)</td>
<td>5.76</td>
<td>.08$^a$</td>
</tr>
</tbody>
</table>

$^a$Indicates one level of abstraction.

$^b$Indicates two levels of abstraction.
superordinate level of abstraction items were rated as more metaphorical than basic level items ($M = 5.34, SE = .078$ vs. $M = 2.35, SE = .087$). Planned comparisons of items indicate a significant difference between superordinate (L1 and L2) and basic level (L0) items, both when pooled across conditions, $t_{i}(276) = 26.58, p < .001$ and in a pairwise comparison of verb type at the level of noun that alternated superordinate- and basic level of abstraction depending on its verb context (e.g., boy), $t_{i}(276) = 13.47, p < .001$.

Finally, is there an effect of degree of level of abstraction? To answer this question we examined the metaphoricity ratings among items belonging to the superordinate level conditions. Comparisons that are relevant involve the number of literal properties that are not retained (i.e., that are abstracted out of) in the interpretation. For example, in the idea-flying metaphor, two default properties of flying—physical entity and being airborne—are abstracted out of the interpretation. In the other two flying–traveling metaphors, only one of these two properties is abstracted: physical entity in the idea–traveling metaphor, and being airborne in the boy–flying metaphor. Metaphors with two properties abstracted out (e.g., physical entity and being airborne) were rated as more metaphorical than metaphors with only one such property abstracted ($M = 5.83, SE = .091$ vs. $M = 5.09, SE = .098$), $t_{i}(276) = 4.38, p < .001$. Additionally, a comparison for the third noun type that creates different degrees of level of abstraction (e.g., ideas flying vs. ideas traveling) revealed that specific verb sentences (i.e., those that required interpretation at a higher level of abstraction) were rated as more metaphorical than the sentences using the general verb ($M = 5.83, SE = .091$ vs. $M = 4.99, SE = .120$), $t_{i}(276) = 4.34, p < .001$.

These data confirm our predictions. Verbs that are pragmatically implausible if interpreted at the literal, basic level of abstraction tend to be rated as metaphorical, and degree of metaphoricity increased with degree of abstraction. People thus

<table>
<thead>
<tr>
<th>Noun</th>
<th>General (e.g., to travel)</th>
<th>Specific (e.g., to fly)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SE$</td>
</tr>
<tr>
<td>Basic level: L0 (e.g., bird travel/bird fly)</td>
<td>2.37</td>
<td>.15</td>
</tr>
<tr>
<td>Alternating level: L1 (e.g., boy travel/boy fly$^a$)</td>
<td>2.58</td>
<td>.17</td>
</tr>
<tr>
<td>Superordinate level: L2 (e.g., idea travel/idea fly$^b$)</td>
<td>4.99</td>
<td>.12$^a$</td>
</tr>
</tbody>
</table>

$^a$Indicates one level of abstraction.
$^b$Indicates two levels of abstraction.
seem to use dual reference, that is, level of abstraction, as a cue to the metaphorical use of verbs, just as they use this cue to recognize the metaphorical use of nouns (Glucksberg, 2001).³

Do people also use the same comprehension strategies for verbs as they do for nouns? Glucksberg and Keysar (1990, see also Glucksberg, 2001) have argued that people understand nominal metaphors using the discourse strategy of dual reference. In the metaphor “My lawyer is a shark,” the term shark is extended to name the superordinate category to which the literal shark and the metaphor topic, my lawyer, now belong. Due to this dual reference function, metaphoric comparisons can be expressed as category assertions, and vice versa: My lawyer is a shark and my lawyer is like a shark are for most intents and purposes interchangeable (Glucksberg, 2001; Glucksberg & Keysar, 1990). In nominal metaphors, vehicle terms can thus be used to refer at either of two levels of abstraction: to the literal basic-level referent (e.g., actual sharks that swim in the ocean) or to the superordinate category of animals and people that the metaphor vehicle exemplifies (e.g., creatures that are vicious, aggressive, etc.).

Predicative metaphors seem to have these same properties. In expressions such as “The car flew through the intersection,” the verb is taken to refer to a higher level of abstraction (traveling very fast) regarding the literal, basic-level category of traveling (through the air). Like nominal metaphors, when a verb has dual reference, predicative metaphors can be paraphrased as literal comparisons and vice versa, for example, It was as if the car flew through the intersection. Note that literal uses of verbs cannot be paraphrased in this way, for example, The robin flew to its nest cannot be sensibly paraphrased as It was as if the robin flew to its nest. Such a paraphrase actually negates the original assertion.

Finally, just as nominal metaphors use vehicles that epitomize certain categories of objects, situations, or events, predicative metaphors use verbs that epitomize certain categories of actions. For example, the verb to fly literally entails airborne movement, but it also epitomizes swift travel. Flying through the air epitomizes speed, and so expressions such as “He hopped on his bike and flew home” are readily understood via the same strategies that nominal metaphors, such as “His bike was an arrow,” are understood. Arrows are prototypical members of

³Recently, Talmy (2000) argued that motion verbs can be metaphorically used and interpreted in fictive motion statements such as “The highway runs along the coastline.” Although the issue is far from settled, it is not clear that fictive motion verbs are metaphorical, or are simply one of the ways that we routinely (and hence literally) refer to space or locations. As Jackendoff and Aaron (1991) noted, statements such as “The road goes from New York to L.A.” do not seem metaphorical at all. Indeed, they argue that “there is no way to express spatial extent other than by using such expressions. … virtually all the extent verbs of English can also be used as motion verbs” (p. 329). They point out that it would certainly be odd to say “Metaphorically speaking, the road goes from New York to L.A.” In contrast, the verbs that we used in this study do no behave in this way: It would be perfectly acceptable to say “Metaphorically speaking, the idea flew across town.”
the category of speeding things; flying is a prototypical member of the category of fast travel. For nominal and predicative metaphors, prototypical members of categories can be used as metaphors to attribute properties to topics of interest. Future work should establish the extent to which nominal and predicative metaphors share representational and processing characteristics.

REFERENCES


APPENDIX

Experimental stimuli employed in the metaphoricity ratings: The first sentence of each set refers to the basic level (L0), the second to the alternating level (L1), and the third to the superordinate level (L2). The first verb in each sentence is a specific verb and the second a general verb.

Subject Noun Phrase Sentences

The bird grabbed the worm and flew/went across town.
The boy grabbed his bike and flew/went across town.
The idea flew/went across town.
Margaret’s knitted sweater unraveled/fell apart during her vacation.
Margaret’s ancient car unraveled/fell apart during her vacation.
Margaret’s careful plan unraveled/fell apart during her vacation.

As the ocean storm’s intensity increased, Patrick’s ropes frayed/wore out.
As the ocean storm’s intensity increased, Patrick’s boat engine frayed/wore out.
As the ocean storm’s intensity increased, Patrick’s nerves frayed/wore out.

The barber-shop quartet is whistling/moving toward center stage.
The galaxies are whistling/moving toward a common center.
Political opinion is whistling/moving toward a common center.

Sara’s worn down nanny limped/traveled back home.
Sara’s worn down station wagon limped/traveled back home.
Sara’s worn down confidence limped/traveled to new depths.

The children danced/moved over the full extent of the stage.
The boats danced/moved along the full extent of the shore.
The paint danced/moved over the full extent of the canvas.

Droplets rained/fell on every inch of the arena.
Confetti rained/fell on every inch of the arena.
Sound rained/fell on every inch of the arena.

The hurricane stormed/forced its way through the coastal defenses.
The troops stormed/forced their way through the opposing defenses.
Lisa’s verbal assault stormed/forced its way through his emotional defenses.

The storm clouds hovered/hung over the village.
The poster hovered/hung over the desk.
John hovered/hung on her every opinion.

The toddler crawled/climbed up the steep slope.
The semi crawled/climbed up the steep slope.
Their despair crawled/climbed up to a peak.

The black bear was slumbering/idling on the side of the road.
The RV was slumbering/idling on the side of the road.
His energy was slumbering/idling at a most inopportune time.

The club bouncer lumbered/traveled towards town.
The bulldozer lumbered/traveled towards town.
The bad news lumbered/traveled towards town.

The little girl tiptoed/moved along the trail.
The mountain bike tiptoed/moved along the trail.
The autumn leaves tiptoed/moved along the trail.

The raccoons ate/consumed the debris of the fair.
The garbage truck ate/consumed the debris of the fair.
Mark’s subconscious ate/consumed his emotional debris.

The water streamed/ran through the forest.
The marathoners streamed/ran through the streets.
The words streamed/ran through her head.

The punkers pushed/displaced other concert goers off of the platform.
O.J.’s trial pushed/displaced all other stories from the front page.
Thoughts of food pushed/displaced all other thoughts from his mind.

The commuters shivered/shook in the harsh wind.
The building shivered/shook in the earthquake’s harsh aftershocks.
Justice shivered/shook at the O.J. verdict.

The tap dancer danced/beat rhythmically on the stage floor.
The waves danced/beat rhythmically on the shore.
The moonlight danced/beat rhythmically on the shore.

The bees swarmed/gathered on the honeycomb.
The clouds swarmed/gathered on the horizon.
The colors swarmed/gathered on the mural.

The neighbors obeyed/adapted (to) the constraints of the property.
The plants obeyed/adapted (to) the constraints of the garden.
The treaty obeyed/adapted (to) the constraints of their demands.

The balloons inflated/grew into unusual shapes.
His waistline inflated/grew no matter what he did.
Her courage inflated/grew to meet the challenge.

The rock climbers climbed/rose to the mountain ridge.
The sourdough climbed/rose to perfection
Inflation climbed/rose to new heights.
The dog howled/expressed (his need) for attention
The child howled/expressed (his need) for attention.
The vegetable garden howled/expressed (its need) for attention.

The tuna were floundering/trying to escape from the fisherman’s net.
Julie was floundering/trying to provide for her children while on welfare.
Julie’s thoughts were floundering/trying to fit together in class.

The entire harvest wilted/decayed over time.
The Victorian house wilted/decayed over time.
The town vagabond’s sanity wilted/decayed over time.

The virus infected/contaminated the nuclear plant workers.
The toxic waste infected/contaminated the nuclear plant workers.
The rumor infected/contaminated the nuclear plant workers.

Object Noun Phrase Sentences

The young man kidnapped/stole the child that wandered from the group.
The young executive kidnapped/stole the opposition’s solution.
The young lover kidnapped/stole the moon for the evening.

The woman killed/rejected the prizewinning hog.
The woman killed/rejected the proposal.
The woman killed/rejected her desires.

Before it was too late, Brian bolstered/restrained his weapon.
Before it was too late, Brian bolstered/restrained his tongue.
Before it was too late, Brian bolstered/restrained his pain.

Jen filed/saved her official letters.
Jen filed/saved her money.
Jen filed/saved her anger.

Matt unlocked/opened his door.
Matt unlocked/opened his old wound.
Matt unlocked/opened her heart.

Melissa uncorked/opened the bottle of wine.
Melissa uncorked/opened the starting gate.
Melissa uncorked/opened her thoughts.
They unleashed/released the dogs.
They unleashed/released the prisoner.
They unleashed/released her worries.

Kathy devoured/consumed the gourmet meal.
Kathy devoured/consumed the lecture material.
Kathy devoured/consumed the child’s attention.

The mischievous student craned/stretched his neck to see the board.
The mischievous student craned/stretched his rubber band for firing.
The mischievous student craned/stretched his imagination in class.

They retreated/withdrew the troops.
They retreated/withdrew the invitation.
They retreated/withdrew their welcoming smile.

They melted/dissolved the ice.
They melted/dissolved the alliance.
They melted/dissolved his confidence.

He garnished/decorated the meal.
He garnished/decorated the war hero.
He garnished/decorated the truth.

She bridled/confined the horse.
She bridled/confined the oil spill.
She bridled/confined her fury.

The official evicted/ejected the tenants from the apartment.
The official evicted/ejected the cannonball from the cannon.
The official evicted/ejected the fears from the crowd.

The woman sutured/repaired his leg.
The woman sutured/repaired his best suit.
The woman sutured/repaired his enthusiasm.

They parachuted/dropped the bomb into enemy territory.
They parachuted/dropped the candy into the trick-or-treaters’ bag.
They parachuted/dropped the information into the discussion.

She shot/delivered an arrow across the room.
She shot/delivered a message across the room.
She shot/delivered a glance across the room.

The medic darned/mended his socks.
The medic darned/mended the cut.
The medic darned/mended his marriage.

Jason piloted/maneuvered the airplane across the country.
Jason piloted/maneuvered his dance partner across the floor.
Jason piloted/maneuvered the campaign across the country.

We amputated/excised the gangrenous toe from his foot.
We amputated/excised the frames from the film.
We amputated/excised time from our busy schedules for a vacation.

He buckled/fastened his new leather belt.
He buckled/fastened a bandage around her knee.
He buckled/fastened his attention on the performance.