Understanding figurative and literal language: The graded salience hypothesis

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Abstract

In this study I test the prevalent claims among contemporary psycholinguists that understanding metaphor does not involve a special process, and that it is essentially identical to understanding literal language. Particularly, I examine the claims that figurative language does not involve processing the surface literal meaning (e.g., Gibbs 1984), and that its comprehension is not process-ing-intensive, because it does not involve a trigger (e.g., Keysar 1989). A critique, review and reinterpretation of a number of contemporary researches on literal and figurative language reveal that figurative and literal language use are governed by a general principle of salience: Salient meanings (e.g., conventional, frequent, familiar, enhanced by prior context) are processed first. Thus, for example, when the most salient meaning is intended (as in, e.g., the figurative meaning of conventional idioms), it is accessed directly, without having to process the less salient (literal) meaning first (Gibbs 1980). However, when a less rather than a more salient meaning is intended (e.g., the metaphoric meaning of novel metaphors, the literal meaning of conven-tional idioms, or a novel interpretation of a highly conventional literal expres-sion) comprehension seems to involve a sequential process, upon which the more salient meaning is processed initially, before the intended meaning is derived (Blasko and Connine 1993; Gerrig 1989; Gibbs 1980; Gregory and Mergler 1990). Parallel processing is induced when more than one meaning is salient. For instance, conventional metaphors whose metaphoric and literal meanings are equally salient, are processed initially both literally and meta-phorically (Blasko and Connine 1993). The direct/sequential process debate, then, can be reconciled: Different linguistic expressions (salient–less salient) may tap different (direct/parallel/sequential) processes.

1. Introduction

Contemporary research on figurative language has claimed that understanding metaphor is essentially identical to understanding literal

language (e.g., Gibbs 1982, 1984; Gibbs and Gerrig 1989; Glucksberg 1989; Glucksberg and Keysar 1990; Hoffman and Kemper 1987; Keysar 1989, 1994; Keysar and Glucksberg 1992; Ortony, Schallert, Reynolds, and Antos 1978; Sperber and Wilson 1986).* The claim is twofold:

(a) Literal language has no priority over nonliteral language: Processing nonliteral language does not necessitate processing the surface literal meaning first. Rather, nonliteral meaning is processed directly, without the interference of the surface literal meaning (e.g., Gibbs 1984: 287).[1]

(b) Understanding literal and nonliteral language involves precisely the same complex comprehension processes and contextual information (Gibbs and Gerrig 1989; Gildea and Glucksberg 1983; Glucksberg, Gildea, and Bookin 1982; Glucksberg 1989). Specifically, metaphorical and literal interpretations are functionally equivalent: (a) Like literal meaning, metaphorical meaning is computed automatically in an obligatory manner, and (b) its interpretation requires no triggering condition, i.e., a violation of a discourse rule (Keysar 1989: 385). Thus, understanding a metaphor (e.g., Example [1a]) should be as easy as understanding literal language (e.g., Example [1b]):

(1) a. *My job is a jail.*
    b. *Tel-Mond is a jail.*

In contrast, traditional theories (e.g., Grice 1975; Searle 1979) assume that literal and metaphorical interpretations vary in the following respects:

(a) Literal interpretation has unconditional priority: The literal meaning of an utterance is always activated, and is always activated prior to any other meaning.

(b) Metaphor interpretation requires a triggering condition (i.e., a rule violation).

(c) Metaphorical meanings must be more difficult to understand; they should involve a sequential process. As a result, they should require more and different contextual support for their derivation.

As will be seen in section 2, both approaches account for only a limited number of findings. The present paper, therefore, proposes that comprehension of figurative and literal language be viewed as governed by a more general principle of salience, according to which salient meanings are processed first.

The salience of a word or an utterance is a function of its conventionality (e.g., Gibbs 1980), familiarity (e.g., Blasko and Connine 1993), frequency (e.g., Hogaboam and Perfetti 1975; Neill, Hilliard, and Cooper 1988), or givenness status in a certain (linguistic and nonlinguistic) context. Though an elaborated treatment of each component must await research, the notion of conventional meaning requires some attention. Conventional meaning is taken here as the semantics of the sentence, i.e., its logical form representation. This meaning is directly computed from the lexical meanings automatically associated with entries before any extra inferences based on contextual assumptions have been derived. Nunberg, Sag and Wasow (1994) view conventionality as "a relation among a linguistic regularity, a situation of use, and a population that has implicitly agreed to conform to that regularity in that situation out of preference for general uniformity, rather than because there is some obvious and compelling reason to conform to that regularity instead of some other" (492n).

The salience of conventional meanings, however, may be affected by, e.g., context. Thus, if a word has two meanings that can be retrieved directly from the lexicon, the meaning more popular, or more prototypical, or more frequently used in a certain community is more salient. Or, the meaning an individual is more familiar with, or has learned recently is the more salient. Or, the meaning activated by previous context, or made predictable by previous context is the more salient one.

Consider, for instance, the humorous discourse in (2) (cited in Gernsbacher and Robertson 1995), which may illustrate the effect of context on meaning salience:

(2) *Two men walk into a bar, and a third man ducks.*

Of the multiple conventional meanings of *bar*, the first clause enhances the meaning of 'pub'. Hence the low salience status of the alternative meaning ('board') in the second clause, which accounts for the punch.

Lexical access has also been shown to be facilitated by context: Words are recognized earlier in context than out of context (Grosjean 1980; Marslen-Wilson and Tyler 1980; Tyler and Wessels 1983, 1985). Thus, "[i]n the absence of context, it might be difficult to discover what word this [-epre-se-] corresponds to. But if one is provided with context, the task is much easier. For example:

After his wife died, John became very -epre-se-." (Foster 1989: 92)

The strings in (3) also illustrate the effect of context on activation. They exhibit a correlation between reading time and inferribility difficulty. Reading time was longer for each oncoming string (*The next day his body*

was covered in bruises) in relation to the predictability of that string from previous context (Keenan 1978):

(3) a. *Joey's big brother punched him again and again.*
         The next day his body was covered in bruises.
     b. *Racing down the hill Joey fell off his bike.*
         The next day his body was covered in bruises.
     c. *Joey's crazy mother became furiously angry with him.*
         The next day his body was covered in bruises.
     d. *Joey went to a neighbor's house to play.*
         The next day his body was covered in bruises.

However, context has a limited role. Though it may facilitate activation of a word's meaning, it does not inhibit activation of salient (e.g., frequent) meanings. Evidence from eye fixation, for instance, shows that even when prior context is heavily biased in favor of the less salient (e.g., less frequent) meaning of an ambiguous word, subjects look at it longer than its matched unambiguous control word. This finding suggests that the word's salient meaning has been activated as well, in spite of the bias of prior context (Rayner, Pacht, and Duffy 1994). Even when the context is supportive, then, salient meanings cannot be bypassed.

Meaning salience, then, is a matter of degree. The most conventional, popular, frequent, familiar, or predictable, or in terms of Jurafsky's (1996) probabilistic model, the most probable interpretation is the most salient meaning of a specific word or sentence in a specific context. Note that the graded salience hypothesis has predictions only as far as meaning activation is concerned. It has no predictions as to which of the activated meanings should be either retained for further elaboration, or suppressed and discarded as irrelevant (Gernsbacher 1990). Based on the graded salience hypothesis, the assumptions of both the traditional and current views should be modified. The following must be true of both literal and figurative language:

a. Salient (e.g., conventional) interpretation has unconditional priority over less salient (e.g., novel) interpretation: The salient meaning of a word or an utterance is always activated.

b. Novel interpretation of a salient meaning involves a sequential process, whereby the salient meaning is processed first, rejected as the intended meaning, and reinterpreted. The more salient the (reinterpreted) language, the more difficult it is to reject as the intended meaning.

c. Novel interpretation must be more difficult to derive; it should require more and different contextual support for its derivation.

In what follows, I will show that the figurative/literal divide is not a good predictor. Instead, the distinction of interest that can best predict ease of comprehension is the degree of salience of a certain meaning in a certain context. According to the graded salience hypothesis, the direct/parallel/sequential debate can be reconciled: salient meanings (be they literal or figurative) should be processed first. This implies that alternative interpretations of a similar degree of salience should be processed in parallel. Novel uses should involve a sequential process.

2. On the priority of the salient meaning—the case of figurative language

The following facts cannot be accounted for by the traditional view: They all show that figurative and literal interpretations do not vary processing wise. For instance, some of the studies attest that a rich context neutralizes the difference between comprehension of literal and nonliteral language. Contexts longer than 3 sentences rendered metaphoric and literal interpretations equally easy to process (Inhoff, Lima, and Carroll 1984; Ortony, Schallert, Reynolds, and Antos 1978). Similarly, Kemper (1981), who investigated comprehension of proverbs, found that the length of the paragraph affected proverb interpretation: The longer the paragraph, the easier it was to interpret it figuratively.

These findings, however, can be accounted for by both the current approach and the graded salience hypothesis. Upon the current view, figurative language can be processed directly, without having to activate the literal meaning first. Hence, the equal reading times. Upon the graded salience hypothesis, the rich context could have rendered both metaphoric and literal target sentences equally predictable (i.e., salient), and consequently equally easy to understand, as contended by Ortony et al. However, given Janus and Bever's (1985) criticism (discussed later), this is probably not the more plausible explanation.

Findings regarding idiom comprehension do not corroborate the traditional view. For instance, Gibbs (1980) showed that in a conversational context, idioms take less time to be understood figuratively than literally. A similar tendency was found in Ortony et al. (1978). Needham (1992) too disconfirmed the hypothesis that literal meaning is activated during comprehension of idiomatic utterances. He presented subjects with three target sentences preceded by a context which had a title. The targets were either an idiom, a literal (anaphor) target, or a control phrase. The test word for all the three cases was identical, and appeared previously in the text, but was related only to the literal meaning of the idiom and to the literal (anaphor) target. Subjects were told to decide as quickly as possible whether or not the test word had occurred in the passage:

(4) Title: Carol lets out a secret

Carol was cooking dinner for Bob. After dinner, there was going to be a surprise birthday party for him. She was putting some vegetables in a pan. She had poured some drinks for the two of them. She got nervous talking to Bob.

Idiom: *She spilled the beans when**

Anaphor: *She spilled the carrots when**

Control: *She spilled the beer when**

The test word for all three cases was *pan*, presented at *

Though subjects' response time in the three conditions did not differ significantly across subjects, and only marginally across materials, there was a significant effect of condition on error rates across subjects and materials. The error rate for the literal condition was significantly lower than for either the idiom or the control condition, suggesting that the literal meaning was computed only for the literal target. It should be noted, however, that the titles of the tested discourses were related to the figurative meanings of the idiomatic targets. Consequently they could prime their figurative meanings, and render them even more salient.

These findings are consistent with the direct process hypothesis (e.g., Gibbs 1984) which does not require that the literal meaning of the figurative utterance be computed. They can also be accounted for by the graded salience hypothesis, which predicts that salient meanings, such as the conventional (figurative) meaning of idioms should be processed initially.

Consider, however, other findings which are problematic for the current view. They allude to the possibility that the literal meaning of figurative language is activated, and triggers a sequential process. In Kemper's (1981) study, for instance, proverbs were interpreted literally more rapidly than figuratively, when they followed a single word cue. In Ortony et al.'s (1978) study and in Inhoff et al.'s (1984) study, metaphors took longer to process than literal language either within a short context or out of context. Gerrig and Healy (1983), who manipulated metaphor and context ordering, showed that metaphors followed by a context phrase took longer to read than the same metaphor preceded by a context. However, this ordering manipulation had no effect on reading times for literal sentences. In the same vein, Cacciari and Tabossi (1988) found that subjects responded more quickly to literal target words than to idiomatic target words, after hearing the last word of a sentence which was not biased towards the idiomatic completion. They found that while idiomatic meanings were facilitated after 300 ms, literal meanings were facilitated immediately and remained activated after 300 ms. This pattern of activation differs from contextually inappropriate meanings, which get suppressed after a delay

(e.g., Gernsbacher 1990; Gernsbacher and Faust 1990, 1991; Onifer and Swinney 1981; Simpson 1981). These findings suggest that when the context is not biased towards the idiomatic completion of the string, idiomatic expressions are initially processed only literally.

Janus and Bever (1985) suggested that it is not the prior rich context that affected the equal reading times for literal and metaphoric targets in Ortony et al.'s study. Looking into the online processes involved in comprehending metaphoric language, they showed that even when embedded in a context a few sentences long, metaphoric phrases required longer processing times than the same phrases used literally. Criticizing Ortony et al.'s (1978) methodology, but using their materials, Janus and Bever measured reading times at the end of target (vehicle) phrases, rather than at the end of target sentences. They argued that measuring reading times at the end of a target sentence could not isolate the point at which the metaphor was first encountered. It is at that point that metaphor comprehension is expected to be effort consuming, because the computed literal meaning must be reinterpreted. At the end of the target sentence, however, reading times may be affected by the extra processing at the end of sentences, attested to by, e.g., Abrams and Bever (1969), and Just and Carpenter (1980). This extra processing may mask the difference in processing times for comprehension of literal versus meta-phorical sentences. Their findings show that even when the context is rich, novel metaphors present some difficulty to comprehenders. Note that these findings are compatible with the assumptions of the graded salience hypothesis and the traditional view. However, they cannot be reconciled with the direct process model.

Another counter-example to the direct process model is Gibbs (1990), who showed that understanding figurative referring expressions is more difficult than understanding literal referring expressions. In his study, subjects read short narratives ending with either a figurative (metaphoric or metonymic) or a literal referring expression. Subjects were fastest at reinstating the antecedent of the literal description. They were also faster at reinstating the antecedent of the metaphoric expression than the ante-cedent of the metonymic expression. Gibbs's findings are explained in terms of the graded salience hypothesis: The intended figurative meanings of both the metaphoric and metonymic referring expressions (both novel language uses) are less salient than the intended conventional meaning of the literal referring expressions. While both the metaphoric and met-onymic expressions are novel uses of language, the literal expressions are used conventionally.

The question, however, is why the antecedents of metaphorical refer-ring expressions were easier to retrieve than those of metonymic referring

expressions. A check of the contexts supplied for the referring expressions reveals that the literal meaning of the metonymic expression was more salient than the literal meaning of the metaphoric expression in their respective contexts. For example, the concept of glove (the metonymy used) is more salient in the context of baseball than the concept of creampuff (the metaphor used) is in the context of boxing (see Example 5). It is plausible to assume, then, that comprehenders will take longer to reject the more salient meaning (as the intended meaning), before they activate the intended figurative meaning (as anticipated by the revised processing model above). In contrast, the conventional meaning of the metaphorical expression is significantly easier to reject, because it is much less probable or predictable in the given context.

(5)   a.   Metaphoric Referring Expression

> *Stu went to see the Saturday night fights. There was a boxer that Stu hated. This guy always lost. Just as the match was supposed to start, Stu went to get some snacks. He stood in the line for ten minutes. When he returned, the bout had been canceled. "What happened?" Stu asked a friend. The friend replied,*
> *"The creampuff didn't even show up."* (metaphoric reinstatement)
> *"The fighter didn't even show up."* (literal reinstatement)
> *"The referee didn't even show up."* (baseline control)
> *Boxer* (probe word)

   b.   Metonymic Referring Expression

> *Mr. Bloom was manager of a high-school baseball team. He was concerned about the poor condition of the field. He also was worried about one athlete. His third baseman wasn't a very good fielder. This concerned the manager a good deal. The team needed all the help it could get. At one point, Mr. Bloom said to his assistant coach,*
> *"The glove at the third base has to be replaced."* (metonymic reinstatement)
> *"The player at the third base has to be replaced."* (literal reinstatement)
> *"The grass at the third base has to be replaced."* (baseline control)
> *Athlete* (probe word)

Gibbs's (1990) findings, then, may serve to support the hypothesis that novel use of conventional language triggers a sequential process. (For

similar findings concerning literal language, see Gerrig 1989, dealt with later).

Onishi and Murphy (1993) attempted to explain Gibbs's (1990) findings in terms of information structure. Using different materials, they first replicated Gibbs's findings concerning metaphoric versus literal referring expressions. However, they manipulated information structure, placing the highly informative message in predicate position (e.g., *The boxer is a creampuff*) rather than in topic position (e.g., *The creampuff didn't even show up*). When the information was thus presented, equal reading times were obtained for literal and metaphoric targets. Onishi and Murphy concluded that the longer reading times found for metaphoric versus literal referring expressions in Gibbs's study "may be a property not of metaphor alone, but of any reference in which the referring expression's meaning is not highly related to the properties of the referent." (770). Their explanation, however, cannot account for Gibbs's findings that reinstating the antecedent of a less salient (i.e., metaphoric) expression was faster than reinstating the antecedent of a more salient, rather related (metonymic) expression.

Most compelling are findings by Blasko and Connine (1993) who studied comprehension of less versus more familiar metaphors. First they found that the literal meaning was always activated, and remained activated even after 300 ms delay. But more crucially, they showed that in understanding less familiar metaphors, the literal meaning was activated first, whereas the metaphoric interpretation was available only in case the metaphor was highly apt. However, in understanding less familiar/moderate-apt metaphors, the metaphoric interpretation emerged only after 750 ms delay. Their research attests that both salience and aptness (of less familiar metaphors) facilitate the derivation of figurative meanings. These findings tie up with findings by Blank (1988) and Gregory and Mergler (1990), who looked into processing strategies of conventional versus novel metaphors. Their findings suggest that comprehenders activate a sequential process when encountering novel metaphors. However, conventional metaphors are understood as fast as literal utterances. As predicted by the graded salience hypothesis, familiar metaphors activate both their literal and metaphoric meanings simultaneously, since both meanings are equally salient. However, novel metaphors, whose metaphoric meanings are less salient, trigger a sequential process, in which the more salient meaning is activated first. These findings constitute a counter-example to both the traditional and current views: While a sequential process is ruled out by the current view of metaphor, parallel processing is not assumed by the traditional view. As for the graded salience hypothesis, though it can account for both the parallel and

sequential processes, it cannot explain the ease of interpretability of less familiar but apt metaphors.

McGlone, Glucksberg, and Cacciari (1994) also examined figurative language which varied in what I would term degree of salience. They provided evidence for the parallel process of figurative language. They showed that in understanding idioms, particularly less conventional (i.e., less-canonical, variant) idioms, the literal meanings of the words themselves and the idiomatic meanings are simultaneously apprehended. McGlone et al. suggest that the hypothesis that two kinds of meanings are simultaneously apprehended also accounts for the findings in Peterson, Burgess, Dell, and Eberhard (1989).

Peterson et al. found that in literally biasing contexts (e.g., *kick the ball*), lexical decisions to concrete words were faster than to abstract words. In contrast, in idiomatically biasing contexts (e.g., *kick the bucket*) there was no difference between concrete and abstract targets. Moreover, lexical decisions to both concrete and abstract targets were faster than the decision to abstract targets in the literally biasing contexts. McGlone, Glucksberg, and Cacciari suggest that in the idiomatic context, both abstract and concrete noun targets are primed, because an idiomatic phrase such as *kick the bucket* has both a concrete (bucket) and an abstract (die) meaning.

Keysar and Bly's (1995) findings are consistent with the hypothesis that it is the more salient (whether literal or metaphorical) meaning that is activated first. They showed that transparency of idioms results from conventional use. In their research, subjects became acquainted with the original and the contrived meanings of (unfamiliar) idioms that were sometimes the opposite of the original meanings of these idioms. Results showed that it was the recently learned (and hence more salient) meaning that was perceived as more transparent, regardless of whether subjects learned the original meaning or its opposite.

Recent research into ironic language suggests that irony comprehension involves a sequential process: A reanalysis of Gibbs's (1986) findings (see Giora 1995), as well as findings by Giora, Fein, and Schwartz (to appear) reveal that ironic utterances take longer to process than the same utterances used literally. Dews and Winner (1995, to appear), Giora and Fein (to appear a), and Giora, Fein, and Schwartz (to appear) show that irony comprehension involves processing the salient literal meaning as well (for a similar view see also Bredin 1997). In Giora et al. (to appear) we show that the salient literal meaning of irony is activated first. These findings can be explained in terms of the graded salience hypothesis: Even if irony were a widespread practice, ironic meanings have not for

the most part been conventionalized, i.e., made salient (though context may contribute to their salience).

While the evidence adduced in this section is only partly consistent with the traditional view, and only partly consistent with the current view, it is (almost) entirely consistent with the graded salience hypothesis. As predicted by the graded salience hypothesis, novel metaphor understanding involves a sequential process, whereby the more salient (literal) meaning is processed first. However, conventional metaphors, whose literal and metaphoric interpretations are equally salient, induce parallel processing. Contrary to the predictions of the traditional view, but in accordance with the graded salience hypothesis, the figurative meaning of highly conventional figurative language (e.g., idioms) is accessed directly. The only finding which is not predicted by the graded salience hypothesis concerns the relative ease of processing of somewhat novel but apt metaphors.

However, for the graded salience hypothesis to be validated, it needs to be supported by evidence regarding literal interpretation. If it can be shown that in understanding literal language, we also process the most salient interpretation first, then the graded salience hypothesis will render superfluous the role of the literal-figurative divide in explaining language comprehension.

3. On the priority of the salient meaning—the case of literal language

Gerrig (1989) provides an opportunity to examine the applicability of the graded salience hypothesis to literal language comprehension. His data concern what I term degrees of salience of literal language. He looked into the processing strategies of more versus less conventional language used innovatively. He proposed that conventional sense-selection and novel sense-creation should always operate simultaneously. However, a reanalysis of his findings suggests that it is the degree of meaning salience that affects comprehension, and which triggers either sequential or parallel processing.

Gerrig (1989) contrasted the sequential process (termed error-recovery) model with a parallel processing model of meaning creation. According to the parallel-process model he assumed, novel meaning interpretations should not be sensitive to the time it takes to process their conventional meanings. Innovative interpretations of any conventional expression should involve the same processing strategies. In contrast, the sequential-process model predicts that novel meaning interpretations should be sensitive to the processing time of their conventional uses. If a certain conventionally intended utterance is faster to understand than another

conventionally intended utterance, their respective novel meaning derivation should exhibit the same difference.

As an illustration, consider the following discourses cited in Gerrig (1989), which give rise to both conventional and novel interpretations of the same utterances:

(6) a. Conventional story

> *The people of Marni, France have an unusual celebration every year. Over four hundred years ago, Louis X visited their town. He started the tradition of having annual sports events. The town's teenagers race on foot all the way around the town. The older sportsmen race horses around the same course. The foot race is the more popular event.*

   b. Innovative story

> *Over four hundred years ago, Louis X visited the town of Marni, France. He started the tradition of racing snails in the town square. The town's people still gather every year for races of two lengths. By tradition, the short course is made just as long as King Louis's foot. The longer race is made the length of Louis's favorite horse. The foot race is the more popular event.*

Thus, according to the sequential processing model, if *foot race* is understood faster than *horse race* in their conventional use, it should be also understood more swiftly in their innovative use. In contrast, according to the parallel-process model, the reading times of both compounds used innovatively should be roughly the same, irrespective of which took longer to read in its conventional use.

The graded salience hypothesis, however, predicts that the sequential strategy should be applied when a more rather than a less conventional expression is used innovatively. Given that a highly conventional interpretation of an expression is much more salient than its innovative usage, it should also be activated prior to its innovative interpretation. Given its high salience, it should be difficult to reject as the intended meaning and be replaced with a less probable meaning. Complementarily, less salient/less conventional meanings are almost as probable and predictable as their innovative uses, and should have no priority over them. They should, therefore, be activated simultaneously. Because they are less rigid than highly salient, conventional uses, they should be easier to reject (see also my account for Gibbs's 1990 findings).

Results indeed support the predictions of the sequential model as delineated here. Novel meanings of highly conventional expressions took

longer to read (2.97 sec.) than their salient/conventional interpretations (2.10 sec.). Salient and innovative interpretations of less conventional expressions exhibited no reading time difference (2.53 sec. versus 2.51 sec.). Similarly, the highly conventional expressions were easier to verify when used conventionally: fewer errors were made in their verification, and they were verified more quickly than when used innovatively. This difference was not replicated for the less conventional expressions: Their conventional and innovative uses exhibited hardly any differences.

A control experiment showed that these results were unrelated to differential fit in story contexts, but reflected degree of salience of conventional meanings. Paraphrases of original target sentences did not yield reading time differences. However, when rated for goodness of contextual fit, the different (conventional versus innovative) meanings of less conventional expressions were rated as equally fit in the story contexts. In contrast, highly conventional expressions were viewed as fitting better when used conventionally than when used innovatively. Consistent with my proposal, these results show that the different (conventional versus innovative) meanings of less conventional expressions are equally predictable. In contrast, the innovative uses of the highly conventional expressions are always less predictable, and therefore more difficult to process and verify.

Gerrig (1989), however, interpreted these results as disconfirming his version of the sequential model and supporting a parallel-process model. According to "an elaborated concurrent processing model, when readers understand preempting innovations, they are dividing their resources between the processes of examining a conventional reading and creating an innovative meaning. The greater the demands of the conventional readings, the fewer resources remain for constructing the innovative meaning. If a conventional meaning is highly salient, resources are divided between two processes—sense selection and sense creation—for a lengthy period of time" (199).

Note, however, that these results do not actually support the simple version of the parallel-process model presented earlier. According to that model, innovative interpretations of more and of less conventional expressions should not differ in terms of processing. Moreover, contrary to earlier predictions, the elaborated version of the parallel-process model suggests that innovative interpretations must be sensitive to conventional interpretations.

Gerrig's (1989) findings, then, may be taken to attest that comprehenders apply sequential processing when highly salient/conventional expressions are used innovatively: conventional interpretations of highly conventional expressions are read faster than and rated as fitting better

in story context than their innovative uses. In contrast, comprehenders apply parallel processing when they encounter less conventional expressions: The different (conventional versus innovative) interpretations of less conventional expressions are read equally fast and are also rated as equally well fitting in the context story.

The hypothesis that less conventional expressions used innovatively trigger parallel processing gains further support from the fact that their different interpretations are read more slowly than conventional interpretations of highly conventional expressions, but faster than the latter's innovative uses. At any rate, both processing models predict that the conventional, i.e., salient meaning should be activated initially. The sequential model, however, assumes the priority of the salient meaning over the novel one.

Gerrig's (1989) (reinterpreted) findings are corroborated by more recent findings by MacDonald (1994), who examined syntactic ambiguity resolution, and by Miyake, Just, and Carpenter (1994), who examined lexical ambiguity resolution. MacDonald found that, among other things, the degree of frequency, i.e., salience, of a syntactic structure affects syntactic ambiguity resolution. Difficulty in ambiguity resolution was found to vary with the strength (i.e., degree of salience) of the alternative interpretations available. Thus, the relative difficulty of comprehending e.g., Bever's (1970) well-known "garden path" sentence *The horse raced past the barn fell* compared to the relative ease of processing of a similar structure (a main verb reduced relative) such as *The former mental patients heard here sound* ... was shown to be a function of degree of frequency. While the more frequent/salient interpretation of *hear* is transitive, its rival, less salient intransitive and sentential complement interpretations are weaker competitors. *Race*, on the other hand, assumes an intransitive interpretation more often. Hence the strong interference of the more salient interpretation (the intransitive reading) with the less salient transitive interpretation proposed by the above sentence. (For a similar view see Jurafsky (1996), for whom each construction or meaning is augmented with probabilities, i.e., degrees of salience).

Similarly, Miyake, Just, and Carpenter (1994) found that for low-span readers, difficulty in ambiguity resolution varied with the amount of salience of the various interpretations. Miyake et al. looked into individual differences in lexical ambiguity resolution. They found that the degree of frequency (i.e., salience) of the various meanings of a target homograph induces different processing mechanisms in high and low-span individuals. High-span individuals retained multiple interpretations in neutral context, even when one of the interpretations was more highly activated, because it was more frequent. Low-span individuals showed a

larger effect of ambiguity, suggesting that they had only the more frequent (i.e., salient) interpretation available (e.g., *wrestler* in *Since Ken liked the boxer, he took a bus to the nearest pet store to buy the animal*). As predicted by the graded salience hypothesis, highly salient meanings were processed first and triggered a sequential process among high-span individuals. Low-span individuals who can retain only one meaning, activated only the more salient interpretation.

Given Gerrig's (1989), MacDonald's (1994), and Miyake, Just, and Carpenter's (1994) findings regarding literal language processing, and Gibbs's (1980, 1990) and more recently Blasko and Connine's (1993), McGlone, Glucksberg, and Cacciari's (1994), and Keysar and Bly's (1995) findings regarding figurative language understanding, and following Dascal (1987), the standard pragmatic model should be revised along the lines suggested earlier: Instead of postulating the priority of literal meaning, the priority of salient (e.g., conventional, familiar, frequent, predictable) meaning should be postulated.

4. On the triggering (rule violation) condition

According to the revised processing model, the salient meaning of novel metaphors triggers a metaphorical interpretation by manifesting a violation of a discourse norm. A great deal of effort has been made to refute the claim that metaphor interpretation should involve some violation of a discourse norm. The prevailing contention is that rule violation is not a necessary condition (e.g., Keysar 1989, Keysar, and Glucksberg 1992). Metaphoric meaning is activated automatically, independently of any trigger.

To argue against the traditional requirement for a triggering condition, Glucksberg, Gildea, and Bookin (1982) attempted to show that the computation of metaphorical meanings is not optional. They showed that metaphorical meanings are computed even when the task requires only a literal interpretation. Subjects were asked to verify the literal truth value of sentences. They were slower to respond NO to literally false, but metaphorically sensible sentences, such as *Some desks are junkyards* than to literally false sentences such as *Some desks are roads*. Glucksberg and his colleagues concluded that the metaphorical meaning was computed involuntarily, and interfered with the decision.

However, as Dascal (1987, 1989) noted, such findings do not refute the claim that the metaphorical interpretation is dependent on a triggering condition. The target sentences used in the experiments (which had metaphorical interpretations) were all pragmatically deviant. They involved a violation of some discourse rule, which, according to the traditional view, is necessary for the derivation of metaphorical interpretation.

To be able to argue that a triggering condition is not necessary for nonliteral interpretation of novel metaphors, one should show that, for example, a literally appropriate discourse, which exhibits no rule violation, may have a metaphorical interpretation. To do that, Keysar (1989) devised strings of discourse, exhibiting various combinations of literal and metaphorical segments. Each text version consisted of two sections— a literally (L) related section and a metaphorically (M) related section. Each of these sections was either true (L+; M+) or false (L−; M−) with respect to the target sentence. That is, the target sentence was true in the context of L+; M+ and false in the context of L−; M−. Texts were combined to form 4 types of context discourse: (a) L+/M+; (b) L+/M−; (c) L−/M−; (d) L−/M+. Each text version was followed by test sentences of the form 'x is a y', as exemplified below:

(7)   a.   (L+): *Bob Jones is an expert at such stunts as sawing a man in half and pulling rabbits out of hats. He earns his living travelling around the world with an expensive entourage of equipments and assistants.*
            (M+): *Sometimes it seems as if Bob's money is made of rubber because he stretches it so far. How does he create such a healthy profit despite these expenses?*
            "Bob Jones is a magician."

      b.   (L+): *Bob Jones is an expert at such stunts as sawing a man in half and pulling rabbits out of hats. He earns his living travelling around the world with an expensive entourage of equipments and assistants.*
            (M−): *Although Bob tries to budget carefully, it seems to him that money just disappears into thin air. With such huge audiences, why doesn't he ever break even?*
            "Bob Jones is a magician."

      c.   (L−): *Bob Jones is maestro and manager of a famous orchestra. They are known for their drama and style. He earns his living travelling around the world, but the expenses of a major orchestra are not minor.*
            (M−): *Although Bob tries to budget carefully, it seems to him that money just disappears into thin air. With such huge audiences, why doesn't he ever break even?*
            "Bob Jones is a magician."

      d.   (L−): *Bob Jones is maestro and manager of a famous orchestra. They are known for their drama and style. He earns his living travelling around the world, but the expenses of a major orchestra are not minor.*

(M +): *Sometimes it seems as if Bob's money is made of rubber because he stretches it so far. How does he create such a healthy profit despite these expenses?*
"Bob Jones is a magician."

The most significant result which may refute the traditional claim for a triggering condition concerns the effect of contexts (L +/M +) and (L + M −) on the reading times of the target sentence. Recall that a processing model which requires a triggering condition predicts metaphorical interpretation, and hence longer reading times, only on condition that the literal interpretation violates a discourse rule. However, when it does not, as is seemingly the case in both contexts (L +/M +), (L +/M −), no further processing is expected. Such a model, then, predicts equal reading times for the target sentence under the above conditions. If, however, the target sentence is slower to read in the context of (L +/M −) than in the context of (L +/M +), this suggests that metaphoric meaning is processed automatically, without being triggered by a rule violation. Findings indeed show that the target sentence was read faster (791 ms) in context (L +/M +) than in context (L +/M −) (904 ms). The longer reading times in the context of (L +/M −) suggest that readers went on processing the metaphorical meaning (which defied interpretation) despite the availability of the literal meaning.

However, contrary to Keysar's assumption, the target sentence in the context of (L +), does violate a discourse rule. At this stage, the readers must have already activated its literal interpretation. The literal meaning of, e.g., *magician*, made salient through activation by previous context, cannot provide and answer (i.e., an explanation) to the question posed. Though true, it adds no information, thereby violating the informativeness requirement (Grice 1975, Giora 1988).[4] Comprehenders cannot thus be satisfied with the apprehension of the literal meaning. It is possible, then, that the uninformativeness of the literal meaning triggered a search for an additional metaphoric meaning. The longer reading times for the target sentence in the context of (L +/M −) than in the context of (L +/M +) could be a result of the relative incoherence of the target sentence in the context of (M −) as opposed to the more coherent context of (M +).

Recall, however, that the revised processing model assumes a rule violation only upon processing innovative uses of discourse. When the salient meaning of a discourse is intended, as in the case of conventional metaphors (whose metaphoric interpretation is highly salient), no trigger is anticipated.

5. Concluding remarks

In this paper, I have proposed to revise the traditional and current models of language processing in terms of the graded salience hypothesis. Given that meanings made salient through, e.g., conventionality, frequency, familiarity or context should be processed first, the assumptions of the traditional and current views should be modified:

a.   Salient interpretation has unconditional priority over less salient interpretation: The most salient meaning of a word or an utterance is always activated.

b.   A novel interpretation of a salient meaning involves a sequential process, whereby the salient meaning is rejected as the intended meaning and reinterpreted. The more salient the reinterpreted language, the more difficult it is to reject as the intended meaning.

c.   Novel interpretation must be more difficult to derive; it should require more and different contextual support for its derivation.

These assumptions are applicable to both figurative and literal language. They tie up well with Jurafsky's (1996) most recent proposal, according to which the various conflicting models of ambiguous word and construction processing (see Simpson 1994) are reconciled when a single probablisitic mechanism is postulated.

As predicted by the graded salience hypothesis, the research reviewed and analyzed earlier indeed suggests that the salient meaning of figurative and literal utterances is always activated, and is always activated initially (a similar view is also cited in Katz 1996: 31). For instance, in the case of highly conventional idioms (whose salient meaning is figurative), or in the case of less conventional idioms and unfamiliar metaphors (whose salient meaning is literal), it is activated prior to any other meaning (cf. Blasko and Connine 1993; Gibbs 1980, 1990; McGlone, Glucksberg, and Cacciari 1994). In the case of conventional metaphors, whose figurative and literal meanings are as salient, both are processed initially (Blasko and Connine 1993). Indeed, in a recent study, Giora and Fein (to appear b) have shown that processing familiar metaphors (whose literal and metaphoric interpretations are equally salient) involved activation of both their metaphoric and literal meanings, regardless of whether the context in which they were embedded was literally or metaphorically biased. In contrast, processing less familiar metaphors (which have only one salient meaning—the literal) activated the literal meaning in both types of contexts. However, in the literally biased context, it was the only one activated.

The distinction of interest which best explains the above findings is not the metaphoric/literal split, but rather the salient/non-salient continuum. Ample evidence has been adduced to suggest that the literal/metaphoric divide cannot account for ease of processing. As shown earlier, under certain circumstances, figurative and literal language behave alike. For instance, less conventional metaphors and conventional idioms used unconventionally both behave like highly conventional literal language used innovatively: They all trigger a sequential process. On the other hand, conventional metaphors, less conventional idioms, and less conventional literal language used innovatively all trigger a parallel process. Conventional idioms and conventional literal language, which are instances of conventional language intended conventionally are accessed directly (cf. Blasko and Connine 1993; Gerrig 1989; Gibbs 1980, 1990; McGlone, Glucksberg, and Cacciari 1994).

The only findings that are not accounted for by the graded salience hypothesis concern the equal ease of processing found for conventional and less conventional but apt metaphors (cf. Blasko and Connine 1993). Nevertheless, though the notion of (degrees of) salience must await further research, it seems to have more explanatory power than the literal/nonliteral distinction.

At this stage it seems possible to formulate the conditions under which various processing models apply. Thus, direct processing assumed by contemporary cognitive psychologists, seems to apply when highly salient meanings are intended. For example, the salient figurative meaning of highly conventional idioms is processed directly (Gibbs 1980). Parallel processing applies when alternative meanings are equally salient, as in the case of conventional metaphors (Blasko and Connine 1993), or when less conventional referring expressions are used innovatively (Gerrig 1989). Sequential processing, assumed by the traditional pragmatic model, applies when language is used innovatively, as in the case of novel metaphors (Blasko and Connine 1993), novel uses of highly conventional language (Gerrig 1989), novel referring expressions (Gibbs 1990), or literal uses of highly conventional idioms (Gibbs 1980). The graded salience hypothesis, thus, enables the reconciliation of views that have until now been in disagreement.

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Notes

1. Gibbs (1984) has shown that when people understand idioms and indirect requests, the literal meaning need not be derived (see also Rumelhart, 1979, on the psychological status of literal meaning).
2. Note however that in Gibbs, O'Brian, and Doolittle (1995, ex. 2) ironic utterances took longer to read than their literal counterpart, but this difference did not reach significance.
3. In an informal experiment, I presented 12 Hebrew speakers with a list of 60 Hebrew sentences, taken out of their context. In their original contexts, 20 of the sentences had conventional metaphorical meanings, 20 had novel metaphorical meanings, and 20 had ironical meanings. Out of context, all the sentences had (also) plausible literal interpretations. The aim of the experiment was to find out whether such expressions have conventional nonliteral meanings, i.e., meanings that can be retrieved directly from the lexicon without the aid of context. Subjects could either list the possible meanings of the sentences, or provide them with contexts that would allude to their meanings. Results show that apart from the conventional metaphors which were interpreted literally and metaphorically by all the subjects, all the other sentences were interpreted only literally, with one exception: One student also assigned an ironic interpretation to one of the ironies. The results of this informal experiment suggest that only conventional metaphors have conventional metaphorical meanings, i.e., metaphorical meanings that can be retrieved directly from the mental lexicon.

    In fact, theories of irony do not assume that ironic meanings should be retrievable directly from the lexicon. Rather, they all assume that derivation of ironic interpretation requires some interaction with context. According to the echoic mention theory (Wilson and Sperber 1992), identifying the source of the mention is crucial in irony interpretation (Gibbs 1986). According to the standard pragmatic model (e.g., Grice 1975), the pretense theory (Clark and Gerrig 1984) and the indirect negation view (Giora 1995) incompatibility (of the literal meaning) with context is mandatory.

    There is, however, a small number of conventional ironies (in Hebrew), such as, *wise at night* (meaning 'wise guy'), or *discover America* (meaning 'state the obvious'). They are, however, literally inappropriate.
4. Previous research (Giora 1988) has shown that readers evaluate texts which were ordered along the informativeness axis (i.e., from the less to the more informative message) as fitting better than texts which were ordered differently, e.g., from the more to the less informative message. Readers were also shown to take less time to read texts ordered along the informativeness axis than texts ending with the least informative message (Giora 1985). Informativeness was defined in terms of reductions of possibilities by half (see, for example, Attneave 1959; Shannon 1951). Thus, taken literally, *Bob Jones is a magician* is uninformative in that it does not reduce any option (such as Bob Jones is a swindler or a whiz).

    It should also be noted that at times, repetition of the discourse topic at the end of a discourse segment signals text segmentation (e.g., Longacre 1979; Giora and Lee, 1996). However, this is not the function of the literal interpretation here, which is expected to provide an answer (i.e., information) to a question.

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