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Chapter 9

Understanding Idiomatic Expressions: The Contribution of Word Meanings

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Idioms pose interesting problems for standard theories of language comprehension. Some idioms, such as *by and large*, appear to be nothing other than long words. The meaning of *by and large* is roughly equivalent to the word generally, and the idiom itself behaves as if it were a single word. Its meaning is opaque in the same way that most word meanings are opaque. Word meanings cannot be discovered; they must be learned because there is no systematic relationship between the sound of a word and its meaning, or between the individual elements of single-morpheme words and their meanings. The meanings of phrases and sentences, in contrast, can be discovered from the meanings of their individual elements. Phrase and sentence meanings are thus compositional, while most word meanings are not. If idioms are indeed simply long words, then idiom meanings must also be noncompositional.

This view of idioms as noncompositional extends to transparent idioms as well as to opaque ones (Katz, 1973). Indeed, the issue of idiom transparency is moot once non-compositionality is assumed. Even idioms that may have originally been metaphors, such as *carrying coals to Newcastle*, are viewed as non-compositional strings, no different in kind from such opaque idioms as *by and large* or *spic and span*. The issue of compositionality has been central to competing theories of idiom comprehension. On the one hand are those theories that treat idiom comprehension as unique and different from ordinary language processes. These include the idiom list hypothesis (Bobrow & Bell, 1973), the lexicalization hypothesis (Swinney & Cutler, 1979), and the direct access hypothesis (Gibbs, 1980). Each of these approaches to idiom comprehension assumes that idioms are not compositional. Thus, the meanings of the individual elements of an idiom contribute nothing to the meaning of the idiom itself. An

alternative view, expressed in Gibbs & Nayak's (1989) decompositionality hypothesis (also see Nunberg, 1978) and in Cacciari & Tabossi's (1988) configuration hypothesis, treats idioms as continuous with ordinary forms of language use. On this view, the meanings of an idiom's elements may play important roles in idiom interpretation and use, depending on the particular type of idiom involved. Before considering the issue of idiom types, we will briefly review the evidence relating to the two major classes of idiom comprehension models: non-compositional, which assumes that idioms are a unique form of language, and compositional, which assumes that idioms may range from the non-compositional word-like phrase to fully compositional metaphor-like constructions (cf. Gibbs & O'Brien, in press).

Idioms as Noncompositional Strings

Bobrow and Bell (1973) proposed that idioms are represented in a mental idiom list, separate from and independent of the mental lexicon. When an idiom is encountered, the literal meanings of the words are first examined. Then, if the literal meanings are not interpretable in context, the idiom list is searched. If the word string is found in the list, then the listed idiom meaning is taken to be the intended meaning. Aside from the implausibility of such a cumbersome literal-first strategy, the evidence easily rejects this hypothesis. Because literal meanings are always considered first, the idiomatic senses of idioms should take longer to understand than their literal senses. This clear-cut prediction of the idiom list hypothesis is false. Familiar idioms are understood as quickly or quicker than their literal counterparts (Swinney & Cutler, 1979; Gibbs, 1980). For example, the idiomatic meanings of such idioms as *kick the bucket* are understood more quickly in their idiomatic sense (to die) than in their literal sense (i.e., boot the pail).

Swinney & Cutler tried to account for rapid idiom comprehension by assuming that (1) idioms are stored directly in the mental lexicon as "long words" and (2) word meanings and the compositional meanings of word strings are processed concurrently. When an idiom is encountered, its literal, compositional meanings are derived, and, if the word string matches a "long word" in the mental lexicon, then that long-word idiom is also activated. Because word recognition is usually faster than phrase comprehension, idiomatic meanings may be identified more quickly than literal phrase meanings, e.g., the idiomatic meaning of *kick the bucket* may be accessed directly before its verb phrase meaning of booting the pail.

A major problem for the lexical representation hypothesis is that many idioms behave like ordinary phrases, not like words. Many idioms can undergo syntactic operations such as tense marking, e.g., one can kick the bucket now, one will kick the bucket tomorrow, or one may have kicked the bucket last week. If the string *kick the bucket* is merely a long word, then the element *kick*

should not be syntactically productive. In addition, many idioms are lexically productive. Gibbs, Nayak, Bolton and Keppel (1989) found that some idioms retained their figurative meaning even when one word was substituted for another, as in *crack the ice* instead of the more usual *break the ice*. These phenomena — the syntactic and lexical flexibility of at least some types of idioms — effectively reject the lexical representation hypothesis as a general model of idiom comprehension.

One final form of the lexical representation hypothesis merits consideration. Gibbs (1980) found that idioms in context could be understood more easily than comparable literal expressions. This basic finding led Gibbs to propose the direct access hypothesis: People can bypass literal meanings entirely, and so the most familiar, conventional meaning of a word or a phrase will be the first meaning that people will arrive at. Hence, if the idiomatic meaning of a word string is highly conventional, then that meaning will be accessed before any literal meanings.

This position, of course, faces the same problems as Swinney and Cutler's (1979) lexicalization hypothesis. Even if literal meanings could be entirely bypassed, the direct access hypothesis requires some mechanism for accessing idiomatic rather than literal meanings. What cues lead listeners to seek idiomatic meanings in the first place? The direct access hypothesis also requires an exact match between an input string and a stored idiom. Yet it is clear that different patterns of words can yield the same idiomatic meanings, e.g., "Mary was just letting off some steam," "Some steam was let off by Mary" and "Mary let some steam off" can all be recognized as the same idiom (Gibbs et al., 1989). Such syntactic variants are not confined to the psycholinguistic laboratory. A recent newspaper article on the refusal of a traditional military college to admit women quoted the college dean as saying "We will continue to march to the drums we've been marching to" (New York Times, 1989).

Activation of Literal Meanings During Idiom Processing

In addition to the problems raised above, the direct access hypothesis is also inconsistent with the notion that language comprehension is non-optional. Understanding "...occurs automatically without conscious control by the listener. [We]...cannot refuse to understand..." (Miller & Johnson-Laird, 1976, p. 68). Automatic comprehension may not apply to discourse levels of language use, but it certainly applies at the word level. Stroop, for example, demonstrated that people could not ignore the meanings of printed words, even when the task was to ignore what the words meant and to report only the color of the ink they were printed in (1935). When words have more than one meaning, then the most frequent meaning of a word is always activated (Simpson, 1981; Tabossi, 1988; Tabossi, Colombo & Job, 1987; Rayner & Frazier, 1989). Thus, even when a word string has a highly conventional meaning, as in "kick the

bucket," the most frequent meanings of the individual words would be activated in addition to the idiomatic meaning of the word string. This implies that people should not be able to suppress the literal meanings of these words, no matter how conventional an idiom may be. In addition, models that posit complete bypass of literal meanings have difficulty with the segmentation problem: What cues might be available to enable people to suspend or inhibit ongoing linguistic processing? Whether word meanings that are automatically activated play a functional role in idiom understanding is, of course, a separate question.

Direct evidence on the activation of literal meanings during idiom comprehension was reported by Cacciari and Tabossi (1988). People listened to stories that could end either with a literally intended expression or an idiomatic expression. The idiom expressions could not be recognized as such until the very last word of the idiom string, e.g., an expression could be literal as in "he was in seventh *place*" or idiomatic as in "he was in seventh *heaven*." What meanings of this expression are activated in this context? Using a cross-modal priming paradigm, Cacciari and Tabossi found that the literal meaning of heaven is activated immediately. The idiomatic meaning, related to the concept of happiness, is not activated until 300 msec later, when both the literal and idiomatic senses are active. In a later study, Tabossi and Cacciari (1988) provided contexts that were appropriate to the idiomatic meanings of target phrases. Under this condition, both the idiomatic and literal meanings were available immediately. At first glance, this finding would seem to parallel the findings for ambiguous words in general. Both the most frequent, dominant meaning and the contextually appropriate meanings are activated. However, there is one important difference between literally ambiguous words and words that are used idiomatically. In the literal ambiguous case, the dominant but contextually inappropriate meanings do not remain active for more than 200 msec or so, perhaps for as little as 120 msec (Onifer & Swinney, 1981; Simpson, 1981). In the idiom case, both the idiomatic and literal meanings may persist for 300 msec (Cacciari & Tabossi, 1988) and in certain cases much longer than that (see below). These findings suggest that word meanings are accessed and may play important roles in the use and comprehension of idiomatic expressions. Two models of idiom comprehension are consistent with this general idea: the configuration hypothesis proposed by Cacciari and Tabossi (1988), and the decompositionality hypothesis proposed by Gibbs and Nayak (1989).

Idioms as Recognizable Configurations

The configuration hypothesis treats idioms as no different from any other kind of familiar, memorized string of words. When such a string is encountered, word meanings are activated and, at the same time, the string itself can be recognized as a unit, or configuration. Very familiar word sequences, such as lines of poetry or snatches of songs, are prototypical configurations. Some of

these configurations can be recognized upon hearing the first few words, so that when someone utters the words "Oh beautiful for spacious....," most U.S. residents would immediately recognize the sequence as the opening line of the song, "America, the Beautiful." How this utterance might be interpreted is, of course, context-dependent. If uttered while flying over the Rocky Mountains, it would probably be interpreted as a comment on this continent's natural beauty. If uttered while walking by an unsightly, noxious landfill, it would probably be interpreted as an ironic comment on the environment. Other familiar strings may not be recognized as such until the phrase is completed, as in "Oh say, can you.....," which can be an ordinary request, as in "....can you make it for dinner next week?", or the opening line of the U. S. National Anthem, "...can you see."

In either case, the meanings of the individual words are activated while the configuration is being perceived and recognized. The word "take," for example, is a lexical entry that is activated when someone utters the sentence "the boy took the book," and this lexical entry is also activated when someone utters idioms such as "take the bull by the horns" or "take to heart" (Cacciari & Tabossi, 1988). The meanings of the individual words in configurations, whether they form idioms or not, can thus play important roles in discourse. First, they can play a role in immediate idiom comprehension. Second, they may be involved in the syntactic and lexical flexibility of idioms, i.e., they might enable people to produce syntactic and lexical variants of familiar idioms, and, of course, to understand such variants. They can play a role in a third important idiom phenomenon, *semantic productivity*, as when people use the semantics of an idiom's elements to create an idiom with a new meaning, e.g. "no matter how terribly they tortured him, he didn't spill a single bean!". Finally, the internal semantics of an idiom's elements should be involved in a fourth and relatively unexplored idiom phenomenon, *discourse productivity*. When idioms are used in conversation, responses to idioms may well play on the semantics of the words in the idiom, as in:

> Tom: Did the old man kick the bucket last night?
> Joe: Nah, he barely nudged it!

In this case, the verb "nudge" can only be understood by reference to the verb "to kick." The discourse meaning of "barely nudge" can be understood as "not even close to dying" only by analogy with "kick": *Not being close to dying* is to *dying* as *barely nudge* is to *kick*. In cases such as this, both the idiomatic and the literal meanings of the verb "to kick" must be available for (a) Joe's response to Tom, and (b) Tom's ability to understand that response. Viewed in this light, Cacciari and Tabossi's finding that both literal and idiomatic meanings are activated *and remain activated* during idiom comprehension makes sense. Both the literal and the idiomatic meanings can contribute to idiom interpretation and use in discourse.

These examples suggest that idioms are not monolithic, nondecomposable units. Instead, they are no different from any other kind of familiar word sequence whose interpretation is context dependent and whose individual elements may play important roles in ongoing discourse. The extent to which the meanings of individual words in a sequence contribute to the meaning of the sequence itself can, of course, vary. As we saw earlier, some brief word sequences, such as the idiom *by and large*, seem to behave like a long word. Such sequences cannot be varied, either syntactically or lexically. In addition, responses that play on the individual words wouldn't make sense, e.g., it is difficult to imagine a context where responses such as *by and small* or *by or large* might be interpretable. Other familiar sequences, such as *pop the question*, do seem to depend, at least in part, on the meanings of the words in the sequence. Such idioms can be varied, and can also be responded to in ways that can use the meanings of their individual elements, as in

Susan: When do you think he'll pop the question?
Evelyn: I don't know, but when he does I'll pop the answer!

Clearly, word sequences, including idioms, may differ widely in the extent to which their elements may contribute to their meanings. How shall these differences be characterized?

Semantic Decomposition and Idiom Flexibility

Nunberg (1978) proposed that idioms vary in the extent to which they are semantically analyzable, or decomposable. A normally decomposable idiom is one whose parts map directly onto their idiomatic referents. In the idiom *pop the question*, for example, the verb *pop* and the noun phrase *the question* map directly onto their respective idiomatic referents "suddenly ask" and "marriage proposal." A nondecomposable idiom such as *spic and span*, in contrast, has no parts that map onto the idiomatic meaning of "perfectly neat, clean and orderly." On this logic, idioms such as *kick the bucket* are nondecomposable because there is no semantic relation between any of the words in the idiom and the idiomatic meaning of *die*. Between these two extremes are so-called abnormally decomposable idioms, such as *carry a torch* and *spill the beans*. In idioms such as these, the idiom's individual components relate to their referents metaphorically instead of directly, i.e., there is no clear semantic relation between *beans* and *secrets* as there is between *the question* and *marriage proposal*.

In an extensive series of studies, Gibbs and his colleagues found that college students could reliably categorize idioms in terms of degree of semantic decomposition. When people were asked to classify idioms as decomposable or not, they did so reliably. The decomposable idioms were then presented a second time for grouping into normally and abnormally decomposable, and again people could classify these idioms reliably (Gibbs & Nayak, 1989).

These data demonstrate that people can reliably discriminate among the three idiom types. Can differences in idiom flexibility, both syntactic and lexical, be attributed to differences in semantic decomposition? Decomposable idioms are more syntactically and more semantically flexible than less decomposable idioms, supporting Gibbs and Nayak's decomposition hypothesis (Gibbs & Nayak, 1989; Gibbs, Nayak & Cutting, 1989; Gibbs, Nayak, Bolton & Keppel, 1989). For decomposable idioms, syntactic variants such as "the law was laid down by John" are judged as sensible. For nondecomposable idioms, variants such as "the bucket was kicked by John" are not acceptable. Similarly, decomposable idioms retain their meanings when synonyms are substituted, as in *burst the ice* for *break the ice*. Nondecomposable idioms tend to lose their meaning when such substitutions are made, e.g., *boot the bucket* for *kick the bucket*.

Phrasal idioms thus seem to vary along a continuum of compositionality (or analyzability), and the more analyzable they are, the more flexibly they behave, both syntactically and lexically. These phenomena challenge the notion that idioms have a single semantic representation that is unrelated to the meanings of their components. Even more challenging are two additional phenomena, semantic productivity and discourse productivity. Each of these has yet to be accounted for in theories of idiom representation and idiom comprehension, and it is to these two phenomena that we now turn.

Semantic Productivity

Semantic productivity is the use of lexical and syntactic operations to create new idiomatic meanings from old ones. Studies of lexical flexibility, in contrast, have only examined the extent to which idioms *retain* their original meanings when one word is substituted for another. Without exception, studies of lexical flexibility have used lexical substitutions without any contextual or communicative motivation. For some idioms, substituting a synonym can have little if any effects on either meaning or acceptability, as in *hit the hay* vs. *hit the sack*. For other idioms, synonym substitution can render an idiom either uninterpretable, unacceptable, or both, as in *kick the bucket* vs. *kick the pail*. The functional determinants of lexical flexibility have not been studied in detail, other than Gibbs' finding that analyzable idioms tend to be more flexible both syntactically and lexically than non analyzable idioms.

Semantic productivity, as we noted above, is the ability of people to create new idiomatic meanings by changing various aspects of an idiom's individual elements. In contrast to simple and unmotivated synonym substitutions, semantically productive operations serve communicative functions: They are

motivated by communicative intentions and so they should be informative. Some relatively simple productive operations have been subsumed under the rubric of syntactic or lexical flexibility. Among these are:

1. Adjectival modification, as in "When drugs are involved, it's time to speak your *parental* mind."
2. Adverbial modification, as in "Did he *finally* speak his mind?"
3. Quantification, as in "As a diverse but purposeful group, you should speak your *minds*."
4. Tense marking, as in "He *spoke* his mind."
5. All of the above, as in, "The tenants' association finally spoke their collective minds."

What is noteworthy about this example is not only that an idiom can be semantically productive, but that this particular idiom is one of a group of nondecomposable idioms used by Gibbs, Nayak and Cutting (1989). Recall that nondecomposable idioms should tend to be both lexically and syntactically frozen, yet this idiom seems to be quite productive.

This example suggests that semantic productivity may be independent of both syntactic and lexical flexibility, and it may be independent of semantic analyzability as well. Before examining these issues, however, we wanted to know whether people could understand variants of idioms that are intended to mean something different than the original idioms. To examine this issue, one of our students, William Cohen, generated a set of 27 one-paragraph stories that provided contexts to motivate a semantically modified idiom. Three kinds of semantic modifications were examined:

1. Quantification, as in "he has *three* left feet."
2. Negation or antonymy, as in "he always bit off *a bit less* than he could chew."
3. Miscellaneous, as in "She tended to burn her bridges *ahead of* her" to describe someone who insured her own future failures.

Ten college students read each story with its modified idiom and provided a paraphrase of that idiom. After completing the entire set, the students provided ratings of how understandable each of the modified idioms was. Finally, the students were given the 27 idioms in their original form and asked to rate these for familiarity.

One student apparently misunderstood the instructions and provided no interpretable paraphrases of the idiom variants. The other nine subjects seemed to have no difficulty and provided quite sensible paraphrases, indicating that the idiom variants were easily understood. One of these variants provides a good example:

> Roger always signed up for the easiest courses on campus, even though he was very smart. On hiking trips, he always chose the safest and easiest trails, even though he was in terrific shape and had years of hiking experience. *He was the sort of person who always bit off much less than he could chew.*

The nine paraphrases we obtained were: He did less than he could; Roger never pushed himself; He did not challenge himself; He always did less than his potential best; He took the easiest way out; He always took the easiest way out, although capable of more; He was a person who always did less than he was capable of; He never took on challenges; and He does less than he could, just to be safe.

The idiom variant *(much less than he could chew)* was clearly understood in the same way by all nine subjects. The understandability ratings reinforce this conclusion: On a scale of 1 to 5 (where 1 indicates that the meaning is very clear and 5 that the sentence makes no sense) this item received a mean rating of 1.3. When asked to rate how familiar the original idiom was (bite off more than one could chew), the subjects rated it as quite familiar, with a mean rating of 1.1 on a scale of 1 (very familiar) to 5 (very unfamiliar). Overall, the mean understandability rating of the idiom variants was 1.9 (SD = 0.53), indicating that people had little difficulty interpreting these idiom variants. The mean familiarity rating of the original idioms was 1.6 (SD = 0.56), indicating that the original idioms were, in general, quite familiar.

As one might expect, the more familiar idioms were rated as easier to understand in their variant form. The correlation between rated familiarity and comprehension was +.36. Despite the restricted range, this correlation is reliably greater than zero ($p < .05$). However, even those idioms that were not familiar were generally interpreted sensibly. The idiom that was rated as least familiar by our group of subjects was *To carry a torch for (someone)*. The variant of this idiom appeared in the following context:

> From the moment Jenifer met Clyde, she had been infatuated with him. Even though he seemed uninterested, she would wait outside his classes, hoping to talk to him for even a moment. She even tried to learn Italian when she heard that he liked European women. It seemed that no matter how cold and distant Clyde acted towards her, she couldn't stop her infatuation. Finally, Clyde stopped Jenifer outside the student union and told her very directly that he could never love her. Jenifer cried for days, but *finally put down her torch.*

The mean understandability rating for this idiom variant was 2.8; familiarity with original was rated 3.1. The paraphrases that were provided for this variant were (with the subject's individual comprehensibility and familiarity ratings):

1. Stopped thinking about him	(4; 4)
2. no response	(5; 5)
3. She gave up her attempt	(4; 5)
4. She gave up (sort of a confusing analogy)	(3; 4)
5. She stopped being infatuated	(1; 1)
6. She stopped liking him	(1; 2)
7. Gave up	(1; 1)
8. Eventually, she stopped feeling love for him	(1; 1)
9. no response	(5; 5)

For those subjects who were familiar with the original idiom, comprehension posed no problems (Subjects 5, 6, 7 and 8). But for those subjects who were relatively unfamiliar with the original, comprehension was not that difficult. Only two subjects failed to provide any response, even though the idiom's meaning could be inferred from context.

The conclusion that we draw from this exploratory study is that idioms can be semantically productive, at least in context. This is consistent with the view that the semantics of an idiom's elements are available, and may play a role in understanding idioms both in their original form and in contextually appropriate variants. How easy is it to understand such contextually appropriate variants? Can they be interpreted as easily as ordinary, literally intended language? To deal with this issue, another student, Matthew McGlone, asked subjects to read stories with both original and variant idioms one line at a time. Reading rate was timed, and this provided a measure of comprehension difficulty.

We expected that original idioms would be understood more quickly than their variants when the context was relatively general. In these contexts, both the original and the variant would be plausible and appropriate, but there would be no particular reason to use the variant over the original. When both the original and variant were specifically appropriate, then we expected comprehension to be quite easy. Examples of general and specifically-appropriate contexts are shown in Table 1.

The results of this exploratory study were clear. People can easily interpret variants of idioms, particularly when those idioms are specifically context-appropriate. With more general contexts, where the idioms were not motivated, idioms in their original form were read more quickly than their variants (mean reading time 2150 msec and 2360 msec, respectively). When, however, context was specifically appropriate, then both the original and variant forms were facilitated (1540 and 1780 msec, respectively). Note that the original is always faster than the variant, as would be expected on the basis of sheer familiarity, but also that the variant in the specifically appropriate condition was read at least as quickly as the original in the generally appropriate condition (2150 and 1780 msec, respectively). More interestingly, both the original and variant idioms were read more quickly than ordinary "literal" filler sentences in comparable discourse contexts; the mean reading time for literal filler sentences in context-approriate discourse locations was 2270 msec. This is consistent with Gibbs' (1980) finding that idioms can be understood more quickly than comparable literal expressions. What is new here is that motivated variants of idioms can also be understood more rapidly than comparable literal expressions. Apparently, the familiarity of an idiomatic expression, even in variant form, can facilitate comprehension.

Table 1

Examples of Original and Variant Idioms with General- and Specific-Appropriate Contexts.

General

While Sam was strolling through the city park, he happened to see his old friend Vince feeding the ducks. He and Sam had been closest friends during college, and through the years they had found time for chats in the local coffee shop. They stood and talked by the pond while Vince doled out the rest of his bread to the hungry ducks. Vince asked him about his plans for the summer.

Specific

Lieutenant Sam Murphy was a pilot during the war. While conducting a reconnaissance mission he was shot down over enemy territory and captured. He was presented before one of the enemy commanders and was interrogated for details of his squadron's attack strategy. He knew the entire battle plan, but he acted ignorant. The enemy commander threatened to kill him if the plans weren't disclosed.

Original: *Sam spilled the beans.*
Variant: *Sam didn't spill a single bean.*

These results suggest very strongly that idiom comprehension involves more than simply recognizing a string as an idiom. In addition to idiom recognition, the words comprising the idiom are processed and can be used to generate interpretations of idiom variants. In the next section, we examine how the internal semantics of idioms can play an important role in how idioms are used and responded to in ongoing discourse.

Discourse Productivity

Once an idiom has been used in a conversation, the semantics of its elements may both constrain its further use and provide the bases for elaborations and responses. Recall the example of the conversation between Tom and Joe:

Tom: Did the old man kick the bucket last night?
Joe: Nah, he barely nudged it.

The verb phrase "kick the bucket" permits responses and elaborations that play on the semantics of the verb "to kick." Accordingly, we would expect that different types of idioms might function differently in conversation depending on the nature of the elements comprising the idiom and how those elements contribute to the idiom's meaning.

We have already seen that Nunberg's (1978) classification of idioms into three types — normally decomposable, abnormally decomposable and nondecomposable — accounts in part for some aspects of idiom comprehension and use. Gibbs, Nayak, Bolton and Keppel (1989), for example, found that decomposable idioms — i.e., those that were analyzable in terms of literal relations between an idiom's elements and idiomatic meaning — were more lexically flexible than nondecomposable idioms. Similarly, Gibbs and Nayak (1989) found that decomposable idioms were more syntactically flexible than nondecomposable idioms. Finally, decomposable idioms are easier to understand than nondecomposable (Gibbs, Nayak & Cutting, 1989). Analyzability, however, accounts only partially for these three phenomena. In each of the studies cited above, abnormally decomposable idioms do not differ substantially from normally decomposable idioms. In addition, we have already seen that even nondecomposable idioms, such as *speak one's mind* can be semantically productive. Such idioms can also be productive in discourse, as in:

Mary: Did Harry speak his mind on the bond issue?
Sally: He can't speak his mind if he doesn't even know it yet!

In this example, the concept *mind* is clearly related to both the idiom's meaning and Sally's response, yet Nunberg's idiom typology fails to capture these relations. At the same time, idioms do seem to differ markedly in their lexical and syntactic flexibility and, more importantly, in their semantic and discourse productivity. What differentiates among idioms that vary in flexibility and productivity?

Towards a Functional Typology of Idioms

We begin with the assumption that idioms, like other forms of natural

language, are processed semantically and syntactically. This assumption fits nicely with Cacciari and Tabossi's (1988) finding that the literal meanings of an idiom's elements are activated and remain activated during idiom comprehension (see also Tabossi & Cacciari, 1988). This assumption also accounts for Gibbs, Nayak and Cutting's (1989) finding that nonanalyzable idioms take longer to understand than analyzable ones. If people semantically and syntactically analyze all word strings whether they are idiomatic or not, then comprehension should be interfered with when the results of those analyses fail, i.e., have no relation to the word string's meaning.

This argument suggests an initial classification of idioms into two general types: those in which there is no apparent relation between an idiom's elements and its meaning, and those where there is such a relation. This is basically the distinction between non-analyzable and analyzable idioms. For non-analyzable idioms (type N), semantic and syntactic analyses are nonfunctional. Accordingly, idioms such as *by and large* and *spic and span* should be neither semantically nor lexically flexible, and they should also be nonproductive in discourse. Such idioms can, in essence, be treated as special lexical entries, no different than ordinary long words where the individual morphemes do not comprise the meaning of the word itself.

For analyzable idioms, some relationships between an idiom's elements and its meaning can be discerned. In such idioms, the particular relationship may affect how an idiom might be productive. There are several ways that the "literal" meanings of an idiom's words can map onto the meaning of the idiom itself, and idioms may be classified accordingly.

Analyzable-opaque, Type AO

In this type of idiom, the relations between an idiom's elements and idiom meaning may be opaque, but the meanings of individual words can nevertheless constrain both interpretation and use. For the idiom *kick the bucket*, for example, the semantics of the verb *to kick* constrains interpretation as well as semantic and discourse productivity (see examples above).

Analyzable-transparent, Type AT

In these idioms, there are clear semantic relations between the elements of the idiom and components of the idiom's meaning, usually because of metaphorical correspondences between the idiom's elements and components of the idiom's meaning. In the idiom *break the ice*, for example, the word "break" corresponds to the idiomatic sense of changing a mood or feeling, and the word "ice" corresponds to the idiomatic sense of social tension. The elements of the idiom *spill the beans* similarly map onto the components of the idiom's meaning. "Spill" corresponds to the act of revealing or letting out, and "beans"

corresponds to the material that had been heretofore concealed or otherwise unknown. Included in this class are both the normally and abnormally decomposable idioms of Nunberg's (1978) and Gibbs' et al. (1989) classification. We see no compelling reason to distinguish between these two subtypes. Recall that normally decomposable idioms have quasi-literal relations between elements and meanings, as in *pop the question*, while in abnormally decomposable idioms these relations are more or less metaphorical, as in *spill the beans* or *break the ice*. There seems to be no principled reason why this distinction should be functional either in idiom comprehension or idiom productivity, just as the general distinction between literal and metaphorical usage seems to be nonfunctional in discourse processing contexts (see Gibbs, 1984; Glucksberg, 1989; Keysar, 1989; Rumelhart, 1979).

Quasi-metaphorical, Type M

In these idioms the literal referent of the idiom is itself an instance of the idiomatic meaning, e.g., *giving up the ship* is simultaneously an ideal or prototypical exemplar of the act of surrendering and also a phrase that can refer to any instance of complete surrender. Other examples of this idiom type include *carry coals to Newcastle* to refer to any instance of bringing something to a place that already has a surfeit of that something, *count your chickens before they are hatched* to refer to any instance of premature confidence in an outcome, and so forth. Related to these idioms are such metonymic phrases as *bury the hatchet*, where the action of burying a hatchet was once an actual part of the ritual of making peace, but is now used to refer to any instance of peace making in its entirety.

Quasi-metaphorical idioms may serve the same communicative function as do metaphor vehicles in expressions such as "my lawyer was a *shark*" or "my job is a *jail*." In these metaphors, vehicles such as *shark* or *jail* serve as ideal exemplars of their metaphoric categories — cutthroat people and confining, unpleasant situations, respectively — and simultaneously as names for those categories (Brown, 1958; Glucksberg & Keysar, in press). These metaphors may be used to characterize their referents by assigning them to categories that are diagnostic and often evaluative, as in "Margaret Thatcher *is a bulldozer*" (Glucksberg & Keysar, in press). Quasi-metaphorical idioms function in precisely this way. They simultaneously refer to an ideal exemplar of a concept (e.g., total surrender) and also characterize some event, person or object as a new instance of that concept, as in:

Nick: Things look so bad I think I'll drop the whole project.
Alice: Don't give up the ship. There's too much at stake

In this interchange, Alice identifies dropping the project as an instance of surrender by using the idiom, *don't give up the ship*. This is accomplished by implicitly grouping the two actions into the same category: Dropping the project and giving up a ship are analogues of one another, and both belong to the concept of total surrender. Total surrender, in turn, is referred to by means of an ideal exemplar of surrender, giving up a ship.

This analysis suggests that idiom flexibility and idiom productivity will be governed by the functional relations between an idiom's elements and the idiom meaning. Lexical substitutions, syntactic operations and discourse productivity should be possible whenever those functional relations are preserved. In addition, there should be some communicative or discourse purpose that is served by using an idiom in some form other than the original; a listener or reader must be able to infer a reason for the change. It thus follows that no typology, whether structural or functional, will be fully sufficient to account for idiom flexibility or productivity. The internal semantics of the idiom and the discourse context will always be the functional determinants of idiom use and variation. To illustrate this approach, we consider some variants of each of the four idiom types outlined above.

Determinants of Idiom Flexibility and Productivity

Type N

The idiom *by and large* is considered non-analyzable because a semantic and syntactic analysis of the idiom and its elements fails to produce anything that is relevant to the idiom's meaning. Hence, word substitutions are not possible because there are no similarities between an original word and its substitute that could be relevant. Syntactic operations would also be unrelated to any relevant syntactic properties of the idiom, and so no meaning-preserving syntactic operations should be possible. To the extent that there is any semantic property of an idiom's elements and the idiom meaning, some minimal semantic productivity is possible. The word "large" bears some relation to the idiom meaning of "generally," and so relevant modifications should be possible, as in *by and not-so-large* in a context that would support this qualification. Finally, discourse productivity should also rely on the semantic properties of idiom elements, and so it would be possible to use the semantics of the word "large" to reply as follows:

Ned: By and large, people are well off these days.
Mark: By and not-so-large! Have you seen the figures on homelessness in America?

The productive use of negation in this idiom points up another problem for the view of idioms as non-compositional strings. If an idiom is truly an

unanalyzable whole, then the scope of negation — or, more generally, scope of modification — must be limited to the entire string. A negation or an adjective cannot be used to modify a semantically empty element or constituent within a string (Cruse, 1986). In some cases, modification of idiom constituents, as in *break the **proverbial** ice* can be treated as a metalinguistic comment on the expression as a whole. Nevertheless, there is a clear and important theoretical difference between such metalinguistic comments and true semantic modification, as in the by-and-large example (above), or in such cases as *he broke the really frigid ice*, where the concept of social lack of warmth is intensified, not merely commented on.

These examples suggest that the idiom *by and large* is not a pure type N: The semantics of "large" do bear some functional relation to the idiom's meaning, and so this idiom is partially, if minimally, compositional. Indeed, pure type N idioms may not exist at all. To the extent that a constituent of an idiom may be modified independently of the idiom as a whole, it is compositional and so can be used productively in discourse.

Type AO

We have already provided some examples of how the analyzable-opaque idiom, *kick the bucket* may function in discourse. There may be no discernible semantic relation between the verb "to kick" and the idiomatic meaning of *to die*, yet the semantics of "kick" do constrain the idiom's use. Consider how the semantics of "kick" and the communicative conventions of discourse govern this idiom's use.

Lexical Flexibility

Although lexical substitutions might be understood, they would not be considered apt or informative. The variants *boot the bucket* and *kick the pail* might be recognized as meaning *to die* (Gibbs et al. 1989), but people would be at a loss to understand why someone would use these variants. Neither the substitution of *boot* for *kick* nor *pail* for *bucket* seems motivated by any communicative purpose, and so would not be considered acceptable, unless used by a non-native speaker. In this latter case, the usage would be understood but recognized as a mistake. When near synonyms are substituted for both the verb and the noun, as in *boot the pail*, then the idiomatic meaning of *to die* is not recognized (Gibbs et al., 1989). For opaque idioms, then, lexical substitution by near synonyms is, generally, unacceptable for the following reason. To begin with, there is no relation, metaphorical or otherwise, between the semantics of the idiom's words and components of the idiom's meaning. Near-synonym substitutions, then, would not change or shade the idiom's meaning. Therefore, synonym substitutions, even though understandable, would not be acceptable

because there would be no communicative reason to use synonyms in place of the original wording. This joint result of opacity and communicative purposes makes opaque idioms lexically rigid.

Syntactic Flexibility/Productivity

The constraints on syntactic operations should be largely semantic and pragmatic. These constraints stem jointly from the semantics of the verb "to kick" and the concept of dying. For example, kicking is a discrete action, and so even though one can lie dying for a week, one cannot say "he lay kicking the bucket for a week." One can, for the same kinds of reasons, say "almost, will, can, might, may, should, or didn't kick the bucket..." The operation of joint constraints can be seen in two examples of adjectival modification, one acceptable, the other not. It would be acceptable to say "he silently kicked the bucket" because both kicking and dying can be accomplished silently. It would not be acceptable to say "he sharply kicked the bucket" because there is no way clear way to understand how anyone could die "sharply" (cf. Wasow, Sag & Nunberg, 1983).

The operation of pragmatic constraints is illustrated by the non-acceptability of the passive voice for this idiom. People tend to reject "the bucket was kicked by John" as a paraphrase of "John kicked the bucket." The communicative role of the passive form provides a good reason for not using it for such idioms. Passives are used to put focus on the object of a clause or sentence, usually when there is some prior topicalization, as in:

> The woman turned the corner when *she was hit by a car*.
> What happened to John? *He was hit by a truck*.

No such communicative purpose can be served by topicalizing "bucket," and so the passive form is uninterpretable, i.e., the use of the passive would not be motivated. The general principle we propose is: A syntactic operation on an idiom will be acceptable if and only if it produces a comprehensible difference in interpretation, i.e., a reasonable communicative intention for the syntactic operation can be inferred. This principle, of course, applies to all idiom types. For opaque idioms, it means the passive form will not be acceptable because there would be no good reason to topicalize or focus on a grammatical or logical object. Tense markings, in contrast, would be acceptable and interpretable provided that those tense markings would be interpretable for the idiomatic meaning itself, e.g., one can die in the future and so one can also kick the bucket in the future.

Discourse Productivity

The kinds of constraints illustrated above also control how idioms are

used and responded to in discourse. All the constraints on lexical and syntactic operations apply for discourse. If, for example, the idiom in question is lexically rigid, then word substitutions in subsequent responses to that idiom would be unacceptable, e.g.,

George: Did Andy kick the bucket yet?
Richard: He kicked the pail last night.

Beyond the lexical and syntactic constraints on the original idiom, knowledge of the world will also govern discourse use. The permissible sequence of events in the world, for example, can control idiom use: One cannot go to heaven and then die, and so one cannot go to heaven and then kick the bucket. At this discourse level, then, all the constraints of semantics, syntactics and pragmatics will govern idiom use and comprehension.

Type AT

Comprehension and use of transparent idioms, such as *break the ice* and *spill the beans* should be governed by the same principles that govern opaque idiom use. The central difference, however, is that the elements of transparent idioms can be mapped onto the components of the idiom's meaning. Any operations that (a) respect the semantics of each element, (b) preserve the relationship between the idiom's elements and meaning components, and (c) respect the idiom meaning itself should be acceptable and interpretable provided that a reasonable communicative intent can be inferred. Lexical substitutions should be acceptable if they satisfy these conditions, and so the following variants of *break the ice* should be acceptable: *crack the ice*, *break the frost*, *break the chill*. In each of these cases, the concept of abrupt breaking is preserved and the metaphorical relation between physical temperature and interpersonal warmth/coolness is also preserved. However, why anyone would choose to say "crack the ice" instead of "break the ice" is unclear, and so most people would regard the former as, perhaps, a slip of the tongue. In contrast, using the words "frost" or "chill" does seem to imply a more personal form of coldness, not just an impersonal social awkwardness, and so these variants would be considered more apt and acceptable.

Lexical variants that violate the conditions specified above should be considered unacceptable. To say "crush the ice" would be unacceptable, primarily because the kind of metaphorical ice involved in this idiom is not the kind that can be crushed: It is, metaphorically speaking of course, thin and brittle, capable of being cracked or perhaps even shattered. This example illustrates again how the semantics of an idiom's elements can govern idiom use and productivity at the lexical level.

At the syntactic level, the same principles apply: Any syntactic operations

that satisfy both the semantics and pragmatics of the idiom's elements and the idiom's meaning would be appropriate — again with the proviso that a communicative purpose can be served (or at least inferred by listeners). Accordingly, passive transforms would be acceptable if it would be appropriate to focus on a grammatical object, as in "the ice was finally broken" or "despite days of intensive questioning not a bean was spilled." Note that in this latter expression "bean" was used in the singular. Pluralization operations will also be acceptable if they would be appropriate for the idiom's meaning. "Beans" in this context can be either singular or plural because "secrets" can be singular or plural: The pragmatics of the idiom's referent are the governing factor. The "ice" in "break the ice" cannot be pluralized, because the social tension referred to by the term "ice" is a singular, momentary state. In other contexts, of course, both ice and social tensions can be pluralized. One final example makes this principle clear. *Pop the question* is a transparent idiom and is also considered normally decomposable (Gibbs & Nayak, 1989) because each of this idiom's elements maps directly and literally onto the idiom meaning of *utter a (marriage) proposal.* Despite the "literal" nature of the idiom-meaning relationships, the term "question" cannot be pluralized. People cannot realistically "pop the questions" because people realistically do not make more than one marriage proposal at a time.

Finally, transparent idioms function in discourse exactly as do opaque idioms, with the added productivity that transparency provides. Because the idiom's elements are semantically related to the idiom's meanings, the semantics of those elements can be exploited in discourse. The following example illustrates this kind of productivity:

William: David is really weak; I bet he spilled the beans.
Alice: Spill? He literally poured them all over the place!

In this case the meaning of "spill" and its relation to the act of revealing permit the use of "pour" as an intensifier or emphasizer. Similarly, secrets can be "spilled" all over the place, and so it's appropriate to spill beans that way too.

Type M

Quasi-metaphorical idioms pose an interesting set of test cases. Because they are ideal exemplars of what they represent, lexical flexibility is highly constrained. Consider *carrying coals to Newcastle.* Ordinary paraphrases that use arbitrary lexical substitutes should typically fail, e.g., *carrying wood to Birmingham* communicates nothing even close the original meaning. When, however, a communicative intent can be inferred, then well-chosen paraphrases can be effective. A recent newspaper article on the dismal failures of a nuclear

generating plant at Shoreham on Long Island used the apt headline: "Carrying coals to Shoreham." The opening phrase served to remind readers of the original idiom, and familiarity with the Shoreham nuclear dilemma made the innovative idiom's meaning clear.

Within the constraints imposed by the metaphorical nature of the idiom, lexical substitutions and variants are freely available. The verb "to carry" can be replaced by another verb so long as the action involved is consistent with the intended meaning and context. Thus, bringing to or from, sending, selling, offering, can be used as appropriate. Like any metaphor, quasi-metaphorical idioms can be tailored to suit discourse purposes.

One striking example appeared in a discussion of the Democratic party's difficulties during the presidential primaries of 1988. Jesse Jackson had done very well in the popular vote, particularly in some industrial midwestern states such as Michigan, but had absolutely no chance to win the nomination. The journalists discussed how the democrats had not adequately planned how to handle this issue at the upcoming convention, and were acting, in general, in a rather self-destructive manner. To the question "how will the Democrats handle the Jackson issue at the convention?", one commentator quipped "Oh, I guess they'll *jump off* that bridge when they come to it" (emphasis added). Two things are worth noting about this example. First, the idiom *cross the bridge when one gets to it* is productive because one can substitute "jump off" for "cross" and produce, essentially, a new metaphor. Second, the reality of the literal meaning of bridge is clearly revealed by the reference to jumping — the bridge in question is not just a symbol but is real enough to be jumped from. It still is, of course, a symbol of a future event or hurdle, and so unlike a real bridge it cannot be painted, repaired, or photographed, among other things. But so long as an action is consistent with *bridge* as symbol of future event, that action can be used to generate a novel metaphor that is based on the original idiom.

The principles that govern syntactic operations in general also apply to quasi-metaphorical idioms. Syntactic operations must be communicatively motivated, and so any changes they make in an idiom's meaning must be interpretable in context. Consider the passive form. For most quasi-metaphorical idioms, no purpose would be served by focussing on the grammatical object. For this reason, it would make no sense to say "Newcastle was where the coals were carried to." This constraint, however, is not a general one. There can be metaphorical idioms that would make sense in the passive form, as in "after intensive discussions among the warring parties, the hatchet was finally buried once and for all." In this case, the grammatical object, "hatchet," can be the focus of the expression. The applicability of any syntactic operation will be governed by such communicative considerations.

Discourse productivity will, as before, also be governed primarily by pragmatic considerations. Returning to the bridge example, one can easily imagine a context for the following interchange:

Ken: Don't worry, I'll cross that bridge when I come to it.
Ann: By that time they will have burnt it down!

Here, as in earlier examples, the semantics of an idiom element (in this example, "bridge") can be used to generate appropriate conversational responses to the original idiom. While retaining its role as symbol, "bridge" can still be treated as a real bridge so long as its symbolic function is preserved.

Conclusions

Idiom use and comprehension is an integral part of everyday conversation, and so it should not be surprising to find that it is also an integral part of discourse processing. In discourse processing, the meanings of words and the compositional meanings of phrases and sentences are routinely generated and then used to infer what a speaker intends to convey. Utterances that are intended non-literally must be treated in exactly the same way as are those that are literally intended. After all, rarely could a listener (or reader) know in advance how any given utterance might be intended. The optimal strategy for discourse comprehension, then, is to treat all utterances in the same way. One strategy that could be universally employed would be to analyze all utterances semantically and syntactically, and to retain the results of such analyses at least until an intended meaning is inferred.

In the context of idiom comprehension, this implies that "literal meanings" are *always* generated, and then used where applicable. For non-analyzable idioms, i.e., for those idioms whose elements do *not* contribute to idiom meaning, the search for literal meanings is non-productive and may interfere with comprehension. This would account for Gibbs, Nayak and Cutting's (1989) finding that frozen opaque idioms (a) tend to be non-analyzable, and (b) take longer to understand than flexible, transparent idioms. The general processing strategy of applying semantic and syntactic analyses to all word strings is consistent with the general observation that people cannot ignore word and phrase meanings (cf. Miller & Johnson-Laird, 1976; Stroop, 1935). When applied to idioms, this strategy yields two products: the meaning(s) of the word string itself, and the idiomatic meaning. This, in turn, enables people to use idioms generatively in conversation.

One additional source of evidence for the role of word meanings in idiom use comes from production phenomena. Slips of the tongue can reveal important language processing mechanisms. Word substitutions occur quite often in discourse, and when they do the substitutions are not random. Substituted words are often semantically related to the "correct" or intended word (Fromkin, 1971). Examples of such substitutions in idioms include *scarce as pig's teeth* for *scarce as hen's teeth*, and *swallow the bullet* instead of *bite the bullet*. In

each of these cases the speaker intended the meaning of the original idiom and did not notice the error. More interestingly, the listeners involved understood the intended meaning in each case, and some did not even notice the errors either, even though the substitutions were, if taken completely literally, paradoxical. Pigs have teeth, so saying that something is as scarce as pig's teeth is to say that it is not scarce at all. Yet, because of the close semantic relation between pigs and hens (both barnyard animals), the intended and contextually appropriate idiomatic meaning of scarcity came through. Similarly, *bite the bullet* is a quasi-metaphorical idiom in which the action of biting a bullet is symbolic of all actions that require stoicism in the face of pain. Swallowing a bullet can only be understood by reference to the original idiom, and in the particular incident observed, some of the people involved in this interaction failed to notice the speaker's error. Everyone, including the speaker, recognized the error when it was pointed out.

These anecdotal observations should be followed up by systematic studies of idiom production, but their import is clear. People cannot isolate or ignore the meanings of words or the meanings of phrases when engaging in discourse. At the same time, people rely on familiar, memorized "chunks" of speech whose meanings derive not only from the language itself, but from their role in everyday experience. Included in this category of language are all those strings of words that we have learned, such as movie and book titles, song titles and song lyrics, poetry, proverbs, cliches, morals, and so forth. All of these have "literal" meanings, and all of these have other meanings besides. Fluent speakers of a language in a culture must be able to deal simultaneously with the language itself, and with the use of language in that culture. Like such memorized word strings as songs and poems, idioms are recognized and identified as having their own meanings, but are also treated as linguistic entities and analyzed as such. We are just beginning to understand how people can integrate these various levels of meaning. An important first step is to recognize that people do, indeed must, be able to perform such integrations in discourse.

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Understanding Word and Sentence
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Chapter 10

On the Combinatorial Semantics of Noun Pairs: Minor and Major Adjustments to Meaning

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The process of conceptual combination involves accessing two or more concepts and determining how they fit together to form a new concept. In a sense, conceptual combination is very broad in scope, involved in many situations in natural language understanding. For example, understanding a story probably includes the combining of concepts of the individual sentences. Understanding a sentence, in turn, probably includes combining the meanings of noun, verb, and prepositional phrases. To understand a noun, verb, or prepositional phrase, we combine the meanings of individual words. In this chapter, we will focus on how people combine concepts when they attempt to understand complex noun phrases (i.e., noun phrases other than those consisting of a noun or a determiner and a noun). For example, to understand a phrase like "elephant tie," one might combine the concepts *elephant* and *tie* in such a way to mean, "a tie worn by circus elephants" or "a tie with a picture of an elephant on it."[1] These are possible interpretations of the phrase "elephant tie." Recently, there has been a fair amount of psychological research on this kind of conceptual combination (e.g., Osherson & Smith, 1982; Smith & Osherson, 1984; Medin & Shoben, 1988; Murphy, 1990). Several models have been proposed to account for this process (Hampton, 1987; Smith, Osherson, Rips, & Keane, 1988; Cohen & Murphy, 1984; Murphy, 1988). Besides models of understanding complex noun phrases, there has also been research on how people combine the meanings of nouns and verbs in understanding sentences (Gentner & France, 1988).

This chapter is organized into three parts. In the first part, we introduce