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The Role Of Literal Meaning In Proverb Comprehension

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by

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ABSTRACT

According to the 'Standard Pragmatic Model of Language', a person initially attempts to understand figurative sentences such as metaphors and proverbs in terms of their literal meaning and only processes the figurative meaning when the literal meaning is found inadequate. Experimental studies have failed to support this model; however, many of these studies confounded literalness with conventionality. Furthermore, the role of literal meaning during figurative language comprehension remains unresolved. The purpose of this thesis is to conduct a more valid test of the Standard Pragmatic Model, and to determine the role of literal meaning during proverb comprehension. In the first experiment it was shown that unfamiliar proverbs used figuratively take longer to read compared to unfamiliar proverbs used literally and compared to literal paraphrases of the proverbs' figurative meaning. In contrast, literal and figurative uses of familiar proverbs were read at the same speed. In the second and third studies it was shown that cues related to the literal meaning of a proverb were more effective recall aids for proverbs than were cues related to the figurative meaning of a proverb; however, cues related to the figurative meaning were effective if the proverb was familiar, or if the proverb was used figuratively. These data suggest that literal meaning plays an important role in proverb processing. Experiments four

and five tried to determine if literal meaning leads to the comprehension of the abstract proverbial meaning with some use of either (1) verbal associative processes or (2) mental imagery processes. Participants read the proverbs in context while memorizing either a concurrent verbal or visual-spatial pattern. The results, although weak, suggest that proverb processing is more affected by a visual than a verbal distraction task and that reading a paraphrase of the figurative meaning is more affected by a verbal task. Taken together these data are evidence for a modified version of the Standard Pragmatic Model in which both conventional and literal meanings are processed in an obligatory manner. In addition, the results suggest that a proverb's literal meaning is used to generate a mental image that may play a role in proverb processing.

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THE ROLE OF LITERAL MEANING IN PROVERB COMPREHENSION

Statement of Purpose

The general purpose of this dissertation was to explore the role of literal meaning in the comprehension of figurative language, specifically in the comprehension of proverbs. Figurative language can be defined as a phrase or sentence in which "one thing is described in terms of another" (Cuddon, 1979, p. 391) such as occurs with metaphors, proverbs, idioms and metonymies. Proverbs are "short pithy sayings"[1] which describe a general truth (Cuddon, 1979, p. 537). There were four main goals of these studies. The first goal was to disentangle conventional figurative and literal meaning so as to examine the importance of these two types of meaning and determine the independent contributions of each. A second goal was to examine whether literal meaning plays an important role in figurative language comprehension independent of conventionality. The third aim was to examine whether conventional meaning is processed in an obligatory manner during proverb comprehension. The fourth aim was to investigate the role of mental imagery during proverb

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[1] Although these definitions are weak they are intended as the starting point in a discussion that should lead to a clearer definition of literal and figurative meaning.

comprehension.

This dissertation begins with an examination of literal and figurative meaning, followed by a review of the experimental literature on the processing of figurative language. Most of the previous research that will be discussed focused on the comprehension of idioms and metaphors, however, many of the same issues are also relevant to proverb comprehension. This literature review describes some of the problems with previous studies and suggests improvements in methodology. Five studies are then presented. The first experiment examined the reading time of familiar proverbs, unfamiliar proverbs, and paraphrases placed in contexts related to the literal or figurative meaning of the proverbs. Experiment 1 was designed to determine if both literal and conventional meaning are processed in an obligatory manner. Experiment 2 used cued recall in order to determine the types of information that are processed during proverb comprehension. Experiment 3 examined the relative roles played by the surface form of a sentence and by the underlying metaphoric vehicle. Finally, experiment 4 and 5 investigated if mental imagery plays a role in the comprehension of proverbs.

Literal and Figurative Meaning

Human language permits a considerable degree of flexibility in that the message conveyed can often differ

from the exact literal meaning of the words. For the purpose of discussion, consider a standard dictionary definition of literal meaning. According to the Merriam Webster Dictionary (Woolf, 1974), literal meaning can be defined as "adhering to fact or to the ordinary or usual meaning (as of a word) (pg. 410)." The meaning of a sentence can be called literal if the intended meaning is the same as the expressed meaning of the words in the sentence (Searle, 1979). For example consider the sentence in example (1).

(1) The cat is on the mat.

The word "cat" usually refers to a small furry animal and "mat" to the cat's location on a small floor covering. A figurative sentence such as the one presented in (2) is one in which the expressed meaning of the sentence is different from the exact meaning of the individual words.

(2) My job is a jail.

For example, in (2) the word "jail" does not refer to an actual prison, but instead is used by a person to express a sense of confinement about his or her job.

Literal meaning has been viewed traditionally as the norm of language use, while other, non-literal uses have been viewed as oddities, or as obscure, esoteric forms (Harris, Lahey, & Marsalek, 1980). For instance, Searle (1979) argues that one initially attempts to understand a sentence in terms of its literal truth-value and only

considers the figurative meaning when the literal meaning is found inadequate. According to this view, reading the word "jail" in (2), the reader would first think of a prison. The reader would then realize that "jail" is a physical object, not an occupation, and then reject the literal interpretation. The reader would then examine the context to determine the intended use of the word "jail." This view of language is known as the standard pragmatic model (see Glucksberg, 1992, for a review and critique).

However, Searle's (1979) view of language processing has been challenged, and the status attributed to literal meaning is now controversial (Gibbs, 1986; Ortony, Schallert, Reynolds, & Antos, 1978; Glucksberg, Gildea, and Bookin, 1982). Some psycholinguists argue that there is no fundamental difference between literal and non-literal meaning (Ortony et al. 1978), and instead argue that both literal and figurative interpretation depend on the context in which the sentence is presented. Furthermore they argue that there is no fundamental distinction in the manner in which context is used in figurative and literal interpretations. Other researchers have even dismissed the concept of literal meaning as psychologically meaningless (Gibbs, 1986; Shannon, 1988; Rumelhart, 1979). In contrast, some linguists and psycholinguists argue that this dismissal of literal meaning is based on an over generalization of existing data (Dascal, 1987; Lakoff, 1986; Turner, 1989).

Turner (1989) has argued that many of the studies which have been used to argue that there is no distinction between literal and figurative language (e.g., Gibbs, 1986; Ortony et al., 1978; Glucksberg et al., 1982) investigated only familiar figurative language and did not manipulate familiarity systematically. In spite of this limitation, the results of these studies have been generalized to figurative language in general.

Two assumptions of the standard pragmatic model have been tested extensively. The first assumption is that literal language should be processed more rapidly than figurative language, because the latter depends on the failure to find a plausible literal interpretation of the sentence. According to this assumption, interpreting "cat" in (1) as a furry animal or "jail" in (2) as a prison occurs in an obligatory manner, but interpreting "jail" in (2) to imply confinement is not obligatory. Thus, the assumption is that a reader would arrive at a literal interpretation faster than a figurative interpretation. Studies measuring the time people take to comprehend figurative and literal sentences often have not found evidence for the requisite differences in processing time (see Gibbs, 1980; 1986, Ortony et al., 1978, Kemper, 1981). These studies will be examined in more detail below.

The second assumption is that the processing of literal meaning is obligatory, whereas the processing of non-literal

sense is optional. According to this assumption, the literal meaning would be processed even if the intended meaning is metaphoric as in (2). Researchers, using a Stroop-like task, have shown that the comprehension of figurative meaning is not optional (Gildea & Glucksberg, 1983; Glucksberg et al., 1982). Stroop (1935) showed that people are unable to ignore the meaning of the word "red" when asked to identify the colour of the letters. If the word "red" was written with "blue" letters people would take longer to say "blue", than if the word was unrelated to a colour. Stroop's (1935) studies suggest that people automatically comprehend the meaning of a word even when asked to not read the word. The same logic was used by Glucksberg et al. (1982) to show that people automatically interpret the figurative meaning of a metaphor even when asked only to determine if the sentence was literally meaningful or not. Generally the data from these Stroop-like studies of metaphor processing are inconsistent with the standard pragmatic model. These studies will also be examined in more detail below.

The general purpose of the dissertation is to explore the nature of literal meaning. Part of this general purpose is to determine if literal meaning is processed during the comprehension of figurative language, even when literal interpretation is contextually inappropriate. Many studies that have explored the nature of literal and figurative

meaning (e.g., Gibbs, 1986; Ortony et al., 1979) have confounded conventionality and literalness. Literal meaning, here, is defined as the usual meaning of individual words. Conventional meaning on the other hand, is defined as the usual meaning of familiar figures of speech. In a sense literal meaning is conventional meaning at the word-level. The distinction becomes important when idioms and other familiar figures of speech are considered because the sentence level conventional meaning is often different from the word-level literal meaning. For example, the phrase 'don't rock the boat' has a word-level literal meaning that is different from the phrase-level conventional meaning. The word-level literal meaning of boat refers to a small water craft. The sentence-level meaning, however, is a warning not to cause trouble. Thus, it is important to consider both word-level literal meaning, and sentence-level conventional meanings. In this dissertation, familiarity and context (literal vs. figurative) were systematically manipulated in order to avoid confounding conventionality and literalness.

Another purpose of this dissertation is to determine the function played by literal meaning during proverb comprehension. In particular, the possibility exists that literal meaning is an important component of the mental representation of figurative language, because it may be used to generate a mental image that might play a functional

role in figurative language. The extant literature on this issue is controversial. It has often been observed that mental imagery is correlated with the use of figurative language (Paivio, 1983; Walsh, 1988; Danesi, 1985; Verbrugge, 1977; Lakoff & Johnson, 1981b; Malgady & Johnson, 1980; Gibbs & O'Brien, 1990; see Riechmann & Coste, 1980, for a critique). Metaphors, proverbs, idioms and metonymies frequently use high-image vehicles, suggesting that mental imagery plays an important role in how figurative language is stored and comprehended. However, Riechmann and Coste (1980) have argued that the image is at most related to shallow processing during the initial reading of the proverb, and that the underlying abstraction process or conceptual base is imagery free. Thus, imagery may be experienced by the reader, but it plays no role in comprehension or representation. In contrast, other researchers have argued that the image is an important part of the abstraction processes (Walsh, 1988; Malgady & Johnson, 1983). Lakoff (1987) has argued that the human conceptual system is based on perceptual experience stored in the form of mental imagery. All higher order abstractions are understood through metaphor extensions from direct experience (see also Gibbs & O'Brien, 1990).

In summary, this thesis examines if both literal and conventional meanings are processed in an obligatory manner during proverb comprehension, whether literal meaning is

encoded as part of the mental representation of the proverb, and if the representation takes the form of mental imagery.

Standard Pragmatic Model

According to Searle's (1979) version of the standard pragmatic model, literal sentences take the form of S is P, where S is the subject and P is the predicate of the sentence. In literal utterances the literal meaning (P) is also the intended meaning or referent (R). In contrast, figurative language is language in which the literal meaning (P) is different from the intended meaning (R) of the words used. For example, in the metaphor in (3) the literal meaning of "pig" (P) - a common farm animal with cloven hooves that is used as a source of meat - is not the intended meaning (R) of the sentence.

(3) Sam is a pig.

The sentence in (3) does not mean that S is literally P, but rather P is used to imply that Sam is a filthy or gluttonous person (R). Similarly, the intended meanings of idioms, proverbs and metonymies are different from their "literal" meanings. The problem with this analysis is that "pig" is so often used to refer to a filthy, gluttonous or coarse person that this metaphoric (R) is now listed as one of its definitions (e.g., Barrett & Cohen, Funk & Wagnalls Standard Dictionary, 1983). As stated previously, using a word literally means using a word in its ordinary or usual manner

(Woolf, 1974). It could be argued that the metaphor in (3) is literally true, in that the sentence literally means that Sam (S) is a filthy person (P). The metaphoric use of the word has become one of the literal uses of the word. To avoid confusion, the figurative meaning of familiar figures of speech, which have a figurative meaning that is still recognized as a figurative meaning (e.g., "pig" in example 3 to mean a filthy person) will be called the conventional figurative meaning rather than the literal meaning of the sentence.

Some metaphoric uses of words have become part of the literal usage of the words as a result of familiarity. This is also true for idioms. For example the idiom in (4) has nothing to do with kicking or with buckets.

(4) Kicked the bucket.

Instead, the idiom refers to death: some unstated person (S) has died (R). As with many idioms, the familiar and conventional meaning of the idiom is not (P), but (R). The meaning (R) of this particular idiom cannot be determined from the constituent words, and thus the idiom's meaning (R) appears to be activated as a unit from lexical memory (Swinney & Cutter, 1979; Glass, 1983). The idiom essentially acts like a word; it is lexicalized. The question of interest is whether readers process the meaning of the words "buckets" and "kicking" (P), even though the conventional meaning of this idiom is its figurative meaning

(R). Because this idiom is very familiar, it could be argued that the figurative meaning has become the utterance meaning (P). If this idiom were used literally, then the literal meaning would be (R), the intended referent. Empirical studies have shown that idioms are processed rapidly when used as idioms (i.e., their conventional use). People take longer to read idioms if they are used literally (Gibbs, 1980, 1986; Ortony et al., 1978, experiment 2). These data suggest that the conventional figurative meaning of the idiom is processed in an obligatory manner. If literal meaning is defined as the 'usual' or conventional meaning of a word (cf. Woolf, 1974) then the idiomatic meaning could be called a sentence-level literal meaning of the sentence. It could be argued that these findings support the standard pragmatic model, because the conventional idiomatic utterance meaning (P) appears to have priority over the intended, but non-conventional word-level literal meaning (R).

The same might be true for familiar (but not for unfamiliar) proverbs. For example the meaning of the familiar proverb in (5) has nothing to do with grass or fences (P) but rather implies envy of what other people have (R).

(5) The grass is always greener on the other side of the fence.

The conventional meaning of this sentence is its figurative

meaning. It could be argued that, like idioms, a proverb's figurative meaning is lexicalized or stored in memory as a unit. The question of interest here is, does a reader even bother with the expressed meaning (P), or simply go directly to the figurative meaning (R)? Furthermore, if the proverb was placed in a context about grassy fields and fences, is a reader still likely to interpret (5) according to its conventional figurative meaning even though the context is literal? Is the conventional meaning or the literal meaning processed in an obligatory manner such that the meaning is processed even when it is inappropriate. Unlike the idiom in (4), its figurative meaning (R) could be derived from the words' meanings (P). For instance, one might imagine the situation described in (5) and then reason about the general truth that might be implied by the literal situation. A reader might consider the 'green grass' as a desirable condition for his or her lawn, and that someone else's lawn might seem better only because it belongs to someone else. This 'green grass' situation could then be used to symbolize any situation in which what other people have always seems more desirable. Thus, the reader could interpret (5) to make a general statement such as "what other people have (or other people's circumstances) seem more desirable." Turner (1989) has shown that reading familiar proverbs used literally takes no longer than reading the same proverb used figuratively. These findings suggest that the meaning of

familiar proverbs is retrieved from memory. However, unlike the findings with idioms (e.g., Gibbs, 1980), the figurative use of a familiar proverb was not read faster than its literal use. The equal speed of literal and figurative readings suggests that both literal and figurative meanings may be available during reading.

The figurative meaning of unfamiliar proverbs could not be directly retrieved from memory because they have never been read, or interpreted before, and deriving the figurative meaning from the proverb is now necessary for comprehension. For instance, consider the unfamiliar proverb in (6). A prepackaged meaning (R) is not available for most people, and thus the reader must somehow figure out the intended meaning.

(6) An empty sack cannot stand upright.

It is likely that the conventional, literal meanings (P) of these words are activated prior to the processing of the figurative meaning. If the context (S) was about filling sacks it is unlikely that the reader would go beyond a literal interpretation and thus the reader would interpret the literal meaning to be the intended meaning. In a context (S) about a hungry person (without any mention of bags or sacks), the literal meaning (P) is unacceptable, and must be rejected. Context may help the reader identify the sentence as literally anomalous (Searle, 1979) but usually the context does not explicitly contain the proverb's

figurative meaning. If the context conveys the same meaning as the proverb, then the proverb would be redundant. Somehow the reader has to go from (6) to the intended meaning, which is described in (7).

(7) Without food, you can't keep working.

How does the reader go from P to R? Searle (1979) suggests several possible methods of deriving R from P including familiar usage, hedges and strategies. In contrast, the context based account offered by Ortony et al. (1978) suggests that the context activates schemata related to the figurative meaning. With a short context, Ortony et al. (1978) found that a metaphoric reading of a sentence takes longer than a literal reading of the same sentence. With a sufficiently long context, Ortony et al. (1978) found no difference in reading time between literal and figurative readings of metaphors. According to Ortony et al. (1978), the processing of the figurative meaning does not differ from the processing of literal meaning. Both literal and figurative readings involve the activation of information in long term memory. The context activates the appropriate meanings of the words. A longer context results in a faster reading for both literal and figurative readings. The length, or at least the adequacy of the context is more important for a figurative reading than for a literal reading because the figurative meaning is not as readily available as the literal meaning, but the process is

essentially the same. Although Ortony et al.'s (1978) theory can easily account for the comprehension of familiar metaphors and proverbs, it does little to account for the processing of figurative meaning that is not based on preexisting associations (Camac & Glucksberg, 1984).

The most elaborate theory of proverb comprehension has been developed by Honeck and his colleagues (Honeck, Kibler, and Firment, 1987; Honeck, 1973; Temple, 1993; Temple & Honeck, 1992; Riechmann and Coste, 1980). Honeck et al., (1987) have proposed a theory of proverb-families that are like schemata. The family consists of the proverb, literal or pictorial renditions of the proverb, general interpretations, and various instantiations. According to their Conceptual Base Hypothesis (Honeck et al., 1987) this family is not held together by any shared deep structure, propositional structure, or mental imagery, but rather an abstract schema-like entity, most like the analogical relationship underlying the proverb's interpretation. Honeck et al., (1987; see also Honeck, 1973; Temple, 1993) have argued that a proverb is interpreted by a constructive problem solving process. According to this theory, "proverb comprehension involves four phases: problem recognition, literal transformation, figurative meaning, and instantiation" (Temple, 1993, p.29). A set of serial processes are used to transform the literal meaning of a proverb to its figurative meaning. In the final stage,

instantiation, the reader relates the proverb's figurative meaning to real life situations for which the proverb is appropriate. According to their theory, literal meaning plays a central role in the abstraction of the figurative meaning. Overall their research appears to support a modified version of the standard pragmatic model (see Temple, 1993). Literal meaning is a necessary stage of the abstraction process. Their theory, however, elaborates on the way in which literal meaning is used in the construction of the figurative meaning and views proverb comprehension as a process of analogical reasoning. Glucksberg (1992) has also speculated on the role of literal meaning in the abstraction of figurative meaning. Thus, part of the purpose of the present set of studies is to determine the importance of literal meaning and to determine if literal meaning (P) is processed even if contextually inappropriate.

Assuming that literal meaning does play an important role in the derivation of figurative meaning, how is it used? One possibility is that literal meaning is used to generate a mental image. Walsh (1988) argues for a dual coding modification of Searle's (1979) theory in which the image inherent in the literal meaning is used to guide the interpretation of the proverb. After reading (6), a reader may imagine an empty potato sack and use this image to understand the scenario. In contrast, Riechmann and Coste (1980) argue that the image plays no functional role in the

comprehension of the proverb. Instead the conceptual base is image free (see also Honeck et al., 1987); according to the conceptual base theory the derivation of the figurative meaning is a process of analogical problem solving in which a relationship implied by the proverb is abstracted and applied to a real life situation (an instantiation, usually stated in the context). Thus, the final purpose of this dissertation is to test for the possibility that the image constructed from the literal meaning (P) plays a functional role in the interpretation of the intended meaning (R) of at least some proverbs.

Research Review

As mentioned above, two implications of the standard pragmatic model have been investigated extensively. The first is that the additional stages of processing for figurative meaning should lead to a slower reading time for figurative language compared to the processing of literal language (e.g., Ortony et al., 1978). The second implication is that the optional figurative processing stage should not occur when a literal interpretation is available (e.g., Glucksberg et al., 1982). Each of these will be discussed in turn.

The first implication of the standard pragmatic model is that non-literal meaning is processed only after the failure of the reader to understand the literal meaning.

Ortony et al. (1978) have argued that these extra processing stages should result in longer comprehension latencies. Ortony et al. (1978), Inhoff, Lima, and Carroll (1984), and Shinjo and Myers (1987) have shown that metaphors are comprehended more slowly than literal sentences but only when presented in short contexts. Given a context that is sufficiently long to indicate the figurative meaning of the metaphor, metaphoric comprehension is not significantly slower than literal comprehension. Pollio, Fabrizi, Sills and Smith (1984) have shown that, even without context, metaphors are not identified slower than some types of literal sentences. Gibbs (1980; 1986), Mueller and Gibbs (1987, Experiment 1), Ortony et al. (1978), Schweigert and Moates (1988) and others have shown that idioms are processed more rapidly when the context supports the familiar idiomatic meaning and are only processed as literal phrases when the context forces a literal reading. Kemper (1981), working with unfamiliar proverbs, has found results similar to that observed with idioms. Further challenges to the standard pragmatic model come from research with other types of familiar, non-literal language, such as indirect requests (Gibbs & Mueller, 1988; Gibbs, 1981), and sarcasm (Gibbs, 1986). These studies seriously challenge the standard pragmatic model of metaphor comprehension.

According to Glucksberg et al. (1982) another implication of the standard pragmatic model is that

non-literal interpretations of sentences are optional, not automatic. If non-literal interpretations are optional, then a reader should be able to ignore a potential metaphor when judging if a sentence is literally true or false. Glucksberg et al. (1983) and Gildea and Glucksberg (1982) used a Stroop-like task to determine if readers could ignore potential metaphors. Participants read metaphors, literal sentences and scrambled metaphors and classified them as either literally true or false. The scrambled metaphors were created by randomly scrambling the topic and vehicles of the metaphors to create meaningless sentences. Based on the same logic as the Stroop task, if a potential metaphoric meaning is processed automatically, it would interfere with the participants ability to classify that sentence as not literally true. They reasoned that metaphoric truth should not interfere with judgements of literal truth if metaphor comprehension is an optional stage of processing. However, they found that metaphors were classified as literally false significantly slower than meaningless control sentences that were created by scrambling the metaphors. These results indicate that the metaphoric meaning was interfering with the literal truth judgement. Thus, metaphors appear to be interpreted automatically and their processing does not depend on the failure of the reader to make sense of the meaning during the literal stage of processing. Similar results have been found by Glass (1983, Experiment 4) with

idioms.

To summarize, evidence suggests that (1) metaphors and some other forms of figurative language do not take longer to comprehend than their literal counterparts and (2) metaphoric processing is not optional. Thus, if these two implications of the Standard Pragmatic Model of sentence processing have been properly tested, then the theory has been soundly refuted.

Problems with the Research

The reading time studies (e.g., Ortony et al., 1978) combined with the Stroop-like studies (Glucksberg et al., 1982) seem to form a convincing package of findings that are difficult for the standard pragmatic model to explain. These studies show a great deal of ingenuity in research design but there are important flaws that weaken this evidence. For the most part these studies used familiar figurative language. Furthermore, there are contradictory findings. Each of these issues will be discussed in turn.

It can be argued that the metaphors used by many of the researchers (Glucksberg et al., 1982; Ortony et al., 1978) were familiar. For example the metaphor "Some roads are snakes," used by Glucksberg et al. (1982) is a relatively common way of describing a winding road. In contrast some of the scrambled metaphors used by Glucksberg et al. (1982) could make sensible, albeit novel metaphors (e.g., "Some

jobs are snakes."). From this perspective the data could be taken to indicate that the more common items produced Stroop-like effects, but the novel metaphors created by scrambling the topics and vehicles did not. Kumpf, Turner and Katz (1993) have shown that if a person is told that a randomly generated concrete sentence is meaningful, they are able to a give metaphor interpretation to a fairly high proportion of these sentences. The point here is that Glucksberg et al.'s (1982) data suggest that constructing metaphor interpretation for such randomly generated sentences is not an automatic process. Similarly the metaphors used by Ortony et al. (1978) were fairly familiar (e.g., relating children to troops). Furthermore, familiarity was neither controlled nor systematically manipulated in Ortony et al. (1978). Thus generalizing from these data to all metaphors is questionable. These findings could therefore be taken as evidence that the Standard Pragmatic Model is not an accurate description of the comprehension of familiar metaphors, but may be an accurate description of the comprehension of novel figures of speech.

Gildea and Glucksberg (1983) did study less familiar ("poor") metaphors. The items used in this study were those metaphors that had failed to show the metaphor Stroop-like effect in their earlier study (e.g., Glucksberg et al., 1982) and were called "poor" metaphors because they had not shown the Stroop-like effect. They found that familiar

metaphoric primes, related to these "poor" metaphors were able to initiate their Stroop-like effects with these "poor" metaphors. For example the familiar metaphoric vehicle "cold" was used as a prime for the metaphor "a marriage is an icebox".

Other types of evidence used against the Standard Pragmatic Model were even more clearly based on familiar figures of speech (e.g., Gibbs, 1980; 1986; Estil & Kemper, 1982). Gibbs (1980; 1986) has found that idioms, which are highly familiar figures of speech, are processed faster when used as idioms than if used literally. Only in recent years have researchers begun to consider the issue of familiarity (e.g., Blasko & Connine, 1993; Temple, 1993; Turner, 1989; Schweigert & Moates, 1988) and the results from unfamiliar figures of speech are, in general, consistent with the standard pragmatic model. In summary, much of the extant research can be taken as explorations of familiar figurative language; the issue of metaphor familiarity has generally been ignored.

Linguists, in contrast to psychological researchers, tend to differentiate between novel metaphors and familiar metaphors. Stage models, such as the one proposed by Searle (1979), are intended to account for novel metaphors. Searle argues that, to the extent that a word's meaning has changed so that it now "means" the metaphoric meaning, the locution is no longer metaphoric (Searle, 1979). Thus, because "pig"

in (3) now conventionally and literally means "a filthy person" this is no longer a metaphoric usage. This analysis implies that only unfamiliar metaphors are true metaphors. Although this extreme argument is not made here, it is argued that the issue of familiarity needs more consideration. Consequently, one can argue that Searle's (1979) model is not strongly challenged by the empirical data because many of these studies did not take into account the issue of familiarity, and its relation to literal meaning. To test Searle's (1979) theory correctly, it is important to manipulate familiarity to determine if different patterns of reading time and memory emerge for different levels of familiarity. If literal and figurative readings of unfamiliar metaphors were read equally fast, then Searle's model would be refuted.

Evidence Consistent With The Standard Pragmatic Model

There are a few studies that suggest that literal meaning is sometimes processed more rapidly than figurative meaning. Janus and Bever (1985) found a significant 200 ms difference between literal and metaphoric reading times if reading time was measured using eye fixation on the metaphoric word. They argued that, in Ortony et al. (1978), real reading time differences were hidden by measurement of reading time for the entire sentence. Furthermore, although Pollio et al. (1984) failed to find a slower reading time

for metaphors compared to other types of sentences, they did find a higher error rate for metaphors, perhaps suggesting a speed-accuracy tradeoff.

Studies that have found longer processing times for figurative language are often interpreted as being inconsistent with the standard pragmatic model (e.g., Alonso-Quecuty & de Vega, 1991; Blasko & Connine, 1993; see Temple, 1993 for additional comments). For example Alonso-Quecuty and de Vega (1991) have found that metaphors required longer processing than literal sentences, but claimed that their findings do not support a stage model. This claim seems to be based on the finding that blocked sets consisting only of metaphors or only of literal sentences can reduce (but not eliminate) the differences between literal and figurative reading time; they argue this suggests strategic processing. The influence of expectation on metaphor processing has also been shown by Reyna (1988) and by Kumpf et al. (1993). Alonso-Quecuty and de Vega (1991) argue that the standard pragmatic model does not allow for strategic processing, however a close reading of Searle (1979) indicates that he does allow for such an effect. Searle argues that literal anomaly is just one of a number of strategies by which speakers indicate that the literal meaning is not intended. On encountering such an anomaly, the listener would be made aware that a non-literal meaning was intended. With a whole series of such anomalies

the reader would immediately begin to look for the intended non-literal meaning. Thus, it is consistent with Searle's (1979) theory that an expectation for metaphors produced by blocked sets would help the reader know that the literal meaning is not intended. Similarly Gerrig and Healy (1983) also have offered evidence for a truncation model in which the literal stage is truncated (shortened) if context suggests a metaphoric usage. The evidence thus far is consistent with the idea that metaphors require longer processing, but aspects of text that encourage strategic processes such as that induced by literal anomaly, blocked sets, or redundant use of familiar metaphors, can reduce the differences in reading time between literal and figurative sentences by a truncation of the literal processing stage.

Furthermore, Blank (1988) found that words in very familiar metaphors were recognized faster than words in moderately familiar metaphors and novel metaphors. In addition, words in moderately familiar and novel metaphors were recognized slower than the same words placed in literal statements, while words in very familiar metaphors were recognized as fast as the same words in literal statements. Blank (1988) interpreted this to support a stage model in which familiar figures of speech are processed rapidly in the same manner as literal uses of words, but extensions of familiar metaphors are processed after the first stage. Geiger (1994) has also shown evidence for longer reading

times for novel metaphors compared to literal sentences. These studies suggest that unfamiliar figurative language is read more slowly than literal language which is consistent with the Standard Pragmatic Model.

Honeck and his colleagues (Honeck et al., 1987; Riechmann & Coste, 1980; Honeck & Kibler, 1984; Temple & Honeck, 1992) have taken a somewhat different approach to the study of figurative language. Rather than attempting to prove or disprove the existence of stages they have attempted to determine through converging lines of evidence, the nature of the mental processing involved in figurative language comprehension. A number of their studies offer evidence in support of a stage model of proverb comprehension. Honeck and Kibler (1984; see Honeck et al., 1987 for a review) for example have shown that participants that are instructed to rate how well a picture captured the literal meaning of a proverb, or to mentally image the literal meaning of a proverb were unable to distinguish true from false instances of the proverb's figurative meaning. In contrast, participants that were instructed to map out the full four term analogical basis of the proverb were able to make this distinction. The imagery and picture matching instructions tended to focus the participants on the literal meaning of the proverbs rather than on the potential figurative meaning of the proverbs. These studies have been used to argue that mental imagery is not involved in proverb

comprehension (an issue that will be discussed in Experiment 4); however these findings also suggest that the comprehension of the figurative meaning of a proverb is only carried out if the reader has a reason to interpret the figurative meaning of the proverb. In other words interpreting the figurative meaning of a proverb is optional, not obligatory. These results are consistent with the Standard Pragmatic Model in that a person that is not given a reason to interpret a sentence figuratively will not.

More recent investigations by Honeck and colleagues (Temple, 1993; Honeck, Casa, Temple, & Firment, 1990, as reported by Temple, 1993) have shown that proverbs used figuratively take longer to read than proverbs used literally. Furthermore familiar proverbs were read faster than unfamiliar proverbs. Temple (1993) has developed an elaboration of Searle's (1979) Standard Pragmatic model of language comprehension based on Honeck's Conceptual Base Hypothesis. Temple (1993) has argued that processing the literal meaning of a proverb is a necessary first stage in comprehending a proverb's figurative meaning. However, Temple's (1993) contexts were only two sentences in length and may not have been long enough to evoke the schema related to the figurative meaning. Recall that Ortony et al. (1978) found that metaphors required a longer reading time when presented after a short context, but were read

equally fast in a longer context. The contexts used by Temple (1993) were longer than Ortony et al.'s (1993) short contexts, but shorter than Ortony et al.'s (1993) long contexts. Another problem with Temple's (1993) study is that familiarity was not systematically varied or orthogonally crossed with context type. Nonetheless, Temple's (1993) study provides evidence in support of the Standard Pragmatic Model.

Finally, Turner (1993) systematically manipulated both context and familiarity and set up an experiment using an orthogonal design in order to test for the possibility of a cross over interaction between familiarity (familiar vs unfamiliar) and context (literal vs figurative). Turner (1989), found that unfamiliar proverbs are processed more slowly when placed in a figurative context rather than in a literal context. In contrast familiar proverbs are processed at the same speed when placed in either a literal or a figurative context. Turner's (1989) experiment will be examined in more detail below. In summary, the data from these studies suggest that research on familiar figurative language cannot be generalized to unfamiliar figurative language (see also Blasko & Connine, 1993). Furthermore, although the Standard Pragmatic Model may not be a valid description of the comprehension of familiar figurative language, it may be a valid description of the comprehension of unfamiliar figurative language.

Process X and the Need for Converging Evidence

Another problem with the extant literature is the excessive reliance on reading time as the primary dependent measure. The use of reading time in order to make inferences about processes may be problematic. Gibbs and Gerrig (1989) have argued that accepting the null hypothesis to discount the presence of "stages" is weak. Equivalence in reading time does not mean that the same processes are involved (see also Dascal, 1987; Turner & Katz, submitted; Temple, 1993). The problem is that different models of sentence processing may predict the same reading time differences but for different reasons. Ortony et al. (1978) for example argued that a longer reading time would be evidence for a sequential stage model of metaphor comprehension. They failed to find such evidence and therefore concluded that metaphor comprehension does not involve sequential stages. Alonso-Quecuty and de Vega (1991) on the other hand found slower reading time for metaphor sentences compared to literal sentences but argued that this is because metaphors are quantitatively "richer" in meanings, and are not processed sequentially. Furthermore, the truncation model proposed by Gerrig and Healy (1983) would predict only small reading time differences that might be hidden by sentence variation (see also Janus & Bever, 1986). Thus, reading time by itself is not sufficient for constructing a theory of language. These

arguments highlight the importance of employing convergent measures such as recognition, recall, and analysis of errors in order to investigate metaphor processes.

Summary of the Literature.

In summary, this review of the literature suggests that the evidence against the Standard Pragmatic Model (Searle, 1979) is relatively weak, and confounded by item familiarity. Furthermore there is some evidence in the proverb literature (Temple, 1993; Turner, 1989) for a modified version of the Sta. lard Pragmatic Model, but more research is needed.

Improving the Methodology

The previous review of the literature has brought to light a number of problems. First, as reviewed above, many studies of figurative language have employed familiar figures of speech, ignoring a potentially important variable: conventionality of meaning. These studies have confounded literal and conventional meanings of the target sentence. Second, many studies have suffered from a confound between literalness and context content. Third, the use of reading time by itself is not sufficient to determine the nature of mental processes. Each of these will be dealt with in turn.

As described above, previous researchers have tended to

confound conventional meaning and literal meaning. Idioms, for example, are conventionally understood in their non-literal sense. This confound may explain to some extent the results of those studies that have been offered as evidence against Searle's stage model of metaphor processing. In order to properly test Searle's model, familiarity and literalness should be varied orthogonally. This can be done by taking familiar and unfamiliar figurative language and placing them in contexts that are related to the figurative or literal meaning of the figurative language. In order to properly refute Searle's model it is necessary to show that words and sentences that are not normally understood as figures of speech, would be understood as quickly when used figuratively as when used literally. To date, only Turner (1989) has conducted such an experiment. Turner (1989) found that familiar proverbs are read at the same speed when placed in either a figurative or a literal context, but that unfamiliar proverbs are read much slower when placed in a figurative context compared to a literal context. These findings support the standard pragmatic model.

Besides confounding literalness with conventionality, many studies have also confounded literalness with the context paragraph. In previous studies that have compared literal and figurative language processing, two types of designs have been employed. In one type, an item is placed in two contexts, one meant to bring out its figurative

meaning and the other meant to bring out its literal meaning. This design ensures that the target sentence is equivalent, but this equivalence is achieved at the cost of completely confounding target literality with context paragraph. In the second type of design, the processing of a figurative sentence is compared to the processing of a paraphrase of the figurative meaning, holding the context constant. This design achieves context equivalency, but at the cost of target equivalency. In order to achieve both target and context equivalency, these two designs should be combined. Figurative sentences should be compared to items using the same target sentence in literal and figurative context paragraphs, and compared to items using the same context paragraph with a literal target sentence (paraphrase). Such a design has been used successfully by Turner (1989).

Another issue that needs to be addressed is the use of a within participant design. A within participant design in which participants are given figures of speech used literally and used figuratively may foster a figurative processing set: participants may expect the sentences to be figurative, thus slowing down the reading time for literal sentences. Temple (1993) has argued that the failure to find a slower reading time for sentences used figuratively (e.g., Kemper, 1983) may be in part due to the creation of a figurative processing set caused by the within participant

design.

Evidence for such a processing set has been shown by Kumpf et al. (1993). Participants were given randomly paired concrete and abstract sentences. Participants that were told that all sentences were meaningful interpreted more sentences with a concrete predicate than participants who were told that not all the sentences were meaningful. Furthermore participants in the all-meaningful condition found relatively fewer familiar metaphors, and relatively more novel metaphors. These data suggest that participant's expectations affect their processing strategy. Reyna (1988) also has shown that a mental set can affect the processing strategy used by participants. Because of processing strategies, Temple (1993) has argued that a between-participant design is more appropriate. The problem with this solution is that the same criticism can be made for between-participant designs. In a between-participant design, the participant has a pure set of items to process and is most likely to adopt a strategy appropriate to those items. It is true that a between-participant design can still allow comparisons between the efficiency of a literal processing strategy for literal items and a figurative processing strategy for figurative items, but such a design does not allow exploration of the normal processing of figurative items. Furthermore in real life literal and figurative items are mixed; with familiar figurative, and

literal language occurring more frequently than unfamiliar figurative language.

To avoid these problems it is best to use a variety of research approaches including studies using a within-participant design in which the likelihood of a figurative item is less common than literal items. The paraphrases used in Turner (1989) and in Experiment 1 of this dissertation served the function of reducing the concentration of the figurative items such that conventional literal language predominated in the experiment (62.5% including all paraphrase controls and unfamiliar proverbs used literally). Proverbs used figuratively made up only 25% of all items; the remaining 12.5% were familiar proverbs used literally. Furthermore the target proverb was placed in the middle of the context paragraph to de-emphasize its role in the paragraph and therefore reduce the likelihood that the participant would adopt a proverb processing strategy.

Turner (1989)

Turner (1989; see Turner & Katz, submitted, for a review) has provided clear evidence that unfamiliar proverbs used figuratively take longer to read than the same proverbs used literally[2]. In this experiment, participants read a

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[2] It should be noted that technically, an unfamiliar proverb is only a proverb when it is used in a figurative context. The term "unfamiliar proverbs

series of 24 passages. The passages consisted of a target sentence embedded in the middle of a context paragraph. The context paragraphs were on average nine sentences long, and were either a conversation between two people or a monologue. The target sentences were familiar or unfamiliar proverbs, or matched paraphrase control sentences. The context paragraphs were designed to favour either the literal or the figurative meaning of the proverb. In addition, paraphrases were used as control sentences to measure the equivalence of context processing. The design of this experiment consisted of three within-participants variables: (1) familiar vs. unfamiliar proverbs, (2) proverb vs. paraphrase control sentences, and (3) literal vs. figurative context paragraphs. After the participants had read all 24 items, they were given a forced choice recognition test for the target sentences and context recognition memory test. The target memory test provided both memory and error data, permitting an examination of the mental processes involved in proverb reading.

Turner (1989) found a slower reading time for unfamiliar proverbs used figuratively than when used literally suggesting that for novel items, access to meanings is ordered according to conventionality of meaning. In contrast no difference was found for familiar proverbs

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used literally" however will be used in order to make it clear that this is the same sentence that is used in the figurative context condition.

used literally or figuratively. This finding suggests that for familiar items either multiple meanings are processed or that context is equally effective at evoking the meaning for literal and figurative meaning (Turner, 1989). Failing to find reading time differences can always be explained by proposing some hidden process X (see Gibbs and Gerrig, 1989). Even if a reading time difference is found one can argue, as Alonso-Quecuty & de Vega (1991) do, that the longer reading time is caused by a qualitatively richer process rather then by a different process. Because of this uncertainty, reading time by itself is not sufficient for constructing a theory of language. For this reason Turner (1989) employed additional dependent measures including recall, recognition and types of errors.

Two findings from the target sentence recognition error data reported by Turner and Katz (submitted, Experiment 1; see also Turner, 1989) give important insights into the processes but suggest conflicting conclusions regarding which meanings are processed in an obligatory manner. As stated above, participants read proverbs or context appropriate paraphrases in a context designed to favour either the proverb's literal meaning or the proverb's figurative meaning. After reading all passages, the participants were given memory tests. Correct recognition was fairly high in all conditions (80%-90%). It is the recognition errors from these memory tests that are of

interest here. Processing of the conventional meaning was studied using a forced choice recognition task in which the participants had to choose between a proverb, a context appropriate paraphrase and a context inappropriate paraphrase. The paraphrases were either paraphrases of the literal or the figurative meaning of the proverb. For a proverb used literally, a contextually appropriate error would have been a literal paraphrase; a contextually inappropriate error would have been a figurative paraphrase. For a proverb used figuratively, a contextually appropriate error would have been a figurative paraphrase; a contextually inappropriate error would have been a literal paraphrase. As one would expect, participants chose context appropriate paraphrases more than context inappropriate paraphrases. However, the difference between context appropriate and context inappropriate errors was not significant for unfamiliar proverbs used figuratively and for familiar proverbs used literally. In both of these cases, the inappropriate errors were the conventional meaning.[3] These context inappropriate errors suggest that

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[3] Note: the two errors in this experiment were analyzed as two levels of an independent variable. It has been suggested that this analysis may not be statistically appropriate because the two levels of this variable were not independent. It should be noted however that these types of errors accounted for less than 15% of total responses (85% were correct recognitions of the target sentence), and each participant had more than one replication per condition. Thus, the two types of errors were relatively independent of each other.

the conventional meaning of a proverb is always processed.

In contrast the second finding - the context appropriate confusion errors for paraphrases - reported by Turner and Katz (submitted, Experiment 1) suggests that the literal meaning is obligatory for both familiar and unfamiliar proverbs. Recall that in this experiment participants read proverbs or paraphrases in context and were then given recognition tests to test their memory for the actual sentence they had read. The test took the form of a forced choice recognition in which the participants were presented with a proverb, a paraphrase of its literal meaning and a paraphrase of its figurative meaning and was asked to select the actual sentence that they had read. If participants selected the paraphrase of the literal meaning of the proverb when they had read the proverb used literally or selected the paraphrase of the figurative meaning of the proverb when they had read the proverb used figuratively it would be classified as a contextually appropriate recognition error. It was found that reading a paraphrase of a proverb's literal meaning will fool a participant into selecting the proverb, but reading a paraphrase of a proverb's figurative meaning is unlikely to fool the participant into selecting the proverb. In addition this effect interacted with familiarity; the effect was present for both familiar and unfamiliar proverbs but the difference was greatest for unfamiliar proverbs. Reading a paraphrase

of the figurative meaning of a familiar proverb was more likely to fool the participant into selecting the proverb than was reading a paraphrase of the figurative meaning of an unfamiliar proverb. Taken together, these findings suggest that a person reading a proverb is likely to understand the proverb's figurative meaning, but a person reading a paraphrase of the proverb's figurative meaning is unlikely to think of the proverb. In contrast literal meaning seems to evoke the proverb and vice versa. These findings suggest a special status for the literal meaning of the proverb, and a close relationship between a proverb and a paraphrase of it's literal meaning.

These two findings lead to incompatible conclusions. The context inappropriate errors for proverbs suggest on the one hand that conventional meaning is processed even when the context does not support that sense of the item. The context appropriate errors for paraphrases on the other hand suggest the obligatory processing of literal meaning. More research is needed to explore this apparent contradiction. These findings, however, demonstrate that the use of convergent measures such as memory data in addition to reading time, can provide clues for new directions of research.

EXPERIMENT 1

Latency data has generally failed to find evidence that literal and figurative meaning are processed differently. If figurative sentence comprehension depends on an initial and obligatory processing of literal meaning, one might expect that figurative sentences should take longer to comprehend (Ortony et al., 1978). However the often reported finding is that the speed of reading figurative sentences is equal to the speed of reading literal sentences, at least for familiar figurative sentences presented with sufficient context (Ortony et al., 1978; Gibbs, 1980; Shinjo & Myers, 1987). As a consequence Ortony et al. (1978) have argued that their data are more consistent with a context based account of figurative language in which it is argued that the figurative interpretation of a sentence is based primarily on context. As Gibbs and Gerrig (1989) have pointed out, acceptance of the null hypothesis cannot be taken as strong evidence that literal meaning was not activated first, because a process x could always be invented that could hide real processing differences. The approach taken here is that other measures, in addition to latency data, must be employed to give converging support. Consequently Turner (1989) systematically manipulated item familiarity, context, and target surface form, and measured a number of dependent variables. Contrary to other studies, Turner (1989) found

that participants did take longer to read unfamiliar proverbs used figuratively than used literally.

Turner (1989) has argued that it may not be literal meaning, but conventional meaning that is important. He predicted a cross over interaction between familiarity (familiar vs. unfamiliar) and intended meaning (literal vs. figurative), in which the conventional would be processed faster than the unconventional. For familiar proverbs, the figurative meaning is conventional and for unfamiliar proverbs the literal meaning is conventional. He found that familiar proverbs were read at the same speed whether used literally or figuratively. These data are, of course consistent with the literature. However, unfamiliar proverbs were read faster in a literal context than in a figurative context (Turner, 1989). Thus, the failure to find processing time differences between figurative and literal sentences in previous research is not a general effect, but instead depends on the familiarity of the figure of speech. Furthermore, Turner (1989) found some evidence in the error data that support a conventional first model of language processing.

There are two main aims of experiment 1. First, since the reading time results of Turner (1989) contradict those of several other researchers (e.g., Kemper, 1982; Ortony et al., 1978); it is important to replicate the results of Turner (1989) to confirm their reliability. The second aim

is to examine in more detail the types of errors that participants make while reading proverbs, by giving participants the opportunity to make these errors during different tasks.

The interaction in the recognition memory error data between familiarity and context appropriateness of error, found by Turner (1989), suggests that conventional meaning is activated during reading, even when it is not supported by prior context. In Experiment 1 these effects will be examined with the use of converging information, including a more direct test of item comprehension. Through the use of converging evidence, it is hoped that more can be learned about the processes by which participants comprehend proverbs and paraphrases.

The design of this experiment was very similar to Turner (1989); however, a few important changes were made. The initial reading phase of the experiment was very similar to Turner (1989). That is, participants read a set of passages in which the time to view each sentence in each passage was recorded. Target sentences were proverbs (familiar or unfamiliar) or their paraphrases. These target sentences were placed in contexts that suggested either a literal or a figurative meaning. The novel aspect involved the tasks given after all the paragraphs had been read. Participants were handed a booklet containing 32 sheets. A proverb or a paraphrase was typed onto each page of the

booklet. Half of these items were actual targets read during the initial reading phase of the experiment; the other half were foils. For proverbs, context appropriate paraphrases were used as foils. For paraphrases, the appropriate proverbs were used as foils. Participants were first asked to choose the exact items that they had read. It is argued that the type of information processed during comprehension could be examined by providing the participants with an opportunity to confuse the proverb and paraphrase. Thus, the target memory task was an attempt to replicate the context appropriate error data reported in Turner and Katz (submitted, Experiment 1). If all that was retained was the meaning of the target, then confusion errors should be high. However if, in addition to the meaning, the form (proverb or paraphrase) was also retained, then participants should be able to distinguish the actual target sentence from the foil.

Participants, having identified the target sentence, were next asked to write out a paraphrase of its meaning, based on how the target was used in the context. The paraphrase task provides a direct test of comprehension. Furthermore, the paraphrase task also allows for the possible occurrence of context inappropriate paraphrasing. That is, if participants read a familiar proverb used literally, and correctly recognized that the item had been presented earlier, would they erroneously recall it as

having been presented in its figurative sense? Such paraphrasing errors would suggest that the figurative sense had been activated during the initial reading, even when it was contextually inappropriate, and provide converging support for our interpretation of the context inappropriate errors reported by Turner and Katz (submitted). As reported above, these errors suggest that conventional meaning is obligatorily processed. As applied to the paraphrasing measure, the comparable results here would be that context inappropriate paraphrasing should be more likely to occur when the contextually appropriate meaning of the proverb is unconventional.

Finally, participants were asked to recall as much of the context paragraph as they could, using the target sentence as a cue. This free recall data served two purposes. First, context recall was used to determine which item the participant had recalled and confirm that the participant remembered the context. Second, the context recall provided an opportunity to explore possible mnemonic effects of the target sentences on the surrounding context. The context recall data will not be reported here since they are not relevant to this dissertation.

Method

Participants

Seventy-seven undergraduate and graduate students from the University of Western Ontario, participated in this experiment. Thirteen students (8 females) were paid to rate the proverbs for familiarity.[4] Based on these ratings, stimuli for the main experiment were constructed. Twenty four students[5] (14 males) received a course credit for rating the completed items in context to determine their relative quality along dimensions such as ease of comprehension, appropriateness, familiarity in context, plausibility, humour, and similarity of proverb and paraphrase. Forty students participated in the main experiment for a course credit. Of these, the data from 2 participants were deleted due to high error rates, and 2 more were deleted due to mechanical problems during testing.

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[4] We had originally planned on using a larger sample to obtain the initial familiarity ratings of the proverbs however these rating were very consistent. For both familiar and unfamiliar proverbs, the students were in unanimous agreement for more than half of the items. Furthermore, only extremely familiar or unfamiliar items were chosen. If familiarity was to be used as a continuous variable or if moderately familiar items were to be used, it would have been necessary to use a larger sample.

[5] Both the initial familiarity ratings and the ratings in context were collected for Turner (1989). The results have been reported here in order to describe the items in detail.

Thus, the data for the main experiment of experiment 1 are based on 36 students (24 females).

Apparatus

A Commodore 128 computer with colour monitor and 1571 disk drive was used in this experiment. The keyboard was used for all responses. Items were presented in the 40-column mode (40 characters per line) to make it easy to read the words.

Materials

Stimulus materials consisted of twenty-four proverbs (12 familiar and 12 unfamiliar). The proverbs were placed in contexts that favoured either a literal or a figurative reading (the items are presented in Appendix A). These items were constructed for previous research (Turner, 1989). Proverbs were collected from common dictionaries of proverbs (Simpson, 1982; Smith & Wilson, 1970) according to a number of criteria: (1) The proverbs had to be plausible, literally true sentences, (2) the proverbs could not use archaic wording or syntax, (3) unfamiliar proverbs could not contain idiomatic phrases, (4) proverbs could not be humorous or have rhyming words in them. Using these criteria, 119 proverbs were selected from the dictionaries. These proverbs ranged from very familiar to very unfamiliar according to the author's estimates of familiarity. The proverbs were subsequently printed on rating forms and 13 participants were asked to rate each proverb's familiarity

on a seven-point scale ranging from 0 (very unfamiliar) to 6 (very familiar). In addition, if the participants felt that the proverb was familiar, but worded differently from the more familiar form, then they were asked to write the alternative form with which they were more familiar and rate the proverb according to that form. After the rating sheet was completed participants were given a surprise recall test. Recall scores were later used to eliminate items that were too easy to remember.

Proverbs for use in the experiment were selected based on these ratings. Only proverbs that had an average rating of 5.0 of higher (familiar) or 1.0 or lower (unfamiliar) were used. Moreover, items were eliminated if more than two participants gave alternative forms or if more than six participants recalled the proverb.

Of the initial 119 proverbs 78 were at the extremes (53 rated highly unfamiliar and 25 rated highly familiar). Contexts were then generated for 24 proverbs (12 familiar proverbs with a mean = 5.71, std. = 0.306 and 12 unfamiliar proverbs with a mean =0.58, std. =0.285). The length of the context varied from 6 sentences to 11 sentences with most paragraphs being 9 sentences long. Context length was varied so that the proverb would not occur in the same position in every paragraph. The target sentence was placed in the middle of the context paragraph. Varying the context length and placing the target in the middle of the context

was done to reduce the participant's ability to anticipate the occurrence of a proverb and therefore reduce the likelihood of a figurative processing set. Two paragraphs were written for each proverb: a paragraph favouring the literal meaning of the proverb and a paragraph favouring the proverbial (figurative) meaning of the proverb. The proverb's meanings were determined using the dictionaries (Simpson, 1982; Smith & Wilson, 1970). Furthermore, to form control paragraphs, paraphrases were written for the figurative and literal meanings of the proverbs. The paraphrases were then placed in their appropriate paragraphs, producing four versions of each item. An example of the items use in Experiment 1 is given in Table 1. The target sentence and paraphrase control sentences are printed in the middle of the paragraph. Each participant would read either the target proverb or the target paraphrase, but not both.

The context paragraphs were all either conversations between two people, or a monologue spoken to a silent second person. All spoken words were placed between quotation marks. Narrative comment only identified speakers where necessary. Each sentence in the literal paragraph was matched to its counterpart in the figurative paragraph in length, complexity, number of syllables, number of clauses, sentence structure, and speaker transitions where possible. An attempt was made to avoid using metaphors or idioms

related to the target proverb (cf. Lakoff & Johnson, 1980) in the context to avoid making the proverb too redundant (see Reyna, 1986 for a discussion). Contexts were made as long as was necessary to make the intended meaning of the target sentence clear. (See Table 1 for an example proverb and context; see Appendix A for a complete list of items.) The paraphrases of the literal and figurative meaning of the proverbs were constructed in such a way as to keep the overall meaning of the paragraph the same as in the proverb condition. The paraphrases were as similar to the proverbs in length and clausal structure as possible without jeopardizing the meaning or flow of the paragraphs. All paraphrases were literal and conventional.

Normative ratings on these passages for familiar proverbs showed that the literal and figurative versions of the paragraphs were comparable in terms of ease of comprehension (2.0 for literal vs. 2.1 for figurative), familiarity (2.3 vs. 2.2), creativity (3.3 vs. 3.2), and plausibility (2.8 vs. 2.5), and according to Tukey's tests, differed only on appropriateness (3.1 vs. 2.6) and humour (4.2 vs. 4.7). Similarly, normative ratings for unfamiliar proverbs showed that the literal and figurative versions of the paragraphs were comparable in terms of ease of comprehension (2.8 for literal vs. 3.1 for figurative), familiarity (3.9 vs. 4.0), appropriateness (3.2 vs. 3.3), and plausibility (3.5 vs. 3.7), and differed only on

Table 1

Sample Item: Familiar Proverb

Proverb: There are plenty of fish in the sea

Literal Context

"I thought I'd hooked a big one," said a fisherman.
"It was a huge, beautiful salmon."
"I wrestled with it for over an hour."
"But the line broke and it swam away."
"Well, don't worry about it," said a second fisherman.

"There are plenty of fish in the sea."(target proverb)
"The ocean is filled with salmon." (target paraphrase)

"Try again, I've lost a few big ones before."
"That's what makes the sport exciting."
"If fishing was easy, it would be boring."

Figurative Context

"I thought I'd found my true love," said a teenage girl.
"He was so handsome, and smart too."
"We've been dating for two whole months."
"But we broke up, he's found someone else."
"Well don't worry about it," said a second girl.

"There are plenty of fish in the sea." (target proverb)
"There are a lot of great guys out there." (target paraphrase)

"Try again, I've broken up with guys before."
"You'll get over it, that's how you learn."
"Without heartbreaks, romance would get boring."

creativity (4.2 vs. 2.6) and humour (5.6 vs. 4.7) (see Turner, 1989, for a detailed analysis). In general the various versions of the paragraph items were comparable.

Design

The experimental design involved three manipulated factors: context (figurative vs. literal), target type (proverb vs. paraphrase), and proverb familiarity (familiar vs. unfamiliar). All variables were completely crossed with each other and run as within-participant variables. Of the eight combinations of item types in the design, the familiar proverbs placed in a context that suggests a literal meaning and the unfamiliar proverbs placed in a context that suggests the figurative meaning can be considered unconventional, the other 6 paragraph types can be considered conventional.

The four main dependent variables of interest were the reading or response time per sentence, number of sentences paraphrased correctly, recognition errors in which a proverb is selected when a paraphrase was read or vice versa, and interpretation errors in which a context inappropriate interpretation was given.

Item and condition assignments were determined ahead of time. Items were randomly drawn from the pool of 48 paragraphs with the constraint that no item would be presented more than once, and that over the course of the experiment all items would be used roughly the same number

of times. Due to the time-consuming nature of the other tasks being performed, only 2 items from each cell were presented for reading; thus, each participant read 16 paragraphs during the initial phase of the experiment. Two practice items were used to familiarize the participants with the procedure.

Procedure

The computer was programmed to input the paragraphs from disk, load a previously stored random order with counterbalanced condition assignments, present instructions, present 2 practice trials, present the stimulus passages one sentence at a time, record each sentence's reading time (based on a program by Hormann & Allan, 1987), and then save the data on disk. The reading time program recorded the data with millisecond accuracy (Hormann & Allan, 1987). Reading time per sentence was measured as the time between the presentation of the sentence on screen and the pressing of the F1 or F7 key.

The experiment was conducted in a small lab room. The paragraphs were presented on a computer screen. The participants had two keys to control the reading of the paragraphs: the F1 and the F7 keys. One key was used to move to the next sentence in the paragraph, the other key was used to return to a previous sentence in the paragraph. Key assignments were counterbalanced so that 1/2 of the participants used the F7 key for the 'next sentence key' and

the F1 key for the 'previous sentence key', and the other half used the F1 key for the 'next sentence key' and the F7 key for the 'previous sentence key'. In addition the number keys and the return key were used to answer math questions between items.

Participants were given 2 practice items to familiarize them with the experimental procedure. Practice items were clearly labelled as such. Participants were told they would not be asked questions about the practice items. Practice items were followed by the 16 experimental items.

Participants were told that the experiment was designed to examine human comprehension of conversational language presented on a computer screen and that they would be asked questions regarding the passages at the end of the experiment. They were not informed that some of the sentences were figurative, nor were they informed about the nature of the recall task. Participants were verbally given instructions and shown the location of the keys they needed to operate the computer. More detailed instructions were also presented on the computer screen.

Participants were given three digit math problems between each item as a distraction task. They would then read each passage. Each passage began with the word "Start" and a message reminding the participant which keys to use. The target sentence was presented in the middle of the passage (usually the 5th sentence). The target sentence

would be either a proverb or paraphrase. Speed of presentation of the paragraphs was completely controlled by the participant. The speed of reading each sentence was recorded. The timer was synchronized to begin with the presentation of the sentence on the screen and has millisecond accuracy. The timer was ended by the participant pressing the "next sentence key" or the "previous sentence key." Each passage ended with the words "The End." The participant would then be given another math problem, followed by the next item. This process would continue until the 16 experimental items had been presented.

Immediately following the reading task, participants were handed a 32-page booklet. Different participants read different paragraphs and each booklet consisted of randomly ordered items specially constructed with reference to the specific items that they had just read. The instructions on the cover page of the booklet defined the tasks. The relevant aspects of these instructions follow.

"You might have noticed one or two proverbs contained in the paragraphs that you just finished reading. All paragraphs contained a "TARGET" sentence that was either a proverb, or an appropriate control sentence. It is these "TARGET" sentences that we are primarily interested in. On the following pages you will find a number of sentences. Some are proverbs while others are ordinary "control" sentences. You only read about half of these sentences so

only answer if you are sure you read the sentence. If you don't remember a "target" sentence then write "new" at the top of the sheet, and leave the page blank. For those sentences that you remember reading, write a paraphrase of the sentence as it was used in the previous paragraphs. A paraphrase is a restatement or a description of the meaning of the sentence, usually using simpler words. Some of the proverbs were not used in their ordinary proverbial sense, be sure to write the meaning that you read in the previous paragraphs."

"After writing the paraphrase, in the space provided, write down everything you remember about the paragraph. Use the exact words and reproduce the paragraph word for word, if possible."

Results

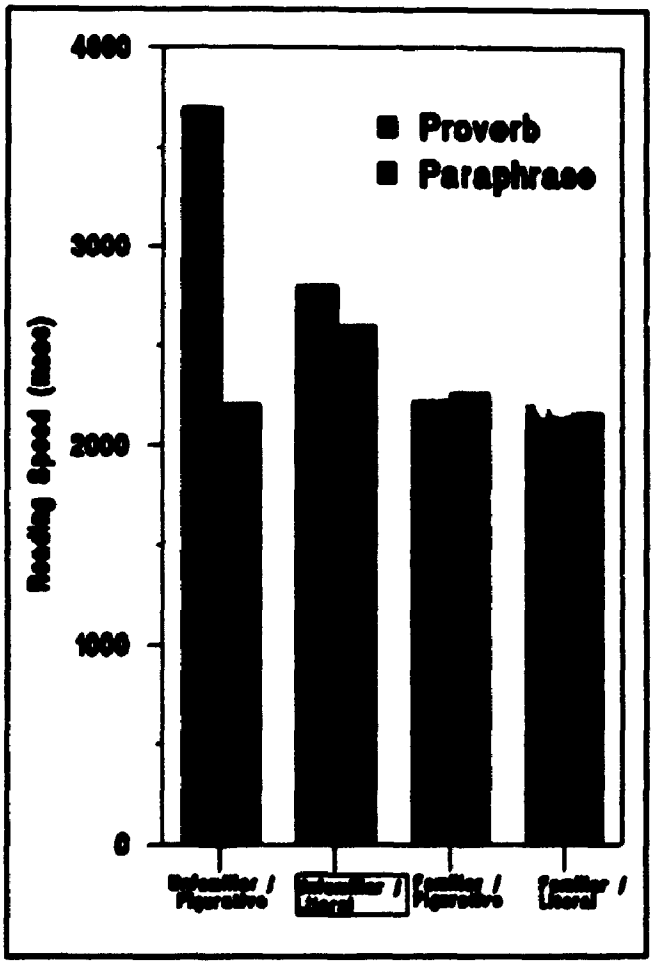
The data were analyzed as a 2 (context: literal/figurative) X 2 (target type: proverb/paraphrase) X 2 (proverb familiarity) completely repeated analysis of variance. Two analyses were conducted, F1, using participants as a random variable and F2, using items as a random variable. Following the recommendation of Clark (1973) minF's will be reported when both F1 and F2 are significant to permit generalization across both items and participants. The minF' statistic is very conservative. When the minF' is significant, then results are very reliable across both participants and items. When both F1 and F2 are significant, but the minF' fails to reach significance, the results will be interpreted, but the findings must be treated with some care. And if only one of the two is significant the results must be treated with extreme care. An effect that is only significant across participants may not generalize to new items and an effect that is only significant across items may not generalize to other samples of people.

Reading Time

The results completely replicated those found in Turner (1989; see Turner & Katz, submitted for review). Figure 1 shows the means of the target sentences. Familiar targets (M= 2401 ms) were processed faster than unfamiliar targets

(M = 3046 ms; minF'(1,37) = 6.237, p<.05). Paraphrase targets (M = 2583 ms) were processed faster than proverb targets (M = 2864 ms). This reached significance across participants (F1(1,35)= 5.05, p<.05) and was marginal across items (F2(1,22)=3.89, p=.06). There was a significant interaction of target type with context across participants (F1(1,35)=11.43, p<.01; F2(1,22)=3.69, p=.06) and a significant interaction of target type and target familiarity, (minF'(1,37)=4.72, p<.05). Finally, the important three-way interaction was significant across participants (F1(1,35)=9.85, p<.01) and marginally reliable across items, (F2 (1,22)=3.89, p<.06). The post hoc analyses failed to find a difference between paraphrases and proverbs for all target sentences except unfamiliar proverbs used figuratively (Proverbs 3834 ms vs. Paraphrase 2426 ms; HSD = 462.4, q=2.8; see Figure 1). Furthermore unfamiliar proverbs were processed faster when used literally (2968 ms) than when used figuratively (3834 ms; HSD of 437.7, q=2.8). These data indicate that the unfamiliar proverbs required additional processing time compared to when they are used literally (proverb in literal context) and compared to their figurative meaning control (paraphrase of figurative meaning in figurative context). Familiar proverbs used literally or figuratively were processed at the same speed. Finally it is important to note that unfamiliar proverbs used literally and their paraphrases were processed significantly more

Figure 1. Reading time Data Comparing Proverb and Paraphrase Reading time.



slowly than familiar proverbs and their paraphrases, confirming the findings of Turner (1989).

As a further check on the latency data, the reading time data were analyzed using only those items to which an adequate context appropriate paraphrase was given. Correctly paraphrased items produced virtually identical results to those reported above. Thus, the differences in latency observed here are not caused by a failure to comprehend selected items.

Recognition of target

Correct recognition. Recall that each participant had to decide whether a given item was one that they had read, or was new. The targets were either proverbs or paraphrases of other proverbs. The foils in the recognition test were the context appropriate counterparts. For example the foil for a proverb would be the paraphrase of the sense in which the proverb had been used; the foil for a paraphrase target would be the appropriate proverb. A target was considered recognized if it met the following criteria: (1) the item presented earlier was chosen as OLD and the item was given the context-appropriate paraphrase and (2) the participant recalled a sufficient amount of the context to show that the participant had actually recalled the original item. Such items were scored as 1 and other responses were scored 0. The only significant finding was the interaction of target

type and target familiarity($F1(1,35)=5.96$, $p<.05$; $F2(1,22)=7.12$, $p<.05$).

For familiar targets, the proverbs (83%) were recognized more than their paraphrases (74%). This effect held for both literal (84.7% vs. 76.4%) and figurative (80.5% vs. 72%) uses of familiar proverbs. The reverse relationship held for unfamiliar targets. Now the paraphrases (87%) were recognized more often than the proverbs (79%). This was also true for both literal (75% vs. 88.8%) and figurative (83% vs. 86.1%) uses of unfamiliar proverbs. Overall recognition rates were high. These data are consistent with the recognition data of Turner (1989).

Confusion Errors. The main analysis is the type of error made. The most frequently made errors were those in which a proverb was confused with a paraphrase or vice versa. Confusion errors were scored if a participant who had read a proverb during the reading phase of the experiment wrote 'old' on the page with the paraphrase on it, or if a participant who had read a paraphrase wrote 'old' on the page with the proverb on it. Such errors were scored as 1, all other responses as 0. Confusion errors were only scored if the participant recalled the correct context paragraph. Confusion errors were recorded in an attempt to replicate the context inappropriate errors found in Turner (1989). More confusion errors were made for targets used literally (17.6%) than for targets used

figuratively (10.7%); $F1(1,35) = 5.65$, $p<.05$ and $F2(1,22) = 9.78$, $p<.05$. This main effect is qualified by an interaction with target type (proverb vs. paraphrase): $F1(1,35) = 5.34$, $p<.05$ and $F2(1,22) = 3.54$, $p=.07$. Participants were equally likely to confuse proverbs and paraphrases when placed in literal contexts (18% vs. 17%), but were more likely to confuse a proverb with a paraphrase (18%) than a paraphrase with a proverb (3.5%) in figurative contexts. Thus, these data suggest that the contexts worked as one might expect: a literal context resulted in a literal interpretation of a proverb and a figurative context resulted in its non-literal interpretation. The lesser confusion of a paraphrase presented at experiment with the proverbial counterpart in figurative contexts suggests also an asymmetry in the nature of the message that gets encoded: A participant is more likely to mistakenly select a paraphrase when he/she has read a proverb, than to mistakenly select a proverb when he/she has read a paraphrase.

There were also effects involving the nature of the target read. More confusion errors were made for proverb targets (18%) than for paraphrase targets (10.4%); $F1(1,35) = 8.04$, $p<.05$ and $F2(1,22) = 5.79$, $p<.05$. This main effect is qualified by an interaction of target sentence type and familiarity: $F1(1,35) = 12.73$, $p<.01$ and $F2(1,22) = 5.58$, $p<.05$. This interaction is theoretically the most important

for the questions being asked here. For familiar proverbs, participants were as likely to choose a proverb when they had read a paraphrase (13.7%) as to choose a paraphrase when they had read a proverb (13.1%). Familiar proverbs and paraphrases are equally likely to be confused with each other even when the proverb is presented in paraphrase form. These data suggest that, at encoding, the intended meaning of the proverb is made available. On the other hand, for unfamiliar proverbs, participants were more likely to choose the paraphrase when they had read a proverb (22.9%) than choose a proverb when they had read a paraphrase (6.9%). This finding suggests that the familiar proverb is more or less interchangeable with its paraphrase. An unfamiliar proverb leads to an interpretation that can be confused with a paraphrase, but a paraphrase is very unlikely to be confused with an unfamiliar proverb. Taken together, these data are consistent with the context appropriate error data from Turner (1989). Proverbs are more easily confused with a sentence that describes their literal meaning than with a sentence that describes their figurative meaning, unless the proverb is familiar. Furthermore, proverbs are more likely to make the reader think of the paraphrase than a paraphrase is likely to make the reader think of a proverb.

Interpretations of correct recognitions

The paraphrase given to each target correctly

recognized was scored initially as to the adequacy of the interpretation. A secondary analysis examined the type of interpretation errors made.

Adequacy of interpretation. A paraphrase was deemed an adequate interpretation if: (1) the correct target sentence was recognized and (2) the interpretation conveyed the overall gist of the sentence. A score of 2 was given if participants clearly demonstrated context-appropriate usage, a score of 1 was given if the paraphrase did not provide sufficient information to show context-appropriate usage and 0 if the item was either not recognized or no interpretation was given. The author and a senior graduate student[6] independently scored a subsample (10%) of the responses. In 95.6% of the cases the same rating was given; the correlation between the two scores was r=0.95, indicating the reliability of the scoring scheme. In the analyses reported here, only items scored 2 were deemed to indicate adequate comprehension. For the analysis below the data was rescored as either a 1 (comprehended) or a 0 (not comprehended); items initially scored as 1 (inadequate interpretation) were rescored as 0.[7] This scoring scheme

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[6] The author would like to express his thanks to Corinne Enright for scoring some of the data in order to determine the reliability of the scoring method.

[7] The first scoring scheme was reported only because the reliability was calculated using the 3 categories.

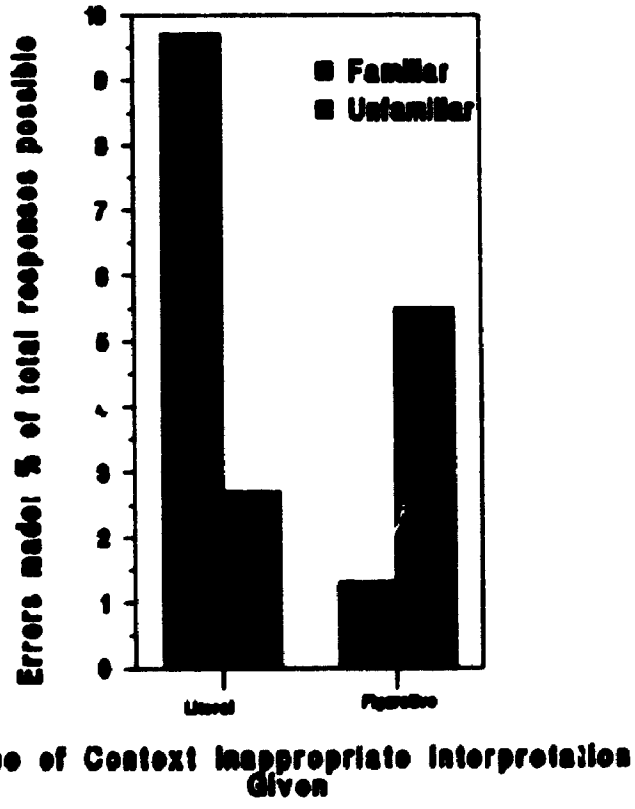
was thus a very conservative test of comprehension. Responses to about 70% of the items met these criteria.

Paraphrases (74%) were more accurately interpreted than were proverbs (65%: $\underline{F1}(1,35)= 4.24$, $\underline{p}<.05$ and $\underline{F2}(1,22)= 10.10$, $\underline{p}<.01$) indicating a greater difficulty of interpreting proverbs in the initial reading task. Furthermore target type interacted with familiarity ($\underline{minF'}(1,56)=4.04$, $\underline{p}<.05$) indicating that familiar proverbs and their paraphrases were equally well interpreted (71.5% vs. 69%) whereas unfamiliar proverbs were reliably harder to understand than their paraphrases (61% vs. 79.5%: HSD = 8%, $q=2.8$, $\underline{p}<.05$). Thus, the interaction resulted from the greater difficulty in comprehending unfamiliar proverbs compared to the other conditions. These data parallel those found with the latency data, excepting that the earlier analysis also showed that this effect was modified by context in as much as unfamiliar proverbs took longer to read in a figurative context than in a literal context. In contrast unfamiliar proverbs were equally easy to paraphrase, and hence equally comprehended, whether used literally (58.5% overall; 78% of recognized items) or figuratively (63.8%; 76% of recognized items). The failure to find a difference in paraphrasing the unfamiliar proverbs suggests that, with increased time to process, equivalent levels of comprehension can be reached.

Context-Inappropriate Interpretation Errors. From the perspective of the question being asked here, the most important type of result would be the presence of context inappropriate errors. If participants read a proverb such as "an empty sack cannot stand upright" in a literal context, then an appropriate paraphrase would be about sacks and their properties; if they had read the same proverb in a figurative context, an appropriate paraphrase would be about the need for sustenance such as food or social support. If a reader sometimes gave a contextually inappropriate interpretation, it would suggest that the alternative interpretation had been generated to the target, even though the other interpretation was invited by the context.

An analysis was conducted only using proverb targets. Neither of the main effects were significant. However the predicted crossover interaction between target familiarity and interpretation (literal vs. figurative) was observed ($F1(1,35) = 4.37$, $p<.05$; $F2(1,22) = 4.02$, $p=.05$). This interaction is depicted in Figure 2. Participants were more likely to incorrectly interpret a proverb as a figurative statement if it was a familiar proverb (9.7%) than if it was an unfamiliar proverb (2.7%). In contrast participants were more likely to incorrectly interpret a proverb as a literal statement if it was an unfamiliar proverb (5.5%) than if it was a familiar proverb (1.3%). These data are completely consistent with the post hoc error analysis performed in

Figure 2. Type of Interpretation Errors Made as a function of Familiarity.



Turner (1989), and together support the position that the conventional meaning of a target is sometimes interpreted, even when the target is placed in a context that is biased towards the unconventional meaning.

Discussion

The aim of Experiment 1 was to replicate the reading time and recognition error data from Turner (1989), and to obtain converging evidence that conventional meaning is activated, even in contexts designed to make salient the non-conventional sense of an utterance. Both aims were successful.

Experiment 1 successfully replicated the reading time, context inappropriate error, and context appropriate error data from Turner (1989; see Turner & Katz, submitted, Experiment 1, for a review of the error data). Familiar proverbs were read at the same speed whether used literally or figuratively; these data are, of course consistent with the literature. However, unfamiliar proverbs were read faster in a literal context than in a figurative context. Thus, the failure to find processing time differences between figurative and literal sentences in previous research (e.g., Ortony et al., 1978), is not a general effect, but is related to target familiarity. Furthermore the pattern of reading time was essentially the same when the reading time for only those items that were accurately

paraphrased was examined.

The pattern of recognition confusion errors for the target was also very similar to the context appropriate errors found in Turner (1989), and indicates that proverbs are more easily confused with paraphrases of their literal meaning than with paraphrases of their figurative meaning. This finding was particularly prominent for unfamiliar proverbs, but the same general pattern was true for familiar proverbs. This finding suggests that the representation of a proverb is more closely tied its literal meaning, than its figurative meaning. Furthermore, these data suggest that literal meaning may play an important role in the representation of the proverb in memory.

Finally the pattern of context inappropriate interpretation errors is very similar to the pattern of context inappropriate recognition errors found in Turner (1989). The interaction between familiarity and context for context inappropriate errors suggest that conventional meaning was sometimes processed during the comprehension of proverbs (Turner & Katz, submitted). That is, this evidence suggests that figurative meaning of familiar proverbs was activated when the proverb was used literally, and the literal meaning of unfamiliar proverbs was activated when the proverb was used figuratively. Participants were more likely to make context inappropriate errors or interpretations favouring the conventional meaning of

proverbs (figurative if familiar; literal if unfamiliar). As reviewed above this error finding is inconsistent with the reading time data, which reveal an ordinal interaction rather then the predicted disordinal interaction.

Thus, although the latency data only supports the obligatory processing of conventional meaning for unfamiliar targets, the supplementary error analyses also indicate obligatory processing of conventional meaning for familiar proverbs. Taken together these data suggest that both the conventional meaning of a proverb and the literal meaning of the proverb are activated even if that meaning is inappropriate to the context. Familiar proverbs are read at the same speed when used literally or figuratively because both literal and figurative meaning are processed in an obligatory manner. In contrast, unconventional figurative meanings of unfamiliar proverbs do not appear to become available, unless supported by the context. These error data suggest that the use of memory techniques may yield important clues to help interpret reading time data and are therefore useful tools in exploring the processing of proverbs.

These conclusions however, are based largely on post hoc analyses of the type of error made by participants. The data for such analyses were generated spontaneously and naturally by participants and contain relatively few errors per person (5% on average). Consequently one would wish to

replicate these findings with a procedure that is under experimental control and produces a larger database of responses. Experiment two was conducted as an attempt to replicate these findings using an experimental task.

EXPERIMENT 2

The aim of Experiment 2 was to replicate the context inappropriate error data, by employing an experimental task. The task chosen for use was a modification of one introduced by Endel Tulving (e.g., Thomson & Tulving, 1970; see Tulving, 1983, for a review).

Tulving (1983) has argued that a cue can only be an effective recall aid for an event if the cue information is stored with the memory of the original event. A strong version of this encoding specificity hypothesis is stated in the following:

> Specific retrieval cues facilitate recall <u>if and only if</u> the information about them and about their relation to the (to be remembered) words is stored at the same time as the information about the membership of the (to be remembered) words in a given list (Tulving, 1983, p. 212).

This encoding specificity position thus holds that a retrieval cue will be effective if and only if it was generated at encoding, and will be ineffective in generating to-be-remembered information if it was not generated at encoding. Although controversial, there is a large body of evidence to support this claim (see Tulving, 1983).

The relationship of encoding specificity to the present experiment is the argument that the effectiveness of a cue

should reflect encoding processes. Consider the proverb in example (8).

(8) The grass is always greener on the other side of the fence.

As stated above, this proverb's conventional meaning is related to envy of what other people have. How would this sentence be read if placed in a context meant to bring out the literal sense of the proverb such as sentence (9)?

(9) A neighbour is fertilizing and watering his lawn.

Now suppose that after reading sentence (8) the reader was given either a contextually appropriate cue (e.g., pasture) or a contextually inappropriate cue related to the proverb's figurative meaning (e.g., envy). Using the logic of Tulving's (1983) encoding specificity principle it is argued that if the figurative sense of the proverb had been activated, even while reading the proverb used literally, then the context inappropriate cue would be effective. However if the figurative sense had not been activated, then the inappropriate cue should not lead to recall. Similarly, consider how this sentence would be processed if placed in a figurative context such as in example (10).

(10) Other people's lives always seem much more glamorous.

If the literal meaning is processed then a literal cue should be an effective cue. If the literal meaning had not been activated, then a literal cue should not be an

effective recall aid. Thus, it is argued that recall cues allow the examination of the processing of different meanings during the reading phase of the experiment. Techniques similar to this have been employed successfully for sentence recall by Verbrugge and McCarrell (1977) and by Gibbs (1982).

We suggest that the encoding specificity method can test the assumption that the conventional meaning is active during proverb comprehension. Recall that it is proposed that literal meaning is usually conventional, and would therefore be the conventional meaning for unfamiliar proverbs; this position is similar to that taken by the standard pragmatic model. In contrast figurative meaning is usually conventional for familiar proverbs. Given the similarities in processing time and memory data for familiar proverbs in Experiment 1, one might argue that, for familiar proverbs, both the figurative and literal senses are conventional. If this is the case then contextually inappropriate literal and figurative cues will both be effective recall aids. The two most important predictions are (1) that figurative cues will be effective in aiding the recall of familiar proverbs used literally (consistent with Glucksberg et al., 1982, argument that figurative meaning is automatically activated), and (2) figurative cues will be very ineffective at aiding recall of unfamiliar proverbs used literally (inconsistent with Glucksberg et al., 1982,

argument that figurative meaning is automatically activated). Finally, for comparison, proverbs will also be cued with contextually appropriate cues. According to the encoding specificity principle these cues should be better than contextually inappropriate cues. In addition, if conventional meanings are activated in an obligatory manner, then cue type should interact with contextual appropriateness and familiarity.

Method

Participants

A total of 95 undergraduates from the University of Western Ontario participated in this experiment. Eighty-five participated as a course requirement and 10 were paid for their participation. Four participants were subsequently dropped due to mechanical problems. Thirty of these students were given a slight variation of the main experiment in which they were given the opportunity to reread the target sentences (as was the case in Experiment 1).

Apparatus

A Commodore 128 computer with colour monitor and disk drive was used in this experiment. The keyboard was used for all responses. Items were presented in the 40-column mode (40 characters per line) to make it easy to read the

words.

Design

The experimental design involved three factors: cue type (contextually appropriate vs. inappropriate), context type (literal vs. figurative context), and item familiarity (familiar vs. unfamiliar proverbs). Familiarity and context type were within-participant factors and cue type was a between-participant factor. The item variables (context and familiarity) were completely crossed with each other, and consequently there were four separate item types. Of the four item types in the design, the familiar proverbs placed in a context that suggests a literal meaning and the unfamiliar proverbs placed in a context that suggests the figurative meaning can be considered unconventional, the other two paragraph types can be considered conventional. The main difference between Experiment 2 and Experiment 1 was that no paraphrase controls were used as target sentences.

The two main dependent variables of interest were the reading time per sentence and the cued recall of the target sentences.

Item and condition assignments were determined ahead of time. Items were randomly drawn from the pool of 48 paragraphs with the constraint that no item would be presented more than once and that over the course of the

experiment all items would be used roughly the same number of times. Practice items were randomly drawn from the unused items.

Materials

Stimulus materials consisted of twenty-four proverbs (12 familiar and 12 unfamiliar). These passages were identical to the items used in Experiment 1. The proverbs were placed in contexts that biased either a literal or a figurative reading of the proverb.

The cues for the cued recall task were constructed by first writing literal and figurative paraphrases of the proverbs. Second, the paraphrases were reduced to as few words as possible. Phrases were used because it was too difficult to find single words that would be uniquely related to a particular proverb and not to the others. For example, "birds" is related to the literal meaning of three proverbs, but "baby birds" is related to one proverb -- "Don't count your chickens before they hatch" -- because only this proverb mentions hatching. Furthermore, it was difficult to find cues that were likely to cue the figurative meaning of unfamiliar proverbs. Third, an attempt was made to equate the length of literal and figurative cues. Fourth, the cues were edited to ensure that there was no lexical overlap between the key words in the target sentence and its cues. Fifth, three other people

read over the list of cues to make sure none were either too easy or too difficult. The average length of these phrases was 3 words with cues for unfamiliar proverbs tending to be slightly longer. Cues for the unfamiliar proverbs were slightly longer because it was difficult to reduce their meaning down into a single short phrase (see Table 2 for example cues; see Appendix B for a complete list of cues).

Procedure

The computer was programmed to input the paragraphs from disk, load a previously stored random order with counterbalance condition assignments, give instructions, four practice trials, present the stimulus paragraphs one sentence at a time, record each sentences reading time (based on a program by Hormann & Allan, 1987), and then save the data on disk.

The experiment was conducted in a small lab room. The paragraphs were presented on a computer screen. The context was written in large black letters (40 characters per line), and the target sentences were written in large blue letters. The target sentence was presented in blue letters so that during the recall test the experimenter could simply ask the participants to recall the sentences written in blue letters, rather than asking the participants to recall everything they remembered. The participants had one key to control the reading of the paragraphs.

Table 2

Examples of cues

Familiar Proverb:

There are plenty of fish in the sea

Literal cue: the ocean is filled

Figurative cue: other lovers

Unfamiliar Proverb:

Raw leather will stretch

Literal cue: making shoes

Figurative cue: training children

Participants were given four practice items to familiarize them with the experimental procedure; these practice items were used to familiarize the participant with the blue lettering of the target sentence. Practice items were clearly labelled as practice items. Participant were told that they would not be asked questions about the practice items. These practice paragraphs were randomly drawn from the item pool, but the target sentences were paraphrases (not proverbs). Practice items were followed by 12 experimental items. Only 12 items were given to each participant because of the time-consuming nature of the cued recall task. Each participant received three familiar proverbs used figuratively, and three familiar proverbs used literally, three unfamiliar proverbs used figuratively, and three unfamiliar proverbs used literally.

Unlike Experiment 1 (and Turner, 1989), most participants in Experiment 2 were not able to reread the target sentences. This change was made to simplify the experiment, and because few participants reread the target sentences in Experiment 1. Nonetheless, to make sure that there were no processing differences caused by this change, a small subsample of 30 participants was given the opportunity to reread target sentences. Consequently, this subsample provides the opportunity of testing for systematic differences in reading time and recall resulting from being able to reread the target sentence.

Participants were told that the experiment was designed to examine human comprehension of conversational language, presented on a computer screen. They were told that they would be asked questions regarding the passages at the end of the experiment. They were not informed that some sentences were figurative, nor were they informed about the nature of the recall task. Participants were verbally given instructions and shown the location of the keys they needed to operate the computer. More detailed instructions were also presented on the computer screen. The participants were told that a target sentence in the middle of the paragraph would be highlighted in blue letters. They were also told that it was the target sentence that they would be asked questions about in part two of the experiment.

Between each item, the participants answered a 3-digit addition problem to prevent memorization between items. Each item was presented in the following format. The participant would solve a 3-digit math problem. The participant would then read a passage. Each passage began with the word "Start" and a message reminding the participant which keys to use. In the middle of the passage (usually the 5th sentence) the target sentence would be printed in blue letters. Participants were told that they would be asked comprehension questions about the sentences written in blue, but were not told that they would be asked to recall it. The participant controlled the speed at which

the paragraph was presented. As with Experiment 1, the speed of reading each sentence was recorded and the timer was synchronized to begin with the presentation of the sentence on the screen. The timer was ended by the participant pressing the "next sentence key." Each passage ended with the words "The End." The participant was then given another math problem, followed by the next item. This process continued until the 12 experimental items had been presented.

After reading all of the 12 passages the participants were given several sheets of paper with a cue phrase printed on each. The participants were asked to recall the target sentence. In addition, the participants were asked to complete three rating scales and recall as much of the context paragraph as they could. The rating and context recall data were used in scoring the target sentences but will otherwise not be reported here.

For half the participants, cues were contextually inappropriate. That is, if the target proverb was used literally, a cue related to the figurative meaning of the proverb would be presented. If the target was used figuratively, a cue related to the literal meaning would be presented. For those participants in the context appropriate condition, the cues were contextually appropriate to the passage. That is, if the target was presented in a literal context, the cue would be related to

the literal meaning of the proverb, and if the target was used figuratively, the cue would be related to the figurative meaning of the proverb.

Results

Reading time Data

One of the main differences between this experiment and Experiment 1 was that participants could not reread target sentences. As a manipulation check to ensure that this procedural change did not induce differences in reading time patterns, 30 participants were given the same opportunity to reread the target sentences provided to participants in the earlier studies. To test for significant differences between these 30 participants and those not given the opportunity to reread, an analysis of variance was conducted. There was no significant effect of the opportunity to reread the target sentences on reading time ($F1(1,89) = 1.71$, ns), nor did the opportunity to reread interact with the other variables. Thus, the analyses reported below are collapsed across this factor.

Processing speed from all 91 participants was analyzed using the raw speed per sentence. The basic finding is that the reading time data generally replicated the findings reported in the first experiment. Proverb sentences in a literal context were read 441 ms faster than proverb sentences in figurative contexts ($minF'(1,78) = 6.17$, $p<.05$).

Table 3

Reading time Data for Proverbs

	Familiar			Unfamiliar		
Literal Context	N	Mean	Std	N	Mean	Std
Raw Speed *	91	2294	1065	91	3109	1754
Raw Speed /outlier**	91	2138	696	91	2855	1075
Figurative Context	**N**	**Mean**	**Std**	**N**	**Mean**	**Std**
Raw Speed *	91	2518	1235	91	3768	2212
Raw Speed /outlier**	91	2297	729	91	3342	1237

* Analysis reported in the dissertation are based on the raw speed per sentence. The other analysis are presented here for the purpose of comparison.
** These are the means calculated using raw reading time when outliers more than 2 standard deviations from the cell mean were removed.

Familiar proverbs were read 1032 ms faster than unfamiliar target sentences (minF'(1,35)= 10.10, p<.01). There was also a significant interaction of familiarity by context across participants (F1(1,89)= 7.31, p<.01, MSE= 665645), but not across items (F2(1,22)= 2.58, p=.12, MSE= 584254). To examine the simple main effects of context, differences were examined by use of Tukey's HSD Procedure. Familiar proverbs were read faster than unfamiliar proverbs in both literal (HSD =343.9 ms), and figurative contexts (HSD = 343.9 ms). Of more importance is the effect of the same item in different contexts. As in Experiment 1, familiar proverbs were read equally fast in both literal and figurative context. In contrast, unfamiliar proverbs were read 659 ms faster in a literal context than in a figurative context (HSD = 286 ms). These findings replicate the reading time data from Experiment 1.

Cued Recall Data

The means and standard deviations of the cued recall data are presented in Table 4. As can be seen in Table 4, context appropriate cues (51%) were more effective at cuing proverbs than were context inappropriate cues (32.3%; minF'(1,75)= 11.5, p<.01). Proverbs used literally (39%) were recalled reliably less than proverbs used figuratively (43%; F1(1,89)= 3.77, p=.05: F2(1,22)= 3.06, p<.10). Familiar proverbs (48%) were recalled better than unfamiliar

Table 4

Cued Recall Data (%) for Proverbs

	Familiar			Unfamiliar		
Context Appropriate Cues						
	N	Mean	Std	N	Mean	Std
Literal Context						
(Lit. cue)	42	61.9	28	42	53.2	35
Figurative Context						
(Fig. cue)	42	52.7	28.5	42	37.3	29.6
Context Inappropriate Cues						
	N	Mean	Std	N	Mean	Std
Literal Context						
(Fig. cue)	49	34.6	28	49	8.8	20
Figurative Context						
(Lit. cue)	49	42.9	29	49	43	34

proverbs (22%; minF'(1,29)= 3.3, p<.10). These main effects are qualified by an interaction of context and cue appropriateness that is essentially an effect of the literalness of the cue[8] (literal vs. figurative); minF'(1,39)= 13.25, p<.01. To examine the simple main effects of cue appropriateness, an HSD of 9.1% was calculated. Literal cues (57%) were substantially more effective retrieval aids than figurative cues (21%) for proverbs used literally, whereas literal (42.8%) and figurative cues (45%) were equally effective for proverbs used figuratively. Finally the three-way interaction was significant (F1(1,89)= 8.31, p<.01: F2(1,22)= 4.7, p<.05).

This three-way interaction (see Table 4) qualifies the main effect of cue appropriateness and the two-way interaction of cue appropriateness and context. The HSD for

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[8] In an orthogonal design made up of discrete cells there is no real difference between a main effect variable and an interaction. One could easily recode an interaction as a main effect and treat a main effect variable as the interaction term. Below is a table that illustrates the cells if context (literal vs figurative) and cue type (literal vs figurative) were treated as main effects and context appropriateness was treated as an interaction term.

	Cue type: literal cue	Cue type: figurative cue
literal context	context appropriate	context inappropriate
figurative context	context inappropriate	context appropriate

the simple main effects of appropriateness of cues was 10%. For both familiar and unfamiliar proverbs used figuratively, context appropriate cues were not reliably more effective than inappropriate cues. That is, a literal cue was equally effective at accessing the proverb used in its figurative sense as was a figurative cue. On the other hand, when the proverb was used literally, context appropriate cues related to the literal meaning were appreciably more effective retrieval aids than were inappropriate cues related to the figurative meaning of the proverb (familiar: 61.9% vs. 34.6% and unfamiliar: 53.2% vs. 8.8%). For unfamiliar proverbs, contextually-inappropriate cues related to the figurative meaning of a proverb were much less effective recall aids (8.8%). In contrast contextually-inappropriate figurative cues were effective recall aids for familiar proverbs (34.6%). The three-way interaction is a result of the effectiveness of contextually inappropriate figurative cues for familiar proverbs, but not for unfamiliar proverbs. This effect is evidence for the obligatory processing of conventional figurative meaning.

To summarize, (1) appropriate cues were better than inappropriate cues, (2) literal cues were better than figurative cues, as revealed by the interaction of cue type and context type, (3) familiar proverbs were recalled better than unfamiliar proverbs, (4) contextually inappropriate cues related to the figurative meaning were effective recall

aids for familiar proverbs but not for unfamiliar proverbs. To determine the relative importance of each effect presented above, eta squares were calculated. The most important predictor of cued recall was cue appropriateness which accounted for 8.64% of the total variance. The next most important factor was cue literalness (interaction of context and cue appropriateness) which accounted for 6.63%. Familiarity of the proverb accounted for 3.81% of the variance. The three-way interaction showing the obligatory processing of conventional meaning accounted for 1.6% of the variance, and the effect of context accounted for .48% of the variance. This equation accounts for a total of 21.16% of the total variance.

Discussion

The reading time data essentially replicated the findings of Experiment 1 and of Turner (1989). Familiar proverbs were read equally fast in both literal and figurative context, whereas unfamiliar proverbs were read faster in a literal context than in a figurative context.

The cued recall data is new. Context appropriate cues were better at cuing proverbs than context inappropriate cues and familiar proverbs were recalled better than unfamiliar proverbs. Proverbs in figurative contexts were recalled better than proverbs in literal context, but this was only true because of the near zero recall of unfamiliar

proverbs used literally, cued by contextually inappropriate figurative cues. More important is the finding that cues related to the literal meaning of a proverb are, in general, better than cues related to the figurative meaning of a proverb. This was revealed by the large interaction between context appropriateness and context, and by the significant proportion of variance attributable to cue literalness.

The results of Experiment 2 show that contrary to purely context based accounts of figurative language, such as that described by Ortony et al. (1978), context appropriateness is only one of four factors[9] in the full linear model that determine a cue's effectiveness. Significant variance is accounted for by literalness of cues, by proverb familiarity, and by contextually inappropriate conventional figurative meaning. A purely context-based theory cannot account for these data. The appreciable recall of familiar proverbs used literally to the figurative cue indicates that the figurative meaning of a familiar proverb is activated even when it is context inappropriate. Moreover, the near zero recall of unfamiliar proverbs used literally when cued by items appropriate to

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[9] Actually there were 5 factors in the full linear model. The fifth factor was the context of the target sentence (literal vs figurative context), but context does not affect the quality of the cue, but more likely affects memorability of the target sentence. Furthermore context only accounted for .48% of the variance and was therefor not a very important factor.

the figurative sense of the item indicates that the proverbial meaning of such items is virtually never processed unless supported by context. In other words, an unfamiliar proverb used literally is not a proverb. These data are completely consistent with those observed in the first experiment. The novel finding is the strong mnemonic effect of literal meaning cues. These findings suggest that literal meaning is available for both familiar and unfamiliar proverbs regardless of context, but that figurative meaning is only activated if the proverb is familiar or if the figurative meaning is contextually appropriate.

Taken together these data suggest the following four points: First, familiar figurative meanings are processed in an obligatory manner even when contextually inappropriate. This finding is consistent with Glucksberg et al.'s(1982) finding that (familiar) metaphors cannot be ignored. Second the figurative meaning of an unfamiliar proverb is not processed in an obligatory manner, but instead requires the recognition by the participant that the sentence is being used figuratively. This claim is based on the slower reading time of unfamiliar proverbs used figuratively, and on the near zero recall to figurative cues of unfamiliar proverbs used literally. This finding is in contradiction to the claim that figurative meaning is automatically processed (e.g., Gildea & Glucksberg, 1983; Hoffman &

Kemper, 1989). Third, processing literal meaning is obligatory for both familiar and unfamiliar proverbs. This is supported by relatively high levels of recall to literal cues. Literal cues were substantially better than figurative cues for proverbs used literally. When the proverbs were used figuratively, contextually inappropriate literal cues were as effective as the contextually appropriate figurative cues and slightly more effective for unfamiliar proverbs. Fourth, the effectiveness of a cue is not merely a function of the contextual appropriateness of the proverb, but is also affected by literalness of a cue, conventionality of the meaning, and the familiarity of the to-be-remembered item. These findings challenge a purely contextual view of figurative language, and suggest a special status for both literal and conventional language. Furthermore these results place limits on the degree to which it can be claimed that figurative language is "automatically" processed (cf. Gildea & Glucksberg, 1983).

EXPERIMENT 3

The data from Experiments 1 and 2 suggest that contextually inappropriate literal meaning is processed for both familiar and unfamiliar proverbs, but contextually inappropriate figurative meaning is processed only for familiar proverbs. Thus, figurative meaning is only obligatory when the proverb is familiar. One problem with these findings is that it is unclear to what extent they could have been caused by some peculiarity of proverbs, such as unusual syntax, archaic wording, the constraints on meaning for proverbs, or the lexicalization of the proverb's surface form (See Hoffman & Kemper, 1987, for similar comments.) Moreover can these findings be generalized to metaphors? This last issue is especially important. Recall that in the introduction it was noted that researchers have often failed to find reading time differences between metaphors used literally or figuratively (cf. Ortony et al., 1978). It could be argued that proverbs and metaphors are processed differently.

Proverbs are often stated in a form that is general, somewhat archaic, and sounds profound. Normative ratings of proverbs used literally revealed that they do not make particularly good literal sentences, primarily because they are too general (Turner, 1989); proverbs "sound" proverbial. Consequently one could argue that there is a possible confound in the earlier studies; unfamiliar proverbs may not

sound as proverbial as familiar proverbs. These factors may affect the processing of the target sentences. It could be argued that the participants process familiar proverbs according to their figurative meaning because the figurative meaning is cued by some peculiarity of the sentence. Alternatively, perhaps the "proverbial" sound was the cause of the slower reading time for unfamiliar proverbs. It is important to note that these factors are not mutually exclusive; both literal content and style may contribute to processing by clarifying the intended usage of the sentence (see Searle, 1979, and Glucksberg & Keysar, 1990, for a discussion of such processing factors). Furthermore proverbs, like idioms, often have one or two standard forms in which they are usually presented. In contrast, a familiar metaphor may have many different surface forms. Lakoff and Johnson (1980b) catalogued various families of metaphors that all use the same or similar vehicles but have different instantiations that might include active metaphors, dead metaphors, idioms, and even proverbs.

A related issue is the question of what constitutes a familiar metaphor or proverb. Is a metaphor familiar only if its particular surface form is familiar, or is familiarity based more on the underlying vehicle employed? For example, consider sentences (11) and (12).

(11) The grass is always greener on the other side of the fence.

(12) The neighbour's lawn is always healthier than ours.

The sentence in (11) is a familiar proverb. Suppose that a reader encountered the same basic idea, in a different surface form, as in example (12). Example (12) conveys the same general literal meaning, and could be used to express the same figurative meaning: "Envy of what other people have." Would example (12) still be treated as a familiar proverb? According to the Conceptual Base Hypothesis, the specific surface of a proverb form is relatively unimportant; the underlying concept can be accessed by various proverbs, pictures and instantiations (Honeck et al., 1987; Temple, 1993). Thus, according to their theory, familiarity should be more related to the familiarity of the conceptual structure than to the familiarity of the surface form.

To determine if the results of Experiments 1 and 2 are unique to the particular surface version of the proverb, alternative versions of the proverbs were generated. These new target sentences were modelled after the sentential metaphors used by Ortony et al. (1978). In Ortony et al. (1978) the entire target sentence was the metaphor vehicle, and the topic was stated in the context paragraph. Ortony et al. (1978) constructed their items in this manner to make the manipulation of context relatively simple. In their experiment, because the topic was not stated in the target

sentence, they could place identical target metaphors in either a context related to the literal or figurative meaning. For example the target sentence "Regardless of the danger, the troops, marched on" used by Ortony et al. (1978) contains no words related to the topic (children) of the metaphor. If placed in a context describing the movement of an army into battle, the sentence would be read literally. However, if this same sentence was placed in a context describing a group of children that were misbehaving in spite of being threatened with a spanking, the sentence would be read figuratively.

The target sentences for Experiment 3 were alternative versions of the target sentences that had been used in Experiments 1 and 2. These were modelled after the target sentences used in Ortony et al. (1978). Target sentences were created that could be read as literal or figurative sentences depending on the context. Alternative versions of the proverbs were generated by writing literal paraphrases of the proverbs that preserved the underlying metaphoric vehicle, but were free of the lexicalization problems that could confound proverbs (see Appendix A, bottom of each page, for the alternative version used for each item). Furthermore an attempt was made to avoid making these alternative forms "sound" proverbial. The modified proverb versions tend to be less general than the proverb versions, and they are more related to the context. Nonetheless care

was taken to ensure that both the literal and figurative meanings of the proverbs remained, more or less, the same. It is important to emphasize that the term "metaphor" is used to describe these stimuli in the sense that these modified proverbs preserve the root metaphor or underlying vehicle. No attempt was made to reduce the proverbs to a "Topic" is a "Vehicle" form because that would make it impossible to use the same sentence in either a literal or a figurative context. The topic of the metaphor was still implied by the context (as was the case in Experiment2 1 and 2 and in Ortony et al., 1978) rather than stated directly in the target sentence. Metaphor alternatives or modified proverbs were created by writing literal paraphrases of the proverbs and then editing them to keep both literal and figurative meanings as close to the original as possible. In summary Experiment 3 was a replication of Experiment 2 in which modified proverbs were employed.

Method

Participants

A total of sixty-one undergraduates from the University of Western Ontario participated in this experiment. These participants were drawn from two different samples, run at different times. The first 32 were from the summer participant pool and were paid $6 each for their participation. These participants were given context

inappropriate cues. The second group of 29 participants was from the undergraduate participant pool and participated as part of a course requirement. These participants were given context appropriate cues. The confounding of group and participant pool was accidental[10]. Statistical tests failed to find any differences between the reading time of these two groups.

Material

Twenty-four standard proverbs (12 familiar and 12 unfamiliar) were used as items. Modified proverbs were derived by creating literal paraphrases of the proverbs used in Experiments 1 and 2. Two modified versions were created for each proverb and these modified proverbs were used as target sentences (see Table 5 for example target sentences; see Appendix A, at the bottom of each page, for a complete list of modified proverbs). The modified proverb target sentences were placed in the same context paragraphs as in Experiments 1 and 2. Participants were randomly presented with one of the two modified proverbs for each context paragraph. Thus, experimental items were randomly drawn from a data base of 96 items. Twelve paragraphs were presented to each participant.

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10 The context inappropriate group of participants was run prior to the context appropriate group of participants. The context appropriate group was an after thought. The design of the experiment had not originally included a context appropriate group.

Table 5

Example Modified Proverb (Metaphor) Targets

Familiar Proverb
As you make your bed, so you must lie in it.

Modified Proverbs
1 You'll find your bed in whatever condition you left it.
2 The condition of your bed, is your responsibility.

Unfamiliar Proverb
White silver draws black lines.

Modified Proverbs

1 Black marks can be made using silver.
2 Shiny silver leaves black streaks.

Procedure

The procedure for this experiment was identical to Experiment 2 except for the substitution of the proverbs with modified proverbs. The cued recall data and the reading time data will be reported.

Results

Reading time Data

Reading time from all 61 participants was analyzed using raw speed per sentence. Consequently all subsequent analyses were conducted with the unadjusted, raw data (see Table 6 for means).

Modified proverb sentences in a literal context (3268 ms) were read faster than the same sentences in figurative contexts (3835 ms; $F1(1,59) = 6.46$, $p<.01$; $F2(1,22)= 4.65$, $p<.05$). Modified familiar proverbs (3233 ms) were read faster than modified unfamiliar proverbs (3870 ms; $F1(1,59)= 14.21$, $p<.01$; $F2(1,22) = 5.23$, $p<.05$). Unlike the proverb data from Experiment 1, there was no interaction between familiarity and context ($F1(1,59)= 0.04$, ns; $F2(1,22)= 0.03$, ns). The simple main effects of context on reading time were examined using Tukey's tests in order to allow direct comparisons between the results of Experiments 2 and 3. For familiar modified proverbs, literal readings were 463 ms faster than figurative readings (HSD=442, $q=2.8$). Similarly

Table 6
Reading time Data for Modified Proverbs(in msec)

	Familiar			Unfamiliar			Average
	N	Mean	Std	N	Mean	Std	
Literal Context	61	2981	1625	61	3555	2064	3268
Figurative Context	61	3485	1851	61	4185	1757	3835
Average		3233			3870		

for unfamiliar modified proverbs, literal readings were 512 ms faster than figurative readings (HSD=442, q=2.8). Thus, the present results replicate the findings of slower processing time for unfamiliar proverbs used figuratively (Experiments 1 and 2), but unlike the earlier experiments this difference was also found for modified familiar proverbs.

To examine the differences between Experiments 2 and 3, an analysis was coonducted in which the data was combined and experiment (2 vs. 3) was analyzed as an independent variable. The reading time of the modified proverbs was slower than the reading time for the original proverbs; $\underline{\text{minF}}'(1,146) = 5.72$, $\underline{p}<.05$. A priori contrasts testing the difference between modified and the original proverbs revealed that modified familiar proverbs (3233) were read more slowly than the original familiar proverbs (2406; $\underline{\text{minF}}'(1,208)= 4.536$, $\underline{p}<.05$), but there was no significant difference between modified and the original unfamiliar proverbs. These findings are not surprising because unfamiliar proverbs are no less unfamiliar in their modified forms, but modified familiar proverbs are less familiar and thus should require more time.

Cued Recall Data

The means and standard deviations of the cued recall data are presented in Table 7. As with Experiment 2,

context appropriate cues (45.5%) were more effective retrieval cues than were context inappropriate cues (31.3%; minF'(1,66)= 4.30, p<.05). Modified proverbs used literally (33%) were recalled less often than modified proverbs used figuratively (44.5%; minF'(1,49)= 4.77, p<.05). These main effects are qualified by an interaction of context and cue appropriateness that is essentially an effect of the literalness of the cue (literal vs. figurative; minF'(1,54)= 5.82, p<.05). For modified proverbs used literally, literal cues (46%) were better than figurative cues (18%) whereas for modified proverbs used figuratively, literal (44%) and figurative cues (45%) were equally effective. Furthermore there was a marginally significant interaction between familiarity and cue appropriateness (F1(1,59)= 5.18, p<.05; F2(1,22)= 3.02, p<.10). Finally, the three-way interaction was significant across both participants and items (F1(1,46)= 4.28, p<.05: F2(1,22)= 6.45, p<.05), but the minF' was only marginal. There was no overall difference between modified versions of familiar and unfamiliar proverbs (F1(1,59)= 0.01, ns) and no interaction of familiarity and context.

The three-way interaction qualifies the main effect of cue appropriateness, and the two-way interaction of cue appropriateness and context. The main effect of cue appropriateness was largest for modified unfamiliar proverbs used literally: appropriate cues (52.8%) produced the

Table 7

Cued Recall Data (%) for Modified Proverb

	Familiar Modified Proverb			Unfamiliar Modified Proverbs		
Context appropriate Cues	n	mean	std err	n	mean	std err
Literal context (Lit. cues)	29	37.9	6.1	29	52.8	5.6
Figurative Context (Fig. cues)	29	43.7	6.2	29	45.9	6.7
Context inappropriate Cues	n	mean	std err	n	mean	std err
Literal Context (Fig. cues)	32	30.2	3.7	32	6.2	2.7
Figurative Context (Lit. cues)	32	39.6	5.3	32	48.9	6.0

highest level of recall, and inappropriate cues (6%) produced near zero recall ($q(102) = 7.98$, $p<.01$). In contrast context inappropriate literal cues (48.9%) produced nonsignificantly higher recall than contextually appropriate figurative cues (45.9%) for modified unfamiliar proverbs used figuratively. When figurative and literal contexts were compared, recall of unfamiliar proverbs to contextually inappropriate literal cues (48.9%) was significantly higher than to contextually inappropriate figurative cues (6%; $q(115) = 8.688$, $p<.01$). These two findings suggest that figurative cues are not very effective for modified unfamiliar proverbs unless the sentence is used figuratively; in contrast literal cues are quite effective for sentences used either literally or figuratively. Thus, for unfamiliar proverbs, literal cues were better than figurative cues, and contextually inappropriate figurative cues are very poor recall cues.

In contrast, for familiar proverbs used literally, the difference between literal (37.9%) and figurative (30.2%) cues was not significant ($q(102) = 1.4$, ns). Similarly, familiar proverbs used figuratively were recalled equally well to contextually inappropriate literal cues (39.6%) and contextually appropriate figurative cues (43.7%). When literal and figurative contexts were compared, recall of familiar proverbs used figuratively to contextually inappropriate literal cues was not significantly different

than recall of familiar proverbs used literally to contextually inappropriate figurative cues ($q(115) = 1.917$, ns). Thus, for familiar proverbs contextually appropriate cues were as good as contextually inappropriate cues, and literal cues were as good as figurative cues.

Finally, an analysis combining the recall data from Experiments 2 and 3 was conducted to look for any differences in cued recall between proverbs and modified proverbs. The main effect of proverb surface form (original vs. modified) was nonsignificant. The only significant effect of surface form was an interaction with familiarity ($\underline{\text{minF}}'(1,84) = 4.62$, $p<.05$). This interaction is the result of the fact that, with proverbs(Experiment 2), higher recall was observed for familiar items (48%) than for unfamiliar items (35.6%), but with modified proverbs (Experiment 3), familiarity did not result in higher recall for familiar items (familiar 37.8% vs unfamiliar 38.5%). Thus, the data from modified proverbs replicated the findings of Experiment 2 with the exception that there was no advantage for familiar items.

In summary, when we consider the full linear model, the cued recall data revealed the following: (1) contextually appropriate cues are better than contextually inappropriate cues, (2) literal cues are better than figurative cues, (3) cues related to the figurative meaning of a proverb are effective only when the context is related to the figurative

meaning, or the proverb is familiar, and (4) familiarity leads to higher recall when the proverb is used in its original form but not when used in a modified form. These findings suggest that literal meaning is activated for familiar proverbs, unfamiliar proverbs, and modified proverbs, regardless of context, but that figurative meaning is only activated if the modified proverb is based on a familiar proverb or if the figurative meaning is contextually appropriate. Furthermore, the greater than expected effectiveness of literal cues for proverbs used figuratively, suggests that literal meaning does have a special status in the processing of these modified proverbs.

Discussion

In the reading time data, the two main effects of context and familiarity replicated the findings of Experiments 1 and 2. However unlike Experiment 2, both familiar and unfamiliar proverbs were read faster in a literal context. This finding suggests for modified familiar proverbs that the literal meaning is more accessible. In the cued recall data the main effects of cue appropriateness, context, and the interactions of context and cue appropriateness, and context, familiarity, and cue appropriateness replicated the findings from Experiment 2. Context appropriate cues were more effective than context inappropriate cues. Modified proverbs in figurative contexts were recalled better than modified proverbs in literal contexts, but this was primarily true because of the near zero recall of unfamiliar proverbs used literally when cued with the contextually inappropriate figurative cues. Overall then, cues related to the literal meaning of a proverb are better than cues related to the figurative meaning of a proverb as is indicated by the interaction between context appropriateness and context. Context inappropriate literal cues are slightly better at cuing unfamiliar proverbs used figuratively than contextually appropriate literal cues. In addition, familiar proverbs and modified familiar proverbs used literally can be successfully cued with contextually inappropriate cues

related to their figurative meaning suggesting that the figurative meaning of modified proverbs is processed in an obligatory manner even though the surface form of the sentence has been altered.

Taken together, the data from this experiment do not contradict any of the conclusions of Experiment 2. There were two important differences in results between Experiments 2 and 3: the relatively greater reading time to familiar modified proverbs compared to unfamiliar proverbs, and the absence of a recall advantage for modified familiar proverbs compared to unfamiliar modified proverbs. These two findings suggest that the processing of familiar modified proverbs is more difficult than is the processing of familiar proverbs. However, the moderate recall (30%) of modified familiar proverbs used literally to the cues related to the figurative meaning indicates that the familiar figurative meaning is still activated in an obligatory manner during comprehension. In addition, the replication of the cued recall results with the modified proverbs indicates that the literal paraphrases of the familiar proverbs tap into the same memory structures as the original proverbs. Thus, the cued recall data from Experiment 2 did not result from some peculiarity of proverbs, but rather appears to be related to the use of figurative language in general. It is concluded that literal meanings and familiar figurative meanings are

processed in an obligatory manner. Consequently, literal and conventional meanings appear to have a special status in proverb comprehension.

The similarities and differences between Experiments 2 and 3 suggest that proverb familiarity consists of two components. The non-zero recall of familiar items to contextually inappropriate cues related to the figurative meaning of a proverb or modified proverb suggests that familiarity is related to the underlying meaning or vehicle, rather than the surface form of the sentence. However the significant reading time differences between literal and figurative uses of a modified familiar proverb and the failure to find any recall advantage for familiar modified proverbs suggests that familiarity is also partly a matter of surface form. It is argued that surface form and underlying conceptual meaning are two components of familiarity.

The data from the three studies reported here indicate that a purely contextualist account (e.g., Ortony et al., 1979) of sentence processing is wrong. Recall is not simply a function of contextual appropriateness. Cues related to the literal meaning of the target sentence were more effective than cues related to the figurative meaning of the target sentence. Furthermore both conventional literal meaning and conventional figurative meaning are effective at cuing proverbs and modified proverbs. Based on these data

it is reasonable to argue that context, conventional meaning, and literal meaning are three separate sources of information that are used in processing figurative language. Context involves the processing of linguistic and extra-linguistic information to determine the intended sense of a message. Literal meanings are the usual referents to individual words, and conventional meanings are the usual referents to longer strings of words that may differ from the individual words. In contrast, unconventional figurative meaning is neither directly available from the meaning(s) of the words, nor is completely expressed by the context, but instead must be derived from these two sources of information, perhaps by the heuristic strategies proposed by Searle (1979).

An unanswered question is, "In what manner is literal meaning used in order to derive a figurative meaning?" One possibility is that the literal meaning is used to construct a mental image (or mental model) that forms the basis of the conceptual understanding of the proverb (Walsh, 1988, see also Lakoff & Johnson, 1980b). The purpose of Experiment 4 was to investigate this possibility.

EXPERIMENT 4

Imagery in Figurative Language

Many theorists have noted the pervasiveness of imagery in figurative language. The literal meaning of the vehicles used in proverbs, idioms, metaphors, and metonymies is most frequently high in imagery (but see Riechmann & Coste, 1980, for a critique). Some literary scholars use the words imagery and metaphor interchangeably (Walsh, 1988). Thus, a further issue in proverb comprehension involves the role of literal meaning in figurative language and in particular the role of the imagery derived from the literal meaning. The results of the first three studies suggest that literal meaning is processed during proverb comprehension even when contextually inappropriate. The function served by literal meaning is still unclear.

A number of possibilities have been suggested in the literature. First, Glucksberg (1992) has argued that literal meaning is used to establish category labels for concepts that have no name. With the exception of a dismissal of theories investigating vehicle imagery, Glucksberg (1992; Glucksberg & Keysar, 1989) does not discuss imagery and thus does not appear to assign any special role to imagery. Glucksberg (1992, personal correspondence) has argued that in some cases imagery is crucial to understanding a metaphor, in other cases helpful, and perhaps in some cases, not present. A recent experiment

by Cacciari and Glucksberg (1992) has shown that imagery does not appear to be used during idiom comprehension, but the same may not be the case for less familiar figures of speech (Glucksberg, personal communication). Second, Honeck et al.(1987) have argued that literal meaning is used to abstract a schematic conceptual basis. This conceptual base is imagery free. Third, Walsh (1988) has argued that imagery derived from the literal meaning is used as the basis for abstract concepts. To summarize these three points of view, Glucksberg (personal correspondence) argues that imagery may be important in some cases, but does not view imagery as playing a central role in metaphor processing, Honeck et al., (1987) explicitly rejects any important processing role for imagery, and Walsh gives imagery a central role in the comprehension and representation of proverbs. Honeck et al.'s view and Walsh's view will each be discussed in turn. The purpose of Experiment 4 is to determine if the image inherent in the literal meaning serves an important role in comprehendirg the proverb.

According to the conceptual base hypothesis (Honeck et al., 1987), mental imagery does not play an important role in proverb comprehension. In support of this position, Riechmann and Coste (1980) review several studies which have tested the value of imagery in proverb comprehension. Neither imagery instructions nor high-imagery ratings of

proverbs are associated with better memory for proverbs (but see Walsh, 1988, for a critique). Typically, participants instructed to comprehend proverbs recognized more proverb interpretations than participants instructed to form mental images of the proverbs. Riechmann and Coste (1980) argue that imagery instruction may even hinder participants comprehension of the proverb because it could bias the participant towards a literal level of interpretation They reported an experiment in which the lowest level of recall was for high-imagery and high comprehensibility proverbs when participants were given imagery instructions. Similarly, Honeck (1973) found that pairing unfamiliar proverbs with their abstract interpretations produced better recall than simply repeating the proverbs. Honeck interpreted this result to indicate that the proverbs were encoded according to their meaning, rather than as images. One could argue that these data from Riechmann and Coste (1980) and Honeck (1973) do not discount the role of imagery, but indicate that simply imaging will not lead to an interpretation (see Walsh, 1988, for similar arguments). Without context or instructions to interpret the proverbs figuratively, the participants had no reason to encode them figuratively. As was shown in Experiments 1, 2 and 3, a proverb is not interpreted as a proverb unless it is a familiar figure of speech, or if it is used in a figurative context. Furthermore these studies have not eliminated the

possibility that participants in the comprehend condition used imagery during comprehension. Thus, the evidence denying the role of imagery in proverb comprehension is not particularly strong. A more direct measure of imagery is needed in order to determine if participants in fact use imagery during comprehension.

Riechmann and Coste (1980) also express doubts about the manner in which imagery could function in proverb comprehension, citing arguments from the imagery debate of the day suggesting the non-computational nature of mental imagery (e.g., Pylyshyn, 1973; Anderson, 1978). However efforts to produce a working computer model incorporating image processing have had some success (Kosslyn, 1980, 1983; see Gardner, 1985 for a review; see Pylyshyn, 1984, for critique). Furthermore Johnson-Laird (1983; 1989) has developed a mental modelling approach to cognition incorporating imagery processes, which may be computationally plausible. The computational mechanisms underlying imagery processing are irrelevant to the arguments made here. The purpose of the current paper is simply to determine the empirical nature of the processes. Nonetheless, a system in which mental imagery plays a functional role during the comprehension process of proverbs may be computationally plausible (see also Lakoff, 1988).

Imagery in proverb comprehension

In this section, two hypotheses that would give a more important role to mental imagery are considered. One possibility is that the image inherent in the literal meaning of the proverbs is used to set up a mental model (cf. Johnson-Laird, 1983, 1989) of the topic concept. This image helps to organize the conceptual basis and having been established is used to concretize similar situations in subsequent experience. The view that mental imagery serves an important function in proverb processing is not necessarily incompatible with the conceptual base hypothesis, but rather a modification of the conceptual base hypothesis. The image allows easy access to the conceptual base and makes use of the reader's visual-spatial working memory (Baddeley, 1986). The underlying conceptual base is pretty much as described by Honeck et al. (1987). The conceptual base consists of an abstract schema-like representation that is more or less a description of the analogy implied by the proverb. Honeck et al. (1987) described the conceptual base as consisting of proverb-families that are like schemata. The family consists of the proverb, literal or pictorial renditions of the proverb, general interpretations and various instantiations. According to the conceptual base hypothesis (Honeck et al., 1987) this family is not held together by any shared deep structure, propositional structure, or

mental imagery, but rather an abstract schema-like entity, most like the proverb's interpretation. What is different in the Imagery Base Hypothesis, is the argument that the image is a crucial part of the underlying conceptual base.

Consider the proverb in example (13).

(13) Don't carry all your eggs in one basket.

In this proverb the image is of delicate breakable eggs that could be broken if all are packed together. The underlying analogy that is being conveyed is that some TOPIC (an investment, a career choice, etc.) is risky in the same way that eggs are delicate and can break. Thus, to avoid losing everything it is wise not to put all of one's hopes into one investment, or one job prospect. The use of breakable eggs as the vehicle in this proverb is vivid and easily remembered. Consider another example given in sentence (14).

(14) Hard rocks are hollowed out by soft water.

In (14) the message conveyed is that with persistence or subtlety a person can overcome obstacles. The image of rocks being worn away by something as soft as water is a powerful illustration of the importance of persistence. According to the Image Base Hypothesis, the conceptual base consists of both the analogical meaning of the proverb, and the mental image that is used to symbolize the underlying meaning. Proverbs are powerful means of instruction because they convey both an underlying truism and a vivid image that

serve as a natural example of the underlying meaning.

The primary difference between the Conceptual Base Hypothesis and the Image Base Hypothesis is that, according to the Image Base Hypothesis the image plays an important functional role in establishing the conceptual base and in cuing the conceptual base. It is argued that metaphors and proverbs are used as comprehension aids to enable the concretization of abstract ideas through the use of mental images. Evidence from memory research (Paivio, 1986), problem solving research (Mani & Johnson-Laird, 1982; Johnson-Laird, 1983; Kaufman, 1985), and linguistic analyses (Lakoff, 1987; Lakoff & Johnson, 1980b) suggest that humans often need to make abstract things concrete before they can understand them. It is argued that the image serves as a memory cue to enable the organization, retrieval, and comprehension of the abstract ideas expressed in the proverbs.

As an alternative to the Image Base Hypothesis consider the somewhat weaker hypothesis that the use of mental imagery during the comprehension of figurative language takes advantage of multiple memory resources. It has been argued that working memory includes a central executive, a verbal-articulatory loop, and a visual-spatial sketch pad (Baddeley, 1986). Language processing tends to rely mostly on the verbal-articulatory loop. It could be argued that the use of mental imagery during language processing allows

the reader to hold more information in working memory, thus expanding a person's language processing capacity. The frequently cited advantage of concrete over abstract words is consistent with this hypothesis (Paivio, 1986). Abstract and unfamiliar ideas cannot be easily imaged, and thus the processing of abstract and unfamiliar ideas may be limited to the use of the verbal-articulatory working memory. This would limit the efficiency of processing abstract and unfamiliar information and may lead to slower processing or greater loss of information when capacity limitations are reached (Klee & Eysenck, 1973). The use of proverbs, metaphors, and idioms may have evolved in order to make use of the additional working memory capacity available from the visual-spatial sketch pad. In addition to the working memory advantage, the concrete proverbs would also allow a person to encode the information in long term nonverbal memory taking advantage of the long term mnemonic power of mental imagery (Paivio, 1986).

As with the Image Based Hypothesis, this working memory hypothesis would make mental imagery an important component of proverb and metaphor processing. The mental image may not be used directly in the comprehension process, but may aid the comprehension process by increasing the available working memory resources. Experiment 4 may not be able to determine if mental imagery is used in the comprehension process, or if imagery aids merely aids comprehension by

increasing the capacity of working memory. However, the Image Base Hypothesis predicts a stronger effect of the visual-spatial distraction task on proverb comprehension than the extended memory hypothesis. In contrast the extended memory hypothesis predicts memory effects but not comprehension effects.

In contrast, consider a purely verbal theory of the role of concrete words. Schwanenflugel, Harnishfeger, and Stowe (1988) have argued that concreteness effects are caused by the greater availability of context for concrete compared to abstract concepts. Thus, it could be argued that the use of imagery in metaphors gives the participants a context that they can use to understand abstract ideas. Recent studies however have shown that context availability is additive with concreteness (Nelson & Schreiber, 1992). The availability of context and the concreteness of words are two independent factors that contribute to the memorability of concrete language. Thus, although context availability is important, it does not account for concreteness effects. Nonetheless context may explain why concrete vehicles are used in figurative language. The purpose of Experiment 4 is to determine if literal meaning is used to generate an image that facilitates the comprehension of an abstract idea or if literal meaning is used to supply a verbal context.

Visual and Verbal Interference Effects

There are three main purposes for Experiment 4. The first purpose is to determine if the cued recall results observed in Experiment 2 are robust. The second purpose is to examine the effectiveness of the recall cues for paraphrases, which were not included in Experiments 2 and 3. Contextually appropriate cues should be effective at aiding the recall of paraphrase target sentences. In contrast contextually inappropriate cues should be very poor recall cues under all circumstances because these cues are only related to the proverb target sentences. Third, and most important, it was hoped that by using different types of distraction tasks, it could be determined if a mental image serves a functional role in proverb comprehension.

The dual-coding theory of memory (Paivio, 1986) proposes that verbal and non-verbal information are stored in two separate associative networks. Some authors have argued that such a distinction in memory should lead to double-selective interference (e.g., Glass, Eddy and Schwanenflugel, 1980; Klee and Eysenck, 1973; Baddeley, 1986; for a review, see Paivio, 1986). According to these authors, if verbal and image systems are independent, then an imagery task would interfere more with learning pictures and concrete words, and a verbal task would interfere more with learning abstract words. The argument goes as follows: "When a perceptual task selectively disrupts performance on

a concurrent mental task . . . or vice versa, it is generally assumed that common processing systems are involved" (Paivio, 1986, p. 155). This line of research has been further developed by Baddeley (1986) who has proposed that working memory includes two sub-systems, a verbal articulatory loop that is specialized for retaining verbal information, and a visual spatial sketch pad that is specialized for retaining spatial and visual information. Baddeley (1986) has conducted a number of studies that seem to support the general notion that a visual-spatial working memory store is used in processing both spatial tasks and visual information stored in memory.

Several studies have shown selective interference by interpolated tasks (Saltz and Donnenwerth-Nolan, 1981; Den Heyer and Barrent, 1971; Janssen, 1976; Glass, Eddy and Schwanenflugel, 1980; Klee and Eysenck, 1973; Baddeley, 1986). For example, Glass, Eddy and Schwanenflugel (1980) had participants retain a visual pattern while completing a sentence verification task. The visual pattern did not differentially interfere with high and low imagery sentences; however, high-imagery sentences resulted in poorer retention of the visual pattern. Most relevant to our present topic is an experiment by Klee and Eysenck (1973). They presented participants with sentences that were either concrete or abstract, and either meaningful or anomalous. Between each sentence presentation the

participant performed either a concurrent visual-spatial memory task or a verbal task. After judging if the sentence made sense the participants were then asked to recall the digit or pattern. The visual task resulted in longer comprehension latencies for concrete sentences but this effect was primarily true for anomalous sentences. More important however, these researchers also found that the visual patterns were more poorly recalled after concrete sentences and digits were more poorly recalled after abstract sentences. Thus, they showed a strong pattern of modality specific interference in the distraction tasks. Holmes and Langford (1976) criticized this experiment because of the slow presentation of the sentences (one word per second), and thus it is unclear if imagery is related to comprehension, or merely to recall of the words. However, this criticism does not affect the essential finding that concrete sentences resulted in a lower level of recall of visual patterns and abstract sentences resulted in a lower level of recall of digits. The fact that this double dissociation occurs indicates that different processes are involved in comprehending concrete and abstract words.

To summarize, the evidence as a whole favours the argument that a concurrent visual-spatial task interferes with visual memory and a verbal-articulatory task interferes with verbal memory. In addition, there is evidence that visual-spatial tasks interfere more with concrete words and

verbal-articulatory tasks interfere more with abstract words. These findings suggest that visual-spatial processes may be involved in the comprehension of concrete words (see Paivio, 1986, for a review).

This research paradigm can easily be adapted to explore the Image Base Hypothesis of figurative language. Because the Image Base Hypothesis predicts that mental imagery plays an important role in proverb comprehension, then the visual-spatial task should interfere more than the verbal task with proverb comprehension. The alternative theory, the Conceptual Base Hypothesis (Honeck et al, 1987), does not assign any important function to mental imagery. If data are consistent with the Image base Hypothesis, then the theoretical underpinnings of these findings can be discussed later. Note however that this task in no way provides a test between a dual coding and a mental model account of figurative language. Nor does it allow any conclusions to be drawn regarding functional architecture. Rather it tests between theories that assign a functional role to imagery during the processing of figurative language (e.g., Walsh, 1988; Paivio, 1986; Malgady & Johnson, 1980) and those that view the image as non-functional (Riechmann & Coste, 1980; Honeck et al., 1987).

Based on the previous work in modality specific interference, it is hypothesized that the visual-spatial task will interfere with the processing of the proverbs used

literally because they are concrete sentences. Furthermore, it is hypothesized that the verbal-articulatory task will interfere with the processing of the paraphrases of proverbs used figuratively because they are abstract sentences. What is of interest is the question, "does the visual-spatial task also interfere with the figurative use of the proverb?" Proverbs are concrete sentences that also have an abstract figurative meaning. Is proverb comprehension more like the comprehension of abstract sentences or concrete sentences?

To answer the question of interest, proverbs were placed in contexts that bias either their literal or their figurative meaning. Thus, the basic design of the experiment is identical to the previous experiments. However participants in the experimental condition received either a visual or a verbal interference pattern prior to the target sentence and were then tested on their memory for this pattern just after the target sentence. Thus, Experiment 4 tested modality specific interference in a manner similar to Klee and Eysenck (1973).

The important comparisons involved the different tasks and items used. First a no-task control group was given the standard experiment used in Experiments 2 and 3 (see also Turner, 1989; Turner & Katz, submitted) with the addition of control paraphrase sentences to be described below. Second, a verbal task group was used in the hope of achieving double selective interference (as in Klee & Eysenck, 1973) in which

sentences that rely on mental imagery (e.g., proverbs and concrete sentences) would show more competition with the visual-spatial task and abstract sentences (e.g., Paraphrases) which do not rely on mental imagery would show more competition with the verbal task. Third, paraphrase control sentences were used in order to make it possible to determine if any effect of the distraction tasks generalized to all sentences regardless of their nature, or were specific to a particular type of target sentence (e.g., specific to those that require mental imagery). It is argued that the paraphrases of a proverbs figurative meaning convey the same overall message, but consist of words that are more abstract and thus would produce less mental imagery.

The design involved four factors: concurrent task (none, imagery, verbal), target type (proverb vs. paraphrase), context (literal vs. figurative), and target familiarity (familiar vs. unfamiliar). The cued recall data also included a fifth factor: contextual appropriateness of the cue (appropriate vs. inappropriate). Based on the studies reviewed above, it appears that the strongest effect of visual interference seems to occur on the secondary task (Klee & Eysenck, 1973, Glass et al., 1980). However, Baddeley (1986) recommends holding error rates in the secondary, distraction task to a minimum. As a compromise, participants here were instructed to maintain a high level

of accuracy on both secondary and primary task, but a strict criterion was not set.

The effect of the distraction tasks will be measured by three separate dependent measures: speed of reading the target sentence, the accuracy of recognizing the distraction patterns, and cued recall. Memory for the interference pattern will be recorded to investigate the possibility of a trade off between target sentence comprehension and interference task performance (see Glass et al., 1980). Convergent results are expected from these three dependent measures. If the effects are either inconsistent or contradictory, then the variables will be aggregated to best determine the nature of the effects of distraction tasks. The latent variable measuring the overall distraction effect will be examined using aggregation rather than the more conservative MANOVA because these predictions are a priori. The two dependent variables that are of greatest interest in this experiment are memory for the distraction pattern and memory for the target sentence. The individual dependent variables themselves are of little importance. What is important in order to assess the effect of distraction patterns, is the overall effect that the distraction patterns have on these variables.

If imagery is involved in literal processing, but not involved in figurative processing then the results should form a simple two-way interaction in which the visual task

affects performance of literal uses of proverbs and their paraphrases (e.g., based on Klee & Eysenck, 1973), and the verbal task affects performance on figurative uses of proverbs and their paraphrases. The 'no-task' control group should yield results consistent with the first and second experiments.

If imagery is involved in comprehending the figurative use of proverbs, as is proposed by the imagery hypotheses, then there should be a more complex pattern of findings. For proverbs used literally and their paraphrases, the visual task should result in poorer overall performance compared to the control and verbal task conditions (e.g., based on Klee & Eysenck, 1973). The visual task should result in poorer performance compared to the verbal and control conditions for proverbs used figuratively. However, the verbal task will result in poorer performance compared to the control and visual groups for abstract paraphrases of the proverbs used figuratively. The visual task should interfere more with proverbs used literally and their literal paraphrases because these are concrete sentences. In contrast the verbal task should interfere more with the paraphrases of the figurative meanings because these are abstract sentences. Most important, it is hypothesized that if mental imagery plays a functional role in proverb comprehension, a concurrent visual-spatial task should also interfere with the comprehension of proverbs used

figuratively (see Table 8 for a summary of abstractness). If imagery plays no functional role then the verbal task should interfere more with proverbs used figuratively. The interference of the visual task and figurative uses of proverbs would be supported by slower reading time, poorer memory performance for the secondary task, or poorer memory for the primary task. Furthermore, the strongest case for selective interference would be slower reading time, poorer performance on the secondary task, or poorer memory for paraphrases of the figurative meaning of a proverb in the verbal task condition compared to the control and visual task conditions. Note, this hypothesized double dissociation between target sentence type (proverb used figuratively and their paraphrases), and secondary task type (verbal, visual and control task) is not directly tested by any interaction, but is rather nested in the main effect of task and the interaction of task by target type (see Figure 3 for an idealized portrayal of the hypothesized double dissociation). If however there is neither a main effect of task, nor an interaction it would indicate that the imagery task failed to interfere with the literal use of the proverbs and that the distraction tasks simply were not distracting enough.

Familiarity may interact with the other variables (task type, target, and context). In fact the above predictions regarding a greater interference of visual stimuli for

proverbs compared to figurative paraphrases are primarily for unfamiliar proverbs. Familiar proverbs seem to involve the automatic activation of mental imagery, but the image may no longer be functional. A recent experiment by Cacciari and Glucksberg (1992; but see also Gibbs & O'Brien, 1990) has found evidence that the imagery in idioms may not be useful in comprehending the idioms. Idioms are extremely familiar figures of speech. Similarly, Kaufman (1985) has argued that mental imagery is more important in problem solving when the task is novel and not associated with well-established strategies. Additional evidence is provided by Klee and Eysenck (1973). In their experiment the double dissociation pattern was stronger for anomalous concrete sentences than for meaningful concrete sentences, perhaps suggesting that sentences that are more difficult to understand require more visual-spatial processing. Thus, it is argued that for the unfamiliar proverb the mental image may be more important, and thus more interference may be seen between the unfamiliar proverb and the visual task compared to the familiar proverb. However if the mental image associated with a familiar proverb is activated in an obligatory manner, then the image may cause poorer performance on the secondary task (see Glass, Eddy, & Schwanenflugel, 1980). Thus, for unfamiliar proverbs, the distraction effect is most likely to show up as interference of the visual task on performance on the unfamiliar

Figure 3: Idealized predictions for Experiment 4.

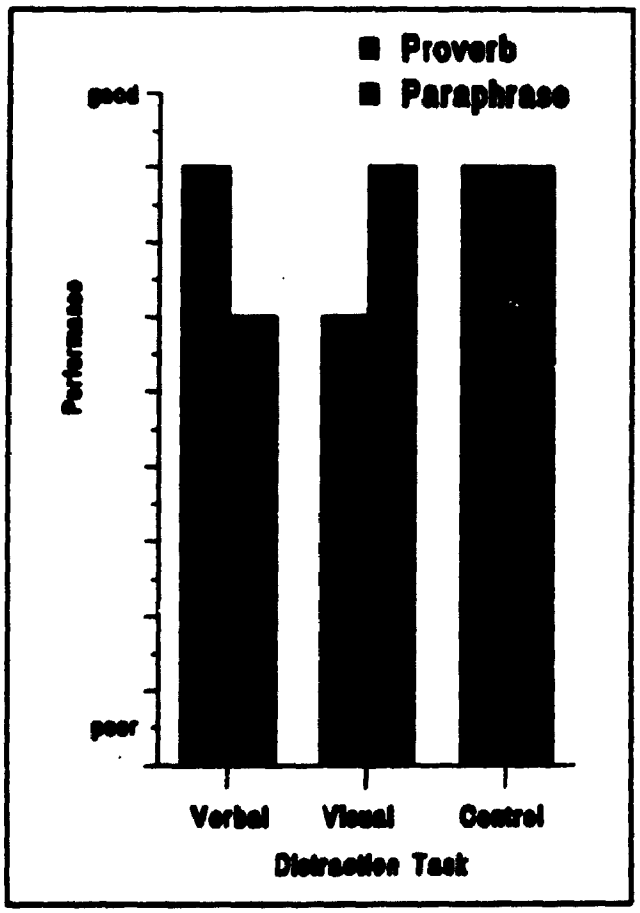


Table 8
Summary of Abstractness for Proverbs and Paraphrases

Form of Sentence	Concreteness of Wording	Concreteness of Meaning	Mental Process
Abstract Sentence	Abstract	Abstract	Verbal-articulatory Working Memory (Klee & Eysenck, 1973 and Glass et al., 1980)
Concrete Sentence	Concrete	Concrete	Visual-spatial Working Memory (Klee & Eysenck, 1973 and Glass et al., 1980)
Proverb	Concrete	Abstract	Might be interpreted using visual spatial processes.
Paraphrase of Figurative Meaning of a Proverb	Abstract	Abstract	Should be interpreted in the same manner as other abstract sentences.
Paraphrases of Literal Meaning of a Proverb	Concrete	Concrete	Should be interpreted in the same manner as other concrete sentences.

proverbs, whereas for familiar proverbs the distraction effect is more likely to show up as interference of the proverb on the visual task.

A final issue that should be considered is the relative effectiveness of the distraction tasks on the contextual appropriate and inappropriate cued recall conditions. If, for proverbs used figuratively, the image is activated but plays no role in comprehension, then recall to contextually inappropriate literal cues may be reduced compared to contextually appropriate cues. The reason for this prediction is that the literal meaning may be related to generating the mental image (cf. Klee and Eysenck, 1973). Thus, the distraction task may interfere with the effectiveness of the cues related to the proverb's literal meaning because mental imagery is important for concrete language (Klee and Eysenck, 1973), but not with the cues related to the proverb's abstract figurative meaning. On the other hand if the image is crucial to comprehension, as is suggested by the Image Base Hypothesis, the effectiveness of both types of cue should be reduced.

Method

Participants

One hundred and ninety-seven undergraduates (mean age = 19.5) from the University of Western Ontario, participated in this experiment as a course requirement. There were

approximately 15 participants in each of the twelve cells. The data from five of the participants were eliminated due to mechanical problems.

Materials

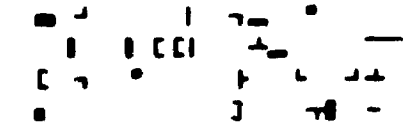
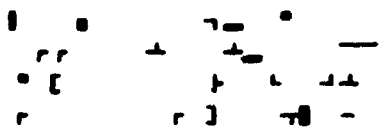
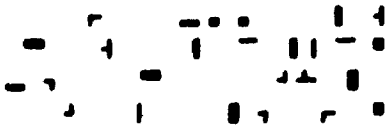
The items were the same as those used in the earlier studies. They were rewritten, however, to place the target at the end of the context paragraph (see Appendix C for a complete list of the revised passages). This was done in order to simplify the procedure for reading the passages, thus allowing the introduction of the various distraction tasks. In addition, the paraphrase control sentences used in Experiment 1 were used as target sentences for comparison with the proverbs. Visual patterns for the distraction tasks were generated using the random number generator and the graphics character set of the Commodore computer (see Table 9 for examples of the verbal and visual distraction patterns). These patterns were edited to ensure no recognizable characters were used. The verbal task consisted of a string of five letters presented to the participant on the computer screen. The participants were asked to articulate the letters out loud while reading the passage and the target sentence. Preliminary tests of the distraction tasks suggested that both were difficult. However, it is not easy to equate the difficulty level of two very different tasks. Furthermore, the visual and verbal task appeared to be difficult in somewhat different

Table 9
Sample Verbal and Visual Distraction Stimuli

Verbal Distraction Patterns

Distracter Patterns	Recognition Foils
B P H W D	B P H D X
M H N Q X	P K N Q X

Visual Distracter Patterns

Distracter Patterns	Recognition Foils
	
	

ways. The visual patterns were a bit more difficult to remember than the verbal patterns, but the verbal task (reciting letters over and over again, out loud) was more difficult to perform than the visual task (imaging the pattern).

Procedure

The reading phase of the experiment was essentially the same as in the previous three studies. The major difference was that the participants in the experimental conditions were given a visual task or a verbal task before the beginning of each passage. The verbal task consisted of retaining in memory a verbal string of letters. The participant was asked to continuously repeat the letters out loud while silently reading the context passage and the target sentence. The visual task consisted of an abstract visual pattern presented on the computer screen. The participant was asked to form a mental image of the visual pattern and hold that image in mind while silently reading the context passage and the target sentence. The participants then read the target sentence. Finally, the participants were tested on their memory for the visual or verbal pattern, using a recognition task. Recognition foils were made by randomly changing 1/2 of the visual or verbal distraction pattern. In the control group a participant was shown a fixation cross instead of a distraction pattern.

After reading all the items the participants were first

given a cued recall task, as in Experiments 2 and 3, in which cues were either appropriate or inappropriate. This cued recall task allowed for direct comparisons between this experiment and the previous two experiments. There was some lexical overlap between cues and paraphrases of the proverbs; however, the same cues and paraphrases employed in the earlier studies were used in order to allow direct comparison between this experiment and the previous two studies.

Design

The design is a 5-factor analysis of variance: task type (control, imagery, verbal), cue type (appropriate vs. inappropriate), target type (proverb vs. paraphrase), context (literal vs. figurative), familiarity (familiar vs. unfamiliar). Task type, cue appropriateness and target type were between-participant variables. The various combinations of the between participant variables required 12 different groups of people. Familiarity and context were within-participant variables. Contextual appropriateness is only required for the analysis of the cued recall data.

Results and Discussion

The following data will be presented in turn: 1) reading time data for target sentence reading, 2) recognition memory data for the distraction pattern, and 3) cued recall data for the target sentence. The data from each variable will first be presented collapsing across the task conditions. This will allow a direct comparison with the previous three studies. The new findings examining the effects of distraction tasks will then be presented. A complete Table of the reaction time, cued recall and distraction recognition data from study 4 can be found in Table 11, in Appendix D.

As is customary in the psycholinguistic literature, minF's will be calculated (Clark, 1973) to determine if the findings can be confidently generalized across both items and participants. However, for the analysis of the distraction effects the main emphasis will be on testing specific predictions using a priori contrasts calculated across both participants (tD1) and items (tD2).

Reading Time Data

Reading time was recorded for each context and target sentence. Recall that the main prediction for the target sentence reading time is that the reading time will be an interactive function of familiarity (familiar vs. unfamiliar), context (literal vs. figurative), and target

sentence type (proverbs vs. paraphrase). In particular the only significant difference between proverb and paraphrase should occur for the unfamiliar proverbs used figuratively.

The main effects and interaction essentially replicated the findings from the previous three studies. The pattern of data in this experiment for the control group and indeed the average of all groups combined, was very similar to previous results. Paraphrases (m=2554 ms) were read faster on average than proverbs (m=3032 ms: $\underline{minF}'(1, 97)= 6.97$, $\underline{p}<.05$). Familiar proverbs and their paraphrases (m=2553 ms) were read faster than unfamiliar proverbs and their paraphrases (m= 2983 ms: $\underline{minF}'(1,25)= 4.99$, $\underline{p}<.05$).

In addition there were significant interactions across participants between context and target type ($\underline{F1}(1,174= 9.8$, $\underline{p}<.01$; $\underline{F2}(1,21)= 1.72$, ns), familiarity and target type ($\underline{F1}(1,174)=24.12$, $\underline{p}<.01$; $\underline{F2}(1,21)= 3.79$, $\underline{p}<.10$) and a marginal 3-way interaction between context, target and familiarity ($\underline{F1}(1,174)= 3.42$, $\underline{p}=.06$; $\underline{F2}(1,21)= 3.03$, $\underline{p}=.09$). Of greater importance, the largest pairwise difference between proverb and paraphrase was for unfamiliar proverbs used figuratively. The simple main effects of target type (proverb vs. paraphrase) were examined using a priori contrasts tests which were calculated by pooling the error term of the 3-way interaction and the between-participant residual. The only significant difference between proverb and paraphrase was the 1057ms difference between unfamiliar

proverbs used figuratively and their paraphrases (critical difference = 777.6). This finding is important because it replicates the difference between proverbs and paraphrases found in Experiment 1 and suggests that unfamiliar proverbs take longer to read than literal language. In summary, the reading time data generally replicated the findings of Experiment 1 and 2.

Cued Recall Data

After the participants completed reading all the items, they were given a cued recall task. The cues were the same as those used in Experiments 2 and 3 and were phrases related to either the literal or the figurative meaning of tne proverb. Some participants received cues that were consistent with the manner in which the proverb was used (contextually appropriate cues) and others received cues that were inconsistent with the context (context inappropriate cues). These same cues were also used to cue the paraphrase target sentences in order to test the effectiveness of these cues in the contextually appropriate and inappropriate cue condition.

In order to allow comparison with Experiments 2 and 3, proverb and paraphrase data will be presented separately. In the proverb data, all of the important findings for cued recall from Experiments 2 and 3 were replicated. Contextually appropriate cues were better retrieval aids

than context inappropriate cues (minF'=(1,68)= 9.19, p<.01). Literal cues were more effective recall aids than figurative cues, as is shown by the interaction of context and cue appropriateness (minF'(1,57)= 22.43, p<.01). Familiar proverbs were recalled better than unfamiliar proverbs across participants (F1(1,99)= 6.36, p<.05; F2(1,22)= 1.03, ns). Finally the three way interaction was significant across participants (F1(1,99)= 3.74, p=.05; F2(1,22)= 1.22, ns). Overall these effects replicate the findings of Experiments 2 and 3.

As expected, paraphrases were recalled more often when the cue was contextually appropriate (36.7%) and almost never recalled (4.5%) when the cue was contextually inappropriate (minF'(1,90)= 43.15, p<.001). Also there were significant effects of context across participants (F1(1,90)= 11.79, p<.01; F2(1,21)= 2.55, ns), a significant interaction of familiarity by cue appropriateness (minF'(1,31)= 4.24, p<.05) and an interaction of context by familiarity across participants (F1(1,90)= 15.5, p<.01; F2(1,21)= 1.95, ns). These three interaction effects seem to be the result of two particular cells. First, paraphrases of familiar proverbs used literally exhibit a moderate level of recall (12%) when cued with contextually inappropriate figurative cues. In contrast recall of paraphrases to the contextually inappropriate cues was near zero in all other cases. This finding is not surprising

because the modified proverbs in Experiment 3 were also literal paraphrases of familiar proverbs, and they too were recalled reasonably well (30%) to these same cues. Thus, the obligatory processing of the figurative meaning of modified familiar proverbs appear to have been replicated. Second, recall of paraphrases of the figurative meaning of familiar proverbs cued with contextually appropriate cues was lower than the other contextually appropriate paraphrase conditions. This finding is partly due to interference of the verbal task and these abstract paraphrases of the proverb's figurative meaning (see below). This finding may also indicate that these cues were less effective in general for these items or that these paraphrases were more difficult to remember.

Secondary Task Effects

Participants read the target sentence while memorizing one of three distraction tasks: verbal repetition, visual-spatial imagery, or control (no task). It was hypothesized that if proverb comprehension involved mental imagery there should be more competition between the visual task and proverb comprehension than between the visual task and paraphrase comprehension. Competitions between primary and secondary tasks for mental resources should result in poorer performance on the distraction task, the proverb comprehension or on both. Similarly it was hypothesized

that there should be evidence for greater competition between the paraphrase conditions and the verbal task.

Reading time

Task differences in reading time were not significant across participants ($F1(2,174) = .09$, ns) but reached significance across items ($F2(1,42) = 9.73$, $p<.01$). When calculated across items, the visual task resulted in a slower reading time (2919 ms) compared to the verbal (2665 ms) and control conditions (2629 ms) which did not differ from one another. These differences may indicate that the visual patterns were more complex, thus making more demands on processing resources. There was also a marginal interaction of familiarity, context and task across participants ($F1(2,174) = 2.61$, $p=.075$) but this was nonsignificant across items ($F2(2,42) = 1.15$, ns). Furthermore, the interaction of target type and task was marginal across items ($F2(1,42) = 3.05$, $p<.10$), but not significant across participants. These interactions appear to be related to an odd trend in the data. Unfamiliar proverbs used figuratively were read faster when the participant had to hold in mind a visual pattern than when the participant had to hold in mind a verbal pattern (visual =3293, verbal = 3718, control= 3578). Furthermore in the visual condition there was no difference between unfamiliar proverbs used literally (m=3386) and figuratively (m=3394).

Recall that it was predicted that the visual patterns would interfere more with the proverbs used figuratively than the verbal patterns. Contrary to the prediction, the visual pattern resulted in a faster reading time for the proverbs compared to the verbal pattern. This interaction did not reach significance, but because it is opposite of the predicted effect, this difference will be examined in more detail later.

The Effect of Distraction Task

In assessing the effect of distraction task, two variables were of particular interest: memory for distraction tasks items, and memory for the target sentences. Because there was no real control over how participants allocated attention between the primary and secondary task, the data from these two tasks were aggregated. However, the results of the two separate analysis will first be reported because the way in which the effects occur in the different variables may have important implications for the interpretation of the results.

Distraction Pattern Recognition. At the beginning of each paragraph participants were given one of three distraction task conditions to hold in mind while they read the paragraph: a verbal repetition task, a visual-spatial imagery task, or a control task (no task). At the end of the paragraph they were tested on their memory for the

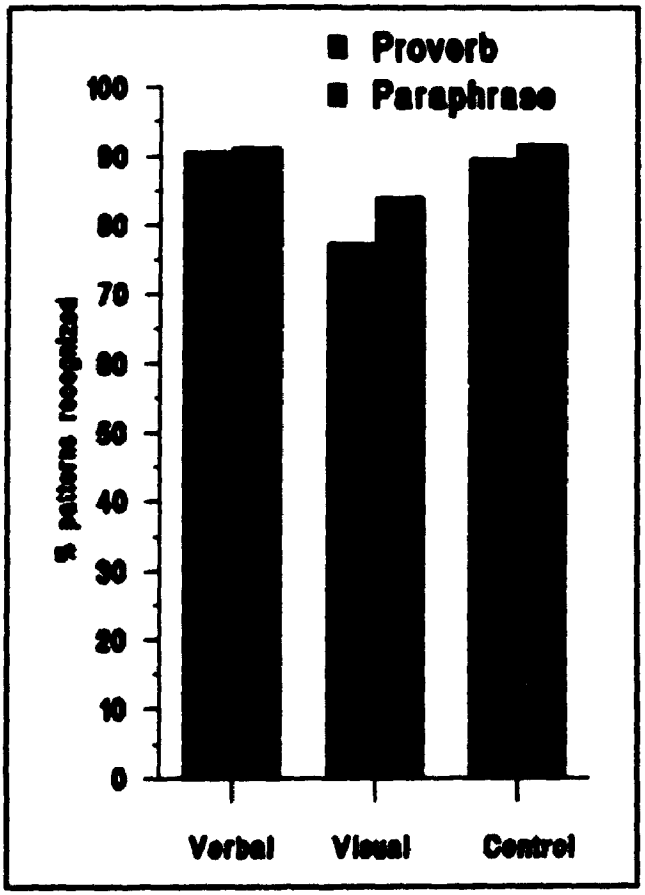
distraction pattern. Participants were asked to press the F1 key if the patterns were the same, or F7 key if the pattern were different from that originally presented. In the control condition participants merely had to press the F1 key because the pattern was always the same. Errors in the control condition sometimes occurred due to switching from the "next sentence" key to the F1 key. The control group data will be included in this analysis because it is likely that some of the errors in the other two condition were also the result of key switching errors.

Distraction patterns were more successfully recognized in the paraphrase condition than in the proverb condition when analysed across items, but this was not significant across subjects ($F2(1,21) = 5.47$, $p<.05$: $F1(1,185) = 1.08$, ns). Participants were significantly poorer at recognizing the distraction patterns in the visual group (82.9%), compared to the verbal group (90.7%) and the control group (91%; $minF'(208) = 6.41$, $p<.05$). The verbal and control groups did not differ. No other main effects or interactions reached significance. This overall main effect is not surprising because proverbs used literally, proverbs used figuratively, and paraphrases of the literal meaning of a proverb were all predicted to compete more with the visual patterns than the verbal patterns. The failure of the interaction between target type (proverb vs paraphrase) and task (visual vs verbal vs control) to reach significance

however is problematic for the theory that mental imagery is involved in proverb processing, but not in the processing of the paraphrases of the figurative meaning. However, because the main predictions were made for specific a priori contrasts, these will be discussed below.

The remaining analyses of the distraction pattern recognition data will focus on the processing of proverbs used figuratively and their paraphrases. The data regarding the memory for the distraction patterns when a participant read a proverb or a paraphrase presented in a figurative context are presented in Figure 4. Recall that it was predicted that memory for the visual distraction pattern would compete more for mental resources with reading a proverb (literally or figuratively) than with reading an paraphrase of the figurative meaning of a proverb. Further, it was predicted that the verbal task would compete more for mental resources with paraphrase of the figurative meaning of a proverb than with proverbs. Thus, participants who read a proverb used figuratively should show poorer recognition in the visual condition compared to the control and verbal conditions. Furthermore they should show poorer recognition for the visual patterns than participants given paraphrases of the figurative meaning. In order to test these predictions, a priori contrasts were calculated using Dunn's multiple comparison procedure (Kirk, 1982). These contrasts were calculated for both participant ($\underline{t}D1$) and

Figure 4. Distraction pattern recognition for proverbs and paraphrases conditions in the figurative context condition.



item (tD2) analyses. These analyses revealed that when the participant read a proverb used figuratively, the distraction patterns were recognized less in the visual condition (79.2%) than in the verbal condition (91.7%: tD1(185)= 3.8, p<.01; tD2(85)= 4.56, p<.01) and compared to the control condition[11] (91.7%: tD1(1,185)= 3.14, p<.01; tD2(85)= 4.56, p<.01. Furthermore it was predicted that participants who read paraphrases of the figurative meaning of proverbs should have poorer recognition in the verbal condition than in the control or visual condition. This hypothesis was not supported by the data. The distraction patterns were in fact recognized better in the verbal condition (92%) and the control condition (92.5%) than in the visual condition (85.4%). These differences did not reach significance in the participant analysis, but the difference between the visual task and the verbal task approached significance in the item analysis (tD1(185)= 1.74, ns; tD2(85)= 2.28, p<.10), and the difference between the visual and the control task reached significance in the item analysis (td1(185)= 1.74; tD2(85)= 2.56, p<.05). The findings with the paraphrases, although weak, are the reverse of the predicted effects and weaken the overall

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11 Recall that performance in the control group was not perfect due to key changing errors. Participants had to change keys 3 times during the Experiment which resulted in less than perfect performance in the control condition. According to this data there was on average about one key change error per participant.

strength of our findings with the proverbs. A contrast was also calculated to compare memory for the visual pattern in the proverb condition (79%) to memory for the visual pattern in the paraphrase condition (85.4%). This difference is consistent with the hypotheses, but only reached significance in the item analysis ($t_D2(46) = 2.72$, $p<.05$; $t_D1(187) = 1.42$, ns), Finally an analysis was conducted across items to test the hypothesis that the difference between the visual condition and the other 2 groups was larger for proverbs than for paraphrases. This analysis was marginally significant across items ($F(1,23) = 3.0$, $p<.10$)[12]. Thus, in summary, according to these a priori contrasts, there is weak support for one of the hypotheses: proverbs used figuratively compete more for mental resources with the visual patterns than with the verbal patterns. These findings however are inconclusive because the contrasts revealed that paraphrase targets also resulted in a slightly poorer memory for the visual patterns, not as predicted for the verbal patterns.

Cued Recall. Recall that a double dissociation was predicted in that proverbs used figuratively would compete

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[12] Recall that distraction condition was a within participant variable in the item analysis. To perform this analysis the distraction pattern recognition in the visual group was subtracted from the average of the recognition in the verbal and the control conditions. This analysis was not calculated across participants because in the participant analysis, distraction task is a between participant variable.

more with the visual patterns and paraphrases of proverbs would compete more with the verbal patterns. There was a significant interaction of task with context ($F1(1,86) = 3.49$, $p<.05$; $F2(1,42) = 3.54$, $p<.05$). The verbal task resulted in lower cued recall for paraphrases of proverbs used figuratively compared to paraphrases in the control group and compared to proverbs in the verbal condition, suggesting the other half of the predicted double dissociation.

The cued recall data presented above was scored as recalled only if the participant recalled the proverb or paraphrase to the cue that was related to that item. However, there was a very low rate of cued recall for paraphrases of proverbs to the intended cue when a contextually inappropriate cue was used. This is not surprising since the paraphrases were completely unrelated to the contextually inappropriate cues. For example a cue that is related to the literal meaning of a proverb would be used to cue a paraphrase of the figurative meaning of the proverb or a cue related to the figurative meaning of the proverb would be used to cue a paraphrase of the literal meaning of the proverb. To better assess the effect of distraction task on the participant's memory for the target sentences, the cued recall data was rescored so that a target sentence would be counted as recalled, regardless of which cue was used to recall the proverb. These data are

shown in Figure 5. The only significant effect of task condition was the interaction of task and context. As predicted, a paraphrase of a proverb's figurative meaning was harder to remember when the participant engaged in a verbal secondary task compared to the visual task, and compared to a proverb in the verbal task; $F1(2, 86) = 4.25$, $p<.05$; $F2(1,42) = 3.56$, $p<.05$. In order to examine this effect, a priori contrasts were again calculated using Dunn's multiple comparison procedure (Kirk, 1982). These contrasts were calculated for both participant ($tD1$) and item ($tD2$) analyses. Cued recall of the paraphrases was significantly lower in the verbal condition (19%) compared to the visual condition (32%) and the control condition (29.6%; $tD1(187) = 2.32$, $p<.05$ [13]; $tD2(92) = 2.96$, $p<.05$). Furthermore, in the verbal condition, paraphrases (19%) were recalled significantly less often than proverbs (32.9%; $tD1(187) = 2.77$, $p<.05$; $tD2(45) = 2.671$). Recall of proverbs in the visual condition was not significantly different from recall in the control condition. Thus, the other half of the predicted double dissociation was found in the cued recall data for the paraphrases: the verbal task interferes with the memory for the abstract paraphrases. No other effect reached significance across participants but, across

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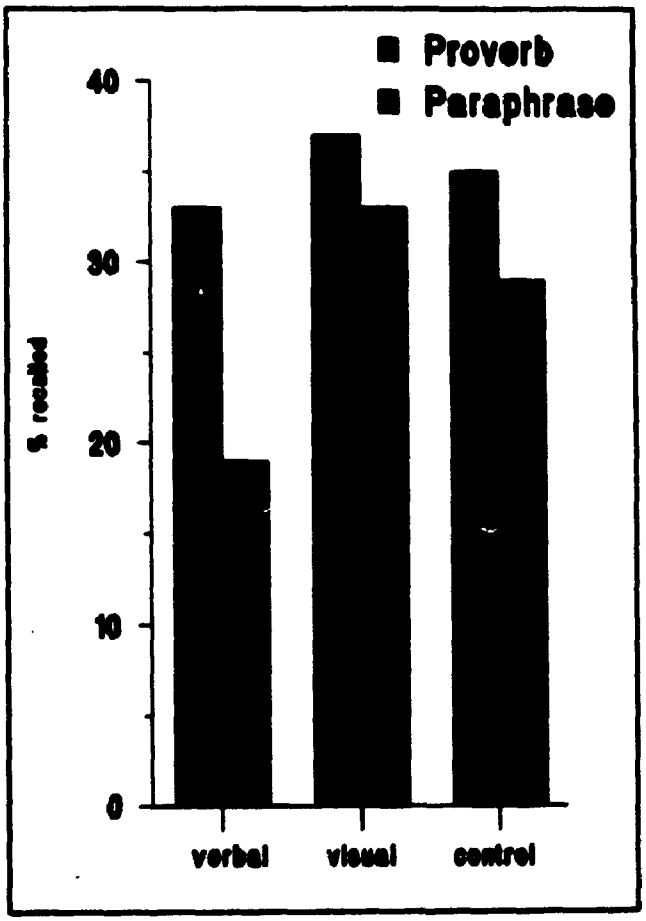
[13] Note: an alpha level of .05, one tail, is being used in these contrasts because a specific direction of the effect was predicted. A significant effect in the opposite direction would contradict the theory.

Figure 5. Cued recall data from proverbs and paraphrases presented in figurative contexts.



items, there was a main effect of distraction task and an interaction of cue type, distraction task, and familiarity ($F2(2,42) = 6.79$, $p < .01$).

Aggregated Data

Both halves of the predicted pattern of interference have been shown; however, these effects are fairly weak, and they show up in different memory tasks. Further, for both the lower recognition of visual patterns while reading a proverb used figuratively, and lower cued recall of paraphrases of the figurative meaning of proverbs after a verbal distraction task, there seems to be a reciprocally higher performance in the other memory task. Participants who read a paraphrase were non-significantly better at the verbal task than the visual task, and participants who read a proverb used figuratively under a visual task were non-significantly better at the cued recall task. These trends suggest a trade off between the primary and secondary tasks in which giving more attention to one task resulted in poorer performance on the other task. To control for the possibility of an accuracy-accuracy trade off between distraction recognition and the target cued-recall, the distraction task data and the cued recall task data were aggregated. Although not without controversy (see Perloff & Persons, 1988, and Paunonen & Gardner, 1991, for contrasting views) it is well known that the aggregation of parallel measures increases the reliability of measurement (Paunonen

& Gardner, 1991). A recent experiment using Monte Carlo simulations (Turner, 1994) has shown that the aggregation of multiple indicator variables does not increase the Type 1 error rate and substantially decreases the Type 2 error rate.

In this aggregation analysis, cued recall of target sentences was scored regardless of the cue used to recall the target sentence. Furthermore some readers might question the scoring of distraction pattern recognition in the control group, because the pattern was always a "+" sign. Although the control group had no distraction memory task to perform, it should be remembered that the distraction procedure involved the use of different keys at different stages in the experiment. Changing the keys that the participant had to press during the different parts of the experiment was done to prevent participants from pressing keys without thinking, however as a result there were some error made due to switching keys. Thus, 'recognition' of the '+' sign in the control group was not perfect, and thus a control condition is needed as a comparison with the other two groups.

Because the large differences in means and standard deviations of the two variables being aggregated, the data were first converted to standard scores. The scores were then simply added together. This aggregate was then restandardized for easier interpretation. These analyses

were calculated collapsing across familiarity because the effects observed were the same for both familiar and unfamiliar items. Literal and figurative data were calculated and analyzed separately.

In these analyses, a priori contrasts between the different cells are of primary interest here. Furthermore to simplify these analyses the data will be analyzed collapsing across cue type (appropriate vs. inappropriate) and familiarity (familiar vs. unfamiliar) and literal and figurative uses of proverbs will be analyzed separately. Collapsing across familiarity was justified because there was no interaction of distraction task and familiarity for either the cued recall or the distraction memory data. The resulting design is a simple 2 (proverb vs. paraphrase target sentence groups) by 3 (verbal vs. visual vs. control group) design.

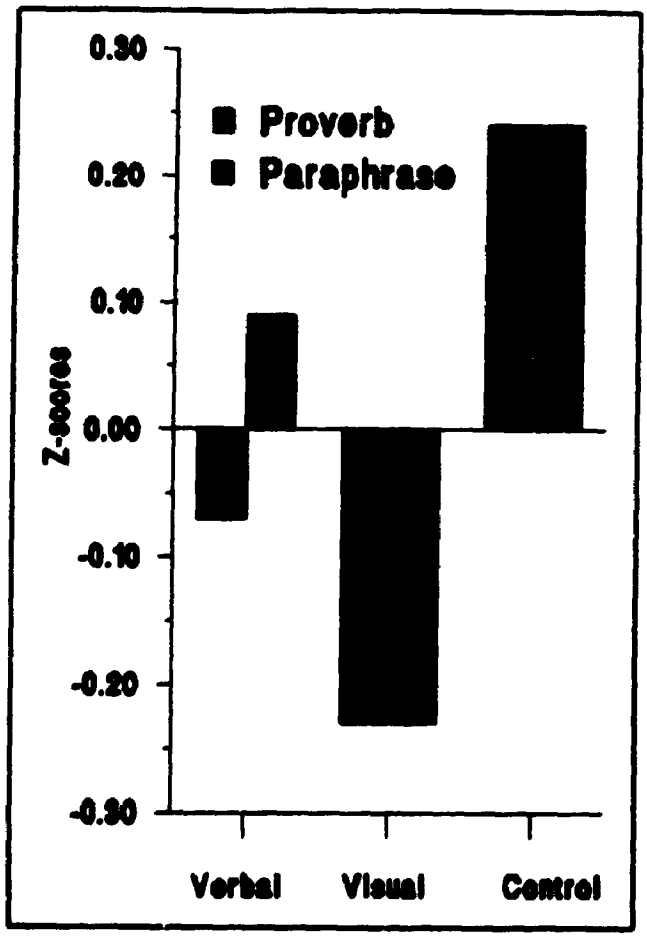
For proverbs used literally it was predicted that the visual task would result in lower aggregated performance for both proverbs and paraphrases because both are concrete sentences. For proverbs used literally there was a significant main effect of distraction task across both items and participants ($F1(2,185) = 5.13$, $p<.01$; $F2(2, 46) = 7.42$, $p<.01$) which approached significance with the more conservative $minF'$ ($minF'(2,181)$, 3.03, $p<.10$). The visual task resulted in lower aggregate performance than the verbal and the control groups. This hypothesis was further tested

by computing an a priori contrast comparing the visual condition (z= -0.24) vs. the mean of the verbal (z= 0.01) and the control condition (z= 0.24; F(1,186)= 7.49, p<.01; F2(1,23)= 5.31, p<.05). This contrast accounts for 3.85% of the variance in the aggregate. This finding is consistent with previous research by Klee and Eysenck (1973) who found that concrete sentences compete more with visual tasks than do abstract sentences. Both proverbs used literally and their paraphrases are concrete sentences and therefore competed for mental resources with the visual distraction task. These means are shown in Figure 6 and are presented as z-scores. A positive number means that the number is greater than the grand mean, a negative number means that the number is below the grand mean. A difference of 1.0 between two means would indicate that two means differed by 1 standard deviation.

Aggregate data: Figurative context

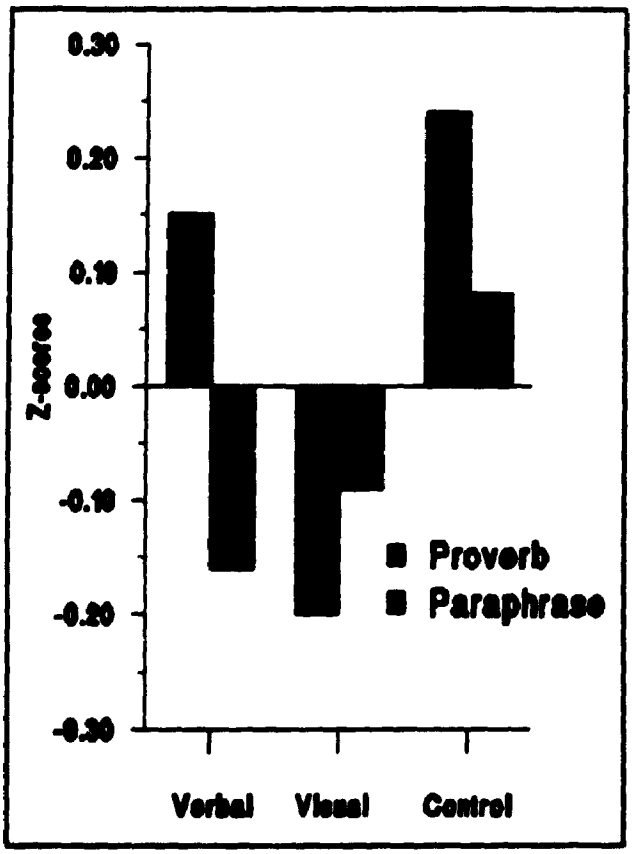
For proverbs used figuratively there was no overall main effect of distraction task or target sentence type (proverb vs. paraphrase) across either participants or items. The interaction was not significant across participants F1(1,185)= 1.04, ns) but was marginally significant across items F2(1,23)=3.70, p= 0.06). A priori contrasts were also computed. Four contrasts were computed and evaluated using Dunn's tables at .05/2, with 4

Figure 6. Aggregated Data for Literal Contexts.



comparisons (tD1crit = 2.54; tD2crit= 2.58). For proverbs the visual task (z= -0.20) resulted in lower aggregate performance compared to both the verbal (z= 0.14) and the control groups (z=.23; tD1(1,185)= 2.575, p<.05; tD2(1,90)= 2.79, p<.05.) For paraphrases however the contrast of the verbal group (z=-0.19) compared to the visual (z= -0.09) and the control (z= 0.08) failed to reach significance (td2(185)= 1.30, ns; tD2(85)= 1.31, ns). The contrast of the control vs. the verbal group for the paraphrases (tD1(185)= 1.34, ns; tD2(90)= 1.95, p<.20) and the contrast of paraphrase vs. proverb in the verbal condition (tD1= 1.627, ns; tD2(44)= -2.12, p<.10) approached significance in the item analysis. Finally an overall contrast was calculated by scoring the two cells with predicted interference as -2 and the other 4 cells as +1. This contrast is significant (F1(1,186)= 5.04, p<.01) and accounts for 2.6% of the variance. These data are presented in Figure 7 and are expressed in z scores. These data are in general consistent with the hypothesis that the proverbs and the visual task compete with each other for mental resources and the paraphrases and the verbal task compete with each other for mental resources. These effects are weak and therefore must be interpreted with caution; only some of the predicted effects reached significance. In particular, those predictions regarding the interference of the visual task and the proverbs were supported, but the

Figure 7. Aggregate Data for Figurative Contexts.



predictions regarding the interference of the verbal task and the paraphrases failed to reach significance in the analysis of the aggregate. Furthermore, although the interference of proverbs and the visual task reached significance, the overall size of the effect (2.6%) is quite small. Assuming for the moment that the hypothesis is correct, the weakness of the results may reflect either of two possibilities: the distraction tasks were not difficult enough to ensure more robust findings, or that mental imagery only plays a minor role in proverb processing. More research is needed to answer this question.

EXPERIMENT 5

The results of Experiment 4 regarding the use of imagery during the comprehension of proverbs were inconclusive. Proverbs used figuratively and literally competed with the participant's memory for the visual task, and paraphrases of a proverb's figurative meaning competed more with the verbal task. However, these findings were weak. There were a number of problems with Experiment 4 that may have caused the weakness of the results. First the use of a cued recall task to assess performance on the primary task may not have been sensitive enough. Second there was a very high level of performance on the verbal task in all conditions, suggesting that it was not difficult enough. The verbal task performance did not differ from the control condition in which participant merely had to press the "same pattern" key on every trial. Finally the excessive number of key changes in the distraction task resulted an inflated error rate which added noise to the experiment. To solve these problems another experiment was conducted that focused on the cells of interest: proverbs used figuratively and their paraphrases. In Experiment 5 the verbal task was made more difficult and an on-line comprehension task was used to assess performance on the reading task.

Method

Participants

Fifty-eight undergraduate students from the University of New Brunswick who participated for a course credit. Eighteen students were used in a pilot experiment to test the similarity of test phrases across conditions and 40 were used in the main experiment.

Materials

The materials were identical to those used in the four previous studies. In addition comprehension test phrases were created. These phrases were based on the cue phrases used in Experiments 2, 3 and 4, but were altered to eliminate lexical overlap with the proverb and paraphrases. Furthermore the length of some of the test phrases were shortened and made consistent across all items. To assess the similarity of the test phrases across conditions, the items in context, followed by the test phrases, were given to 18 students. The participants were asked to decide if the phrase was related to the target sentence. There were no significant main effects or interactions in their relatedness response suggesting that the phrases were equally well related to the target sentences in all conditions.

Design

The design was similar to the previous studies, however only three variables were manipulated: familiarity of

proverb (familiar vs. unfamiliar), target type (proverb vs. paraphrase), and distraction task (verbal vs. visual). The verbal task was made more difficult by increasing the number of letters to be remembered from 5 to 6. The recognition items for the verbal task were also changed. In this experiment the foils for the verbal condition were made by reversing the order of two letters within the distraction pattern. Thus, the participants not only had more letters to remember, but also had to remember the order of the entire sequence to recognize the distraction pattern correctly. The visual task recognition task was also made more difficult by changing a smaller proportion (1/4) of the total picture in the foil patterns. This change was done so that the participant would have to remember the entire pattern visual pattern rather than being able to focus on one corner of the pattern. In summary the verbal task was made much harder, and the visual task was made somewhat harder.

A major advantage of this simplified design was that the hypothesis corresponded to a cross over interaction between target sentence and distraction task.

Procedure

The procedure was very similar to the previous four experiments with the exception of the addition of an on line comprehension test. In Experiment 4, the effect of the distraction tasks on proverb processing was measured using a

cued recall task. The cues were related to the literal or figurative meaning of the proverb and as such provided an indirect measure of the manner in which the proverbs were comprehended. The cued recall test, however, is a memory test, and as such is not a very good means of assessing comprehension. In order to assess comprehension more directly in Experiment 5, subjects were given a test phrase and asked if this test phrase was related to the target sentence.

As in Experiment 4, participants first memorized a distraction pattern (visual or verbal). In Experiment 4 the participants were allowed to view the distraction patterns for as long as they liked, and then press a key, however in Experiment 5, the time given to view the distraction patterns was limited to 5 seconds. This was done in order to reduce the number of keys that the participant needed to press during the experiment, thus reducing the number of key changing errors, and to make sure that the participants in the two groups (verbal vs. visual) were exposed to the distraction patterns for equal lengths of time. The participant then read the passage one sentence at a time. After reading, the target sentence, the participant's recognition memory for the distraction pattern was tested. The participant's comprehension was then tested. To test the participants comprehension, a phrase was presented on the screen. For example if the participant had read the

proverb "The grass is always greener on the other side of the fence", the related test word would be "envy". Half the time the test word was unrelated to the proverb. For the green grass proverb, "children" might be used as an unrelated test word. The participant responded by pressing F1 if the phrase was related to the meaning of the target sentence or F7 if the phrase was unrelated to the meaning of the target sentence. For both target comprehension and distraction pattern recognition tasks the F1 key was used for the yes response and F7 was used for the no response.

Results

Reading Time

The reading time data for experiment 5 are presented in Figure 8. Participants responded faster in the verbal condition than in the visual condition but this reached significance only in the item analysis ($F1(1,38)= 2.36$, $p=.13$; $F2(1,22)= 19.64$, $p<.01$). Familiar proverbs and their paraphrases were in general read faster than unfamiliar proverbs ($F1(1,38)= 2.62$, $p=.11$; $F2(1,22)=2.59$, $p=.12$), but this effect failed to reach significance. Paraphrases were read faster than proverbs ($F1(1,38)= 7.12$, $p<.05$; $F2(1,22)= 2.72$, $p=.11$). There was also a significant interaction of familiarity and target sentence type ($F1(1,38)= 19.36$, $p<.01$; $F2(1,22)=4.66$, $p<.05$). This interaction is consistent with the previous studies.

Familiar proverbs and their paraphrases are read at the same speed but unfamiliar proverbs used figuratively require a significantly longer reading time than their paraphrases. Of greatest theoretical importance, there was a significant interaction of distraction task and target sentence type, at least across items ($F2(1,22)= 6.26$, $p<.05$; $F1(1,38)= 2.03$, $p=.16$). As predicted, people took longer to read proverbs in the visual condition than in the verbal condition. This effect accounts for 3.4% of the variance in reading time across items, which is similar to the percentage accounted for by the predicted effects in Experiment 4. The greater reliability of this finding in the item analysis is probably due to the small number of items used per cell in the participant analysis and the fact that distraction task was a between participant variable, but a within item variable (i.e., different participants received different types of distraction tasks, but the same items were used in each condition).

Closer examination of the means (see Table 10 and Figure 8) revealed that both familiar (verbal=2476; visual= 3151; $tD1(48)= .35$, ns; $tD2(43)= 3.01$, $p<.05$) and unfamiliar proverbs (verbal=2974, visual= 3834; $tD1(48)= 1.52$, ns; $tD2(43)= 3.83$, $p<.01$) were slower in the visual distraction condition than in the verbal distraction condition. These effects reached significance in the item analysis, but not in the participant analysis. Reading time

Figure 8. Reading speed for proverbs and paraphrases in the visual and verbal conditions.

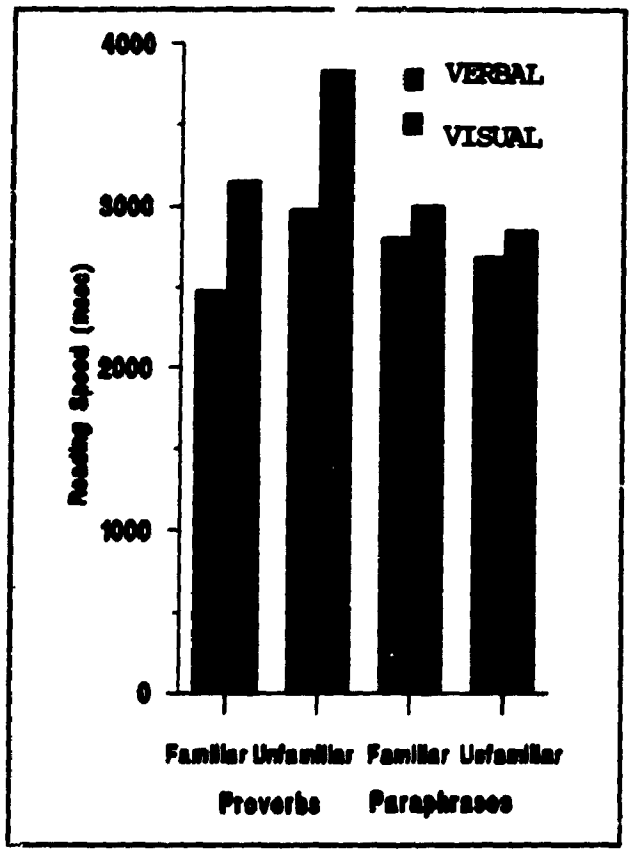


Table 10
Reading Time, Comprehension and Distraction Pattern Recognition Results from Experiment 5

		Familiar Proverb		Unfamiliar Proverb	
	Dependent Variable	Mean	Std Err	Mean	Std Err
Verbal Task	Reading time	2476.7	144.2	2974.7	171.4
	Compre-hension	.838	.047	.782	.058
	Distraction Pattern Recognition	.879	.03	.8975	.029
	Aggregate	.426	.195	.292	.285
		Paraphrases of Familiar Proverbs		Paraphrases of Unfamiliar Proverbs	
	Reading time	2802.6	215.0	2685.8	198.8
	Com re-hension	.78	.0608	.77	.056
	Distraction Pattern Recognition	.835	.033	.82	.045
	Aggregate	-.0213	.2876	-.168	.354

Table 10 cont.

		Familiar Proverb		Unfamiliar Proverb	
	Dependent Variable	Mean	Std Err	Mean	Std Err
Visual Task	Reading time	3151	237.2	3834.2	244.4
	Compre-hension	.847	.0469	.907	.048
	Distraction Pattern Recognition	.762	.059	.8056	.045
	Aggregate	-.426	.405	-.292	.244
		Paraphrases of Familiar Proverb		Paraphrases of Unfamiliar Proverb	
	Reading time	2994.9	259.3	2855.5	202.4
	Compre-hension	.851	.0467	0.918	0.032
	Distraction Pattern Recognition	.827	.0445	.82	.044
	Aggregate	.0213	.247	.1676	.233

for the paraphrases did not differ between the verbal and visual conditions in either participant or item analyses. The findings in the item analysis are consistent with the hypothesis that visual patterns interfere more with proverb processing than do verbal patterns. Although this effect only reached significance in the item analysis it is still of sufficient strength to suggest that the mental image indeed plays a functional role in proverb processing. Furthermore this finding is a direct contradiction of the reading time finding in Experiment 4 which found that unfamiliar proverbs were read faster in the visual interference condition. Because the distraction tasks were made more difficult in Experiment 5 than in Experiment 4 it is most likely that the findings of Experiment 5 are a more accurate reflection of the underlying phenomenon than Experiment 4. More research, however, is needed to confirm these findings.

Comprehension

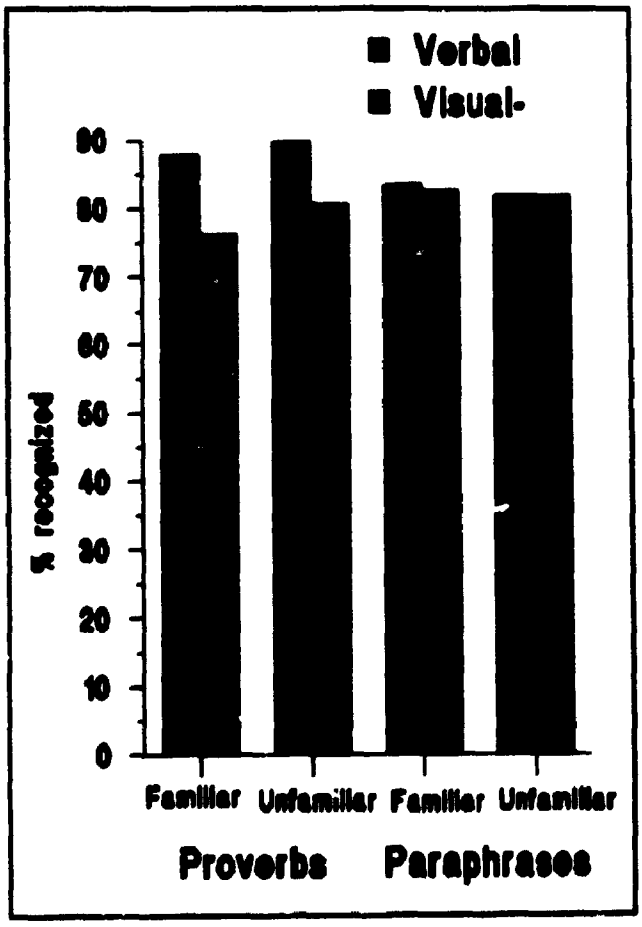
Comprehension performance was better in the visual condition (84.9%) than in the verbal condition (80.9%: $\underline{minF'}(1,57) = 4.88$, $\underline{p} < .05$). There was a marginal interaction of familiarity and distraction task across items ($\underline{F2}(1,22) = 3.08$, $\underline{p} < .10$; $\underline{F1}(1,38) = 1.66$, ns). No other effect reached significance in either participant or item analyses. In particular, there was no interaction of distraction task

with target type, thus failing to support the hypothesis that the visual task should result in poorer comprehension of the proverbs compared to proverbs in the verbal task and compared to the paraphrases in the visual task. Examination of the means (see Table 10) revealed that the verbal task resulted in significantly poorer comprehension of the unfamiliar proverbs (verbal = .78, visual = .91; ($\underline{t}D1(76)= -3.08$, $p<.01$; $\underline{t}D2(43)= -2.42$, $p<.05$;), and paraphrases of unfamiliar proverbs (verbal = .77, visual= .92; $\underline{t}D1(76)= -1.97$, ns; $\underline{t}D2(43)= 2.84$, $p<.05$). Comprehension of paraphrases of familiar proverbs was lower in the verbal condition than in the visual task condition, but this difference was nonsignificant (verbal= 0.78; visual 0.85; $\underline{t}D1(76)= 1.48$, ns; $\underline{t}D2(43)= 1.37$, ns). Comprehension in the verbal and visual condition for familiar proverbs did not differ. The paraphrase results are, in general, consistent with the hypothesis, but the findings for unfamiliar proverbs is the <u>opposite</u> of that predicted by the hypothesis.

<u>Recognition of Distracter Patterns</u>

As can be seeen in Figure 9, verbal patterns (85.8%) were recognized better than visual patterns (80.4%: $\underline{F}2(1,22)= 4.55$, $p<.05$), but this effect was not significant across items ($\underline{F}1(1,28)= 2.67$, ns). There was a marginally significant interaction of distraction task and target sentence type across both items and participants ($\underline{F}1(1,38)=$

Figure 9. Distracter pattern recognition for verbal vs. visual distraction conditions.



3.15, $p<.10$; $F2(1,22) = 3.02$, $p<.10$). This marginal interaction is consistent with the hypothesis that there should be more interference between the proverbs and the visual task compared to proverbs in the verbal task and compared to paraphrases in the visual condition. Examination of the means (see Table 10 and Figure 9) using a priori contrasts ($tDcrit = 2.33$, $p=.05/C=2$), revealed that in the proverb condition, memory for the visual distracter patterns was significantly poorer than for the verbal distracter patterns ($tD1(76)= 2.42$, $p<.05$; $tD2(44)= 2.74$, $p<.05$). This effect occurred for both familiar (verbal=.88 vs. visual= .76) and unfamiliar proverbs (verbal= .90 vs. visual= .81). Verbal and visual pattern recognition did not differ in the paraphrase condition ($tD1(76)= -0.16$; $tD2(44)= 0.1$, ns). Thus, the pattern of results was consistent with the hypothesis for the proverbs, but not for the paraphrases.

Aggregated Data

In summary, the findings from the distracter recognition data and the reading time data are consistent with the hypothesized double dissociation in which proverbs would compete more for mental resources with the visual task than with the verbal task and paraphrases would compete more for mental resources with the verbal task than the visual task. The findings from the comprehension test are

consistent with the hypothesis for the paraphrases, but inconsistent for the proverbs. Thus, the findings of Experiment 5 indicate weak support for the hypothesis.

As in Experiment 4 the manner in which participants will allocate their mental resources is uncontrolled. Participants might concentrate on reading the target sentence, remembering the distraction task, or on the comprehension test. Therefore the variables were aggregated in order to determine if the patterns of interference would still be present once the data from the different dependent variables was combined. The aggregation process would correct for any speed-accuracy or accuracy-accuracy trade off between the various dependent measures. Because the experiment included an on-line comprehension test reading time was also included in the aggregate. To aggregate the data the raw scores were standardized. The standardized reading time scores were multiplied by -1 so that for all three variables, bigger numbers would indicate less interference. The standardized scores were then added together and the results were restandardized.

The interaction of distraction task and target sentence type was significant across items ($F2(1,22)= 9.18$, $p<.01$), but failed to reach significance across participants ($F1(1,38)= 2.45$, ns[14]). This effect accounted for 5.2% of

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[14] Note: the aggregate was significant across participants as well ($F1(1,38)= 6.15$, $p<.05$) when only distraction pattern recognition and reading

the variance across items. No other effects reached significance. Failure of this interaction to reach significance across participants may be due to the small number of items per cell (4) in calculating the participant means and the fact that distraction task is a between-participant variable, but a within-item variable.

Examination of the means (see Table 10) using a priori contrasts revealed that, for proverbs, there was more interference between proverb comprehension and the concurrent visual-spatial task (verbal= 0.36 vs. visual= -0.36; $\underline{t}D(74)= 1.11$; $\underline{t}D2(44)= 3.01$), but this effect only reached significance in the item analysis. The differences between the verbal and the visual conditions did not reach significance for the paraphrases (verbal = -0.09, visual = 0.09; $\underline{t}D1(74)= -0.79$, ns, $\underline{t}D2(44)= 0.88$, ns) but the means were generally in the right direction. Taken together these data are consistent with the hypothesis that mental imagery plays a role in proverb comprehension but, as in Experiment 4, the effects are weak. The slower reading time for the proverb in the visual condition compared to the verbal condition is also consistent with the hypothesis that imagery plays a functional role in proverb comprehension. This role however must be relatively minor because the effects are small and only reach significance in some of the

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time were aggregated (i.e., not including the comprehension variable).

analyses.

Discussion

Experiments 4 and 5 accomplished all three of their goals with varying degrees of success. First, the cued recall results of Experiment 2 and 3 were replicated; literal cues are effective aids to the recall of a proverb even when it is familiar, or when it is used figuratively. Cues related to the figurative meaning of the proverbs are only effective if it is familiar, or if the proverb is used according to its figurative meaning.

Second, Experiment 4 has shown that contextually appropriate cues are effective recall aids for the paraphrase controls sentences. This suggests that the cues are effective in accessing the intended meaning of the context paragraph. More important, the near zero recall of paraphrases to the contextually inappropriate cues shows that the effective cuing of proverbs with contextually inappropriate cues seen in Experiments 2 and 3 was not an artifact caused by chance relationships of the inappropriate cue and the context, but was related to the processing of the proverb itself.

There was some evidence that literal paraphrases of familiar proverbs, placed in literal contexts, were sometimes cued by figurative cues (12%). This finding is consistent with the modified proverb data in Experiment 3. It would appear that the effectiveness of a contextually inappropriate (figurative) cue decreases as the target

sentence becomes increasingly dissimilar to the proverb. There were even a few instances (5%) in which literal cues successfully cued a paraphrase of the figurative meaning of a proverb. This suggests that some familiar proverbs may be familiar enough to be generated by reading the figurative meaning.

Finally, there were some indications of a double dissociation in the dual task data. Reading the target sentence while maintaining a verbal memory load produced greater interference for paraphrases relative to proverbs. In contrast, maintaining a visual image produced greater interference for proverbs used figuratively. Because the participants were still able to perform the visual task and read the proverbs reasonably well it may be that the image serves a relatively minor role. Perhaps varying the difficulty of the distracter task would make this effect more pronounced. Nonetheless the evidence suggests that proverb reading does involve somewhat more visual spatial processing than paraphrase reading.

One intriguing, but odd, finding in Experiment 4, was that participants in the visual distraction condition read their proverbs faster. This effect did not reach significance, but because it was opposite of the predicted effects it needs to be examined more closely. This non-significant effect could be the result of a sampling error. The reading time for proverbs used figuratively varies from

experiment to experiment. The mean in this condition was well within the range of variation observed in the previous studies. A second possible explanation of this effect could be that the visual-spatial task prevented the participants from visualizing the proverbs thus allowing for a more efficient, verbal, method of processing the proverbs, resulting in a faster reading time. By this interpretation, the obligatory activation of the proverb's image is a distraction. If this explanation is true, then increasing the difficulty of the secondary task should result in a faster reading. The distraction task difficulty was increased in Experiment 5 and this finding was not replicated. Proverbs were read more slowly in the visual condition than in the verbal condition. Thus, the first explanation, a sampling error, is more consistent with the data. The reading time findings from Experiment 5, in fact, suggest that imagery does serve a function in the comprehension process. Given the weakness of these results, the role of imagery must be a relatively minor one. More research is needed to confirm these findings.

The results of Experiment 5 are still weak but the results of the two studies are consistent with each other and are consistent with the hypothesized double dissociation between target sentence type (proverb vs paraphrase) and distraction task (verbal vs visual). Because the designs of the two studies were somewhat different (between vs. within

participants) the data from the two studies cannot be combined. Nonetheless, the consistency of the effects across studies suggests that proverb comprehension does involve more visual spatial processing than does paraphrase processing. The results in the paraphrase condition were inconclusive; the data suggests that paraphrase comprehension may involve more verbal processing, but neither experiment showed strong evidence for this predicted effect. More research, however, is needed before definite conclusions can be drawn.

GENERAL DISCUSSION

The general purpose of these studies was to explore the role of literal meaning during the comprehension of figurative language. More specifically, there were four goals to these studies. The first aim was to disentangle conventional and literal meaning in order to examine the relationship between these two concepts and to determine their independent contributions to proverb processing. A second goal was to examine whether conventional meaning is processed in an obligatory manner during proverb comprehension. A third aim was to examine whether literal meaning plays an important role in figurative comprehension, independent of conventionality. The fourth goal was to provide some insight into the nature of the representation of proverbs in memory. Each of these goals will be discussed in turn.

The first aim was to disentangle literal and conventional meaning. Studies of figurative language have, in the past, suffered from three confounds that make interpretation difficult. First, studies have often confounded literal and conventional meaning by employing target sentences that are conventionally understood according to their figurative meaning. Second, other studies have used the same metaphor in a literal and a figurative context, but the contexts are confounded with sentence literalness. Third, some studies have held the

context constant, but at the cost of using different target sentences, thus comparing targets that differ on many dimensions. Disentangling literal and conventional meaning was achieved here by orthogonally varying familiarity of a proverb and the literalness of the context. The interaction of these two variables tests for the effect of conventionality. Secondly, the two designs described above were combined so that the figurative target sentence could be simultaneously compared to both the same sentence in a literal context, and to a paraphrase of the figurative meaning in the same 'figurative' context.

The second aim of this dissertation was to examine whether literal meaning plays an important role independent of conventional meaning. There were no differences in reading time between familiar proverbs used figuratively and literally (Experiments 1, 2 & 4). If processing of conventional (but not unconventional) meaning is obligatory, then conventional uses of proverbs should be read faster than unconventional uses of proverbs. Thus, familiar proverbs used literally (i.e., unconventionally) should have taken longer to read than familiar proverbs used figuratively. Such a result has been shown with idioms (see Ortony et al., 1978; Gibbs, 1980) but was not found in these studies with proverbs. Furthermore if conventional meaning is the only meaning that is processed in an obligatory manner, then conventional uses of proverbs should be more

easily confused in a memory test with paraphrases than unconventional uses of a proverb. However, paraphrases of the literal meaning of a proverb were more likely to be confused with the proverbs than were paraphrases of the figurative meaning of a proverb even when the literal meaning was unconventional (Experiment 1). Furthermore, literal cues were effective recall aids to both familiar and unfamiliar proverbs used figuratively (Experiments 2, 3 and 4). Taken together these data suggest that literal meaning is processed in an obligatory manner, even when it is unconventional (as is the case with familiar proverbs), and when it is contextually inappropriate (as is the case with proverbs used figuratively). These data appear to support a modified version of Searle's (1979) Standard Pragmatic Model in which both conventional and literal meanings are processed in an obligatory manner.

The third aim of this dissertation was to examine whether conventional meaning is processed in an obligatory manner. Familiar proverbs were read equally fast in literal and figurative contexts (Experiments 1, 2 and 4). Familiar proverbs used literally and unfamiliar proverbs used figuratively were sometimes incorrectly paraphrased according to their conventional meaning: figurative for familiar, literal for unfamiliar (Experiment 1). Contextually inappropriate figurative cues were effective recall aids for familiar proverbs, but not for unfamiliar

proverbs (Experiments 2, 3 and 4). Taken together these data indicate that it is as easy to comprehend a familiar proverb used figuratively as it is to comprehend a familiar proverb used literally. These findings are consistent with Ortony et al.'s (1978) findings that, given a long context, figurative and literal language are read at the same speed.

In contrast, the evidence regarding unfamiliar figurative language suggests that the processing of an unfamiliar proverb's figurative meaning is a more effortful process. Unfamiliar proverbs require longer processing times when used literally than when used figuratively (Experiments 1, 2, 3 and 4). Furthermore unfamiliar proverbs were read slower than their paraphrase control sentences (Experiments 1, 4 and 5). Participants sometimes interpret unfamiliar proverbs used figuratively according to their literal meaning, but very rarely interpret unfamiliar proverbs used literally according to their figuratively meaning (Experiment 1). Cues related to the figurative meaning of an unfamiliar proverb are very ineffective recall cues when the proverb is used literally (Experiments 2, 3 and 4). Cues related to the figurative meaning of an unfamiliar proverb are effective recall aids for unfamiliar proverbs when the proverb is used figuratively (Experiments 2, 3 and 4). Taken together, these findings suggest that the comprehension of an unfamiliar proverb as a proverb is an effortful process that requires the recognition by the

participant that the proverb is intended to be understood according to its figurative meaning.

The findings from unfamiliar proverbs are at odds with much of the extant literature on figurative language (Glucksberg et al., 1982; Ortony et al., 1978). For example, according to Glucksberg et al. (1982), the comprehension of the figurative meaning of metaphors is non-optional and automatic. The unfamiliar proverbs in this experiment were comprehended more slowly when used figuratively than when used literally, even though a fairly long context was provided. Cues related to the figurative meaning of a proverb were not effective recall aids for unfamiliar proverbs used literally suggesting that an unfamiliar proverb's potential figurative meaning is not processed unless the proverb is placed in a context related to its figurative meaning. Furthermore, according to Ortony et al. (1978) metaphors require more contextual support than does literal language, but if given a sufficiently long context, are comprehended as rapidly as literal language. Thus, results based on familiar figurative language cannot be generalized to unfamiliar figurative language. The findings of the present set of studies are consistent with Turner (1989) and with a recent dissertation by Temple (1993), who have found that proverbs used figuratively take longer to read than proverbs used literally. In summary, the findings presented in this dissertation are consistent

with a modified version of Searle's (1979) Standard Pragmatic Model of figurative language in which both conventional figurative meaning and literal meaning are processed in an obligatory manner.

These data suggest that literal meaning plays an important role in proverb processing, but it is unclear what this function is. The fourth aim of the dissertation was to examine two possible functions that literal meaning might play in the comprehension of figurative language: (1) literal meaning is used in a verbal associative manner, and (2) literal meaning is used to generate a mental image. The verbal associative position is more consistent with the Conceptual Base Hypothesis (Honeck et al., 1987). Honeck et al. (1987) have argued that mental imagery is not an important component of proverb processing. It is likely that verbal processes are employed in the process of abstracting a schematic meaning. The image position is more consistent with the Image Base Hypothesis proposed in the current dissertation. Experiments 4 and 5 attempted to determine if verbal-articulatory processes or mental image processes were more important in proverb processing. These competing hypotheses were tested by asking the participants to engage in either a verbal or a visual distraction task while reading a proverb or a paraphrase of the figurative meaning of a proverb in context. It was argued that if proverb processing and visual memory processing use the same

mental resources, it would result in poorer memory of the proverb or poorer performance on the distraction task.

The results of Experiments 4 and 5 suggest that proverb processing competes for mental resources with the visual-spatial memory task and that paraphrase processing competes for resources with the verbal task. The verbal distraction task resulted in lower cued recall performance (Experiment 4) and somewhat poorer comprehension (Experiment 5) for the paraphrases. Reading proverbs resulted in poorer memory for the visual distraction patterns (Experiments 4 and 5). The visual distraction task resulted in a slower reading time (Experiment 5, but not Experiment 4). The aggregate analyses showed the pattern of double dissociation in both studies, but only in the item analysis (Experiments 4 and 5). Taken together these data suggest that proverbs require more visual spatial processing and paraphrases of a proverb's figurative meaning require more verbal processing; however, the findings are weak. Furthermore, these studies failed to find poorer comprehension for proverbs in the visual condition and thus the results must be interpreted with caution. The reading time findings (Experiment 5) indicates that the comprehension of proverbs used figuratively was affected by the visual task; however, a difference in comprehension would be the strongest indicator of interference with the comprehension processes. These findings are at odds with Honeck et al.'s (1987) argument

that the image is irrelevant to proverb comprehension. However, given the weakness of these findings the Conceptual Base Hypothesis is not strongly challenged. Of the theories discussed, the extended memory model is probably the most consistent with the findings from Experiments 4 and 5. Mental imagery may aid comprehension by providing additional memory resources, but may not be directly involved in comprehension. These ideas will be discussed in more detail below.

In summary, the findings indicate that literal meaning has a special status in proverb comprehension, a finding also consistent with a recent dissertation by Temple (1993). Furthermore these studies show a consistent pattern such that conventional meaning is processed even when contextually inappropriate. These studies have also demonstrated that the results of experiments using familiar figurative language cannot be generalized to unfamiliar figurative language. The results of these studies are consistent with a modified version of the standard pragmatic model. Finally, the general pattern of these data is consistent with the hypothesis that mental imagery plays a role in proverb comprehension; however, the findings are too weak to rule out alternative explanations. Some relevant theoretical contrasts are outlined below.

Mental Imagery

The pattern of results of Experiments 4 and 5 are in general consistent with the predictions of the Image Base Hypothesis, however, the findings are fairly weak and thus do not provide strong evidence in support of the Image Base Hypothesis. If mental imagery was an important aspect of comprehension then the results should have been much stronger and the visual task should have affected comprehension. Furthermore, there are a number of problems with interpreting these data: (1) if mental imagery is crucial to the comprehension processes then the visual task should have produced more interference than it did (i.e., slower reading time, poorer recognition, etc.), (2) the visual task should have produced poorer comprehension of the target proverbs than the verbal task, and (3) the visual task should have affected unfamiliar proverbs more than familiar proverbs. The first point is perhaps easy to explain: the distraction tasks may not have been hard enough to produce substantial effects. As evidence for this claim, the slight increase in difficulty in Experiment 5 produced somewhat stronger effects. Further increases may be needed in order to produce substantial interference between proverbs and the visual task. It should be noted however that the participants felt that both of the tasks were already quite difficult. Nonetheless a slight increase in difficulty may produce the predicted patterns of results.

The second problem is somewhat more difficult to explain away. The reading time findings from Experiment 5 do suggest that the visual task produced some comprehension difficulties. Participants did not show poor comprehension because they spent longer reading the target sentence to compensate for the interference. Nonetheless, reading time by itself does not indicate the nature of the processes involved and is therefore not an ideal measure of comprehension difficulty. The third point is difficult to explain away. Neither Experiment 4 nor 5 found any interaction of familiarity with distraction task on any of the dependent measures. It was hypothesized that both familiar and unfamiliar proverbs would cause poor recognition of the visual distraction patterns; however, it was also hypothesized that comprehension difficulties would only be found for the unfamiliar proverbs. The longer reading times found in Experiment 5 for proverbs in the visual condition were consistent across both familiar and unfamiliar proverbs. It may be the case that mental imagery plays an important role in the comprehension of even familiar proverbs or that the tasks are simply not difficult enough to produce a difference. Because of these difficulties in interpreting these data, a strong conclusion regarding the functional role of mental imagery cannot be drawn. All that can be said is that the image is processed when proverbs are interpreted literally and

figuratively. Little evidence was found that can demonstrate that the image serves a purpose. To show that the image serves a purpose, it would be important to show that a participant prevented from using imagery would have more difficulty processing the proverbs.

Working Memory as the Locus of Imagery Effects

The Image Base Hypothesis proposes that mental imagery plays an important role in proverb processing, but the findings of these studies produced no clear evidence that mental imagery is important to the comprehension process. Experiments 4 and 5 found weak evidence that mental imagery was processed during proverb comprehension, but did not find any evidence that mental imagery was important to proverb comprehension. Given the weakness of the results from Experiments 4 and 5 and the absence of any comprehension effect, the results are more consistent with the Extended Memory Hypothesis than with the Image Base Hypothesis. According to this model, the mental imagery from proverbs is used as a memory aid, but is not directly involved in comprehension. According to Baddeley (1986) working memory consists of a central executive, a verbal-articulatory loop, and a visual-spatial sketch pad (Baddeley, 1986). Language processing tends to rely mostly on the verbal-articulatory loop. It could be argued that the use of mental imagery during language processing allows the reader to hold more

information in working memory, thus expanding a person's language processing capacity. The frequently cited advantage of concrete over abstract words is consistent with this hypothesis (Paivio, 1986). Abstract and unfamiliar ideas cannot be easily imaged, and thus the processing of abstract and unfamiliar ideas may be limited to the use of the verbal-articulatory working memory. This would limit the efficiency of processing abstract and unfamiliar information and may lead to slower processing or greater loss of information when capacity limitations are reached (Klee & Eysenck, 1973). The use of proverbs, metaphors, and idioms may have evolved in order to make use of the additional working memory capacity available from the visual-spatial sketch pad.

In summary, the Image Base Hypothesis would predict a stronger visual-spatial interference effect then was found, the Conceptual Base Hypothesis would not predict any visual-spatial interference, and the Extended Memory Hypothesis would predict weak result mostly in the memory tasks. It is important to note however that this working memory resource model does not contradict the Conceptual Base Hypothesis (Honeck, et al., 1987), but provides an additional reason for using high-imagery proverbs. Proverbs may be useful communication aids because they allow both a conceptual base that helps people make sense of abstract ideas and an image that takes advantage of the additional mental resources

available from visual spatial working memory.

It could be argued that the effects that have been reported are related to the long term use of nonverbal memory (cf. Paivio, 1986), however the concurrent task were performed while the participant was reading the proverb and thus is it more likely that the locus of the imagery distraction effect is in working memory, rather than long term memory. However, if people process visual-spatial and verbal-articulatory information separately in working memory, then it is also likely that this distinction is also preserved in long term memory. Thus, a working memory and a long term explanation are not incompatible.

Future Directions for Research

The Role of Context

One unresolved issue is the role that context plays in figurative interpretation. It has been assumed in this experiment that context plays two interrelated roles. First, the inconsistency between the context and the target sentence makes the target sentence literally anomalous. This literal anomaly is an indication to the participant that the sentence is intended to be read figuratively (Searle, 1979). It has been shown that people are quite good at interpreting literally anomalous sentences and that people are more likely to interpret a literally anomalous sentence when they believe that the sentence is meaningful

(Kumpf et al., 1993). Second, the context sets up some kind of interpretive frame or schema that suggests to the reader how the sentence should be read (Ortony et al., 1978). These two roles are interrelated, but it may be possible to separate them.

A recent experiment by Kumpf et al., (1993), for example, has shown that simply telling participants that a literally anomalous sentence is meaningful, is sufficient to encourage more participants to attempt a non-literal interpretation of randomly created sentences. Furthermore, Reyna (1988) found that participants who read metaphors in pure blocks read them faster than participants who read metaphors in mixed blocks suggesting that the reader's expectations affect the way in which a participant will read a sentence. Other studies suggest that a context that provides information (i.e., an interpretive schema) that is related to the figurative meaning of a metaphor will encourage a participant to produce a figurative interpretation quickly (Ortony et al., 1978). Further, a context related to the figurative meaning makes it harder to classify sentences as literally meaningless (Gildea & Glucksberg, 1983). Although these studies emphasized the role of the interpretive schema, they did not remove reader expectation from their items.

Reader expectations and interpretative schemata are most likely both important aspects of figurative language

interpretation. To date there has been no experiment contrasting the relative importance of reader expectations and interpretive schema in determining the specific interpretation given a potential metaphor. A future experiment is needed in which reader expectations and contexts are orthogonally varied. For example, participants could be given a series of proverbs in contexts that were either helpful or unhelpful in interpreting the proverb. Prior to each context, the participant would be told to read the proverb literally or figuratively. The expectation cue could sometimes be consistent with the context and sometimes inconsistent with the hypothesis. After the proverb, the participant could be presented with probe words that could be either related to the figurative or the literal meaning of the proverb, or be unrelated to the proverb. Independent contributions of expectations and context to the reading time for the probe words could then be computed.

Familiarity

These studies have shown a variety of evidence suggesting that familiarity is an important factor in proverb comprehension. Familiar proverbs used figuratively are read as fast as familiar proverbs used literally (Experiments 1, 2, and and 4), and as fast as ordinary literal sentences such as the paraphrase control sentences

(Experiments 1 and 4). Familiar proverbs are recalled better than unfamiliar proverbs (Experiment 2). Familiar proverbs are successfully cued by contextually inappropriate figurative cues (Experiments 2, 3, and 4), but unfamiliar proverbs are not successfully cued by contextually inappropriate figurative cues. There were also some interesting similarities between familiar and unfamiliar proverbs. Both familiar proverbs and unfamiliar proverbs were successfully cued by literal cues (studies 2, 3, and 4). Both familiar and unfamiliar proverbs resulted in poorer performance on the secondary task (Experiment 4 and 5). These data suggest that the difference between familiar and unfamiliar proverbs is not in the processing of the literal meaning, but only in the degree to which the figurative meaning is conventional. For familiar proverbs both literal and the conventional figurative meanings are processed in an obligatory manner. However, for unfamiliar proverbs only the literal meaning is processed in an obligatory manner. The reader has to work out the figurative meaning based on the literal meaning and the context.

A second aspect of familiarity was examined in Experiment 3. In Experiment 3 participants were given modified proverbs that preserved the literal meaning and the underlying metaphoric vehicle of the proverb, but employed a different surface form of the sentence. Experiment 3

examined the extent to which the familiarity effects described in the previous paragraph (such as the equivalence in reading time and the successful cuing of proverbs by contextually inappropriate figurative meaning) are a result of familiarity with the surface form of the sentence or are related to the underlying metaphoric vehicle. The evidence from Experiment 3 suggests that the cued recall effect is related to the underlying metaphoric meaning of the sentence. Reading time differences between Experiment 2 and 3 however appear to be related mostly to the surface form (and partly to the underlying metaphoric vehicle). These data suggest that there are two components of familiarity of proverbs: underlying root metaphor and surface form. Further experiments are needed to determine the relative importance of surface form and underlying root metaphor in determining a proverb's familiarity. Also studies need to determine the boundary limits on how different a sentence can be from a proverb and still access the same underlying memory for the proverb.

A recent experiment by Glucksberg, Brown, and McGlone (1993) examined a related issue: are conceptual metaphors accessed during idiom comprehension? They found that participants preferred to read analogically coherent passages than incoherent passage, but failed to find any difference in reading time between the two. Glucksberg et al. (1993) interpret their findings to suggest that the

idiom's underlying conceptual system (e.g., Lakoff & Johnson, 1980b) is not automatically activated during reading. Their findings do not contradict the results of Experiment 3 from the current dissertation because the root metaphors described here do not refer to any underlying conceptual system but rather to the underlying vehicle referred to in the proverb. For example, in 16 and 17 heathy grass lawn is being used to represent better conditions that someone else has.

(16) The grass is always greener on the other side of the fence.

(17) Our neighbour's lawn always looks much healthier than our lawn.

In both the original (16) and modified proverb (17) the same topic and vehicle are being used; only the surface form of the sentence was altered. In other words, the analogical relationship that underlies the proverb was not manipulated, nor was an attempt made to extend the conceptual metaphor (cf. Lakoff and Johnson, 1980b). In conclusion, based on the finding reported in Experiment 3, it appears that familiarity consists of at least two components: surface form, and underlying metaphoric vehicle.

There may also be another kind of familiarity more related to our mental conceptual system (e.g., Lakoff & Johnson, 1980b). According to Lakoff and Johnson (1980b), metaphors play a key role in our conceptual system.

According to their theory, semantics is based on direct experience. Other concepts are understood through metaphoric extension of direct experience to novel and unfamiliar things. According to Lakoff (1987) mental imagery is a key component of comprehension. Gibbs and O'Brien (1990) have argued that these conceptual metaphors are an important part of idiom comprehension. However, Glucksberg et al. (1993) has provided evidence that suggests that this third type of familiarity does not contribute to reading time or comprehension. The findings from the present dissertation regarding the importance of literal meaning to proverb comprehension is consistent with Lakoff and Johnson's (1980b) view of metaphors, however, the weakness of the imagery interference results in Experiments 4 and 5 suggests that imagery plays only a minor part of proverb comprehension. Thus the results of the present experiment would appear to argue against the importance of conceptual metaphors.

There is also some question as to the existence of these underlying conceptual metaphors. Vervaeke and Kennedy (under review) argue that many instances of conceptual metaphors may simply be instances of multiple literal meanings. Furthermore, Vervaeke and Kennedy (under review) have shown that the conceptual metaphors identified by Lakoff and Johnson (1980) are much less consistent and far less systematic than would be predicted by the implicit

metaphor theory. For example they have shown that substituting a synonym for the metaphor vehicle often changes the meaning of the metaphor. Consider the metaphors in (18), (19) and (20) (borrowed from Vervaeke and Kennedy, under review).

(18 He attacked my argument.

(19) He conquered my argument.

(20) He invaded my argument.

Example (18) is supposed to be an example of the implicit conceptual metaphor ARGUMENT IS WAR. 'Conquered' and 'invaded' should tap into the same conceptual metaphor but (19) and (20) do not sound right. If metaphors were governed by underlying conceptual metaphors then any word that taps into the conceptual metaphor should work yielding a similar metaphoric meaning. The fact that some synonyms either change the meaning of the metaphor, or simply do not work as substitutes, suggests that the conceptual metaphor is not the key to understanding these metaphors. It may be that if (19) and (20) were used frequently they would become acceptable metaphors. If that were the case it would suggest that the reason for the existence of systematic metaphors is not because metaphors are motivated by some underlying conceptual metaphor, but rather that synonyms become acceptable extensions of particular metaphors through familiarity of usage. Thus new instances from a family of metaphors are extensions of individual metaphors rather than

extensions from an underlying conceptual metaphor. Metaphor families may have developed through numerous extensions from particular metaphors, and may in fact be instances of the second type of familiarity; familiarity of the vehicle. In summary, this third type of familiarity may not have any psychological importance and may not be a very accurate description of human metaphor processing. Nonetheless the importance of this third type of familiarity has not been fully explored because researchers have not yet tried to examined the processing of metaphors that are consistent with conceptual metaphors compared to metaphors that are not consistent with conceptual metaphors.

Literal Meaning and the Standard Pragmatic Model

The evidence from these studies has consistently shown the importance of literal meaning. Cues related to the literal meaning of the proverbs are more effective recall aids than cues related to the figurative meaning (Experiments 2, 3 and 4). A proverb's figurative meaning can be accessed through a literal paraphrase of the proverb (Experiment 3). Literal usage of a unfamiliar proverb results in a faster reading time than figurative usage for unfamiliar proverbs (Experiments 1, 2, 3 and 4). The question remains as to what extent the literal meaning is processed when a proverb is used figuratively and how exactly literal meaning is used during comprehension?

The present set of studies suggests that the literal meaning of proverbs is processed. Furthermore, the evidence provided in this dissertation supports a modified version of the Standard Pragmatic Model in which both literal meaning and conventional figurative meanings are processed in an obligatory manner. The figurative meaning of unfamiliar figurative language is not processed until the reader has determined that the literal and/or conventional meaning is inappropriate. According to this model if a person reads an unfamiliar proverb used figuratively, the literal and conventional meanings of words are activated in an obligatory manner. The reader then constructs the literal meaning of the sentence based on the literal meaning of the words. Upon finding the literal meaning inadequate the reader begins to look for the relationship between the context and the proverb, elaborates upon the proverbs meaning and tries to determine the intended use of the proverb. Proverbs usually provide a vivid picture of an event. This image may be stored in working memory to help the reader hold both the context and the proverb in mind at the same time. The reader extracts from the proverb a relationship that can then be applied to the context. For example the proverb in (21) might be elaborated to the more general truth expressed by (22).

(21) Too many cooks spoil the broth.

(22) Too many people making decisions is likely to lead

to problems.

The general truth (22) is a figurative interpretation of (21), but (21) is actually a example of this general truth. This meaning would then be applied to the context. Thus in proverb interpretation the literal meaning is not irrelevant, but is used to express a general truth.

In the preceding discussion a serial stage model is assumed. However, is the literal meaning of the entire sentence computed before the reader recognizes that the literal meaning is inappropriate or does this recognition occur prior to the complete interpretation of the sentence's literal meaning? It is likely that the stages are only partly serial. One possible account is that the reader begins to compute the sentence-level literal meaning, but that the literal meaning is abandoned before the reader constructs the full literal meaning. Readers are unlikely to complete a sentence-level literal interpretation if the literal meaning is not consistent with the context. Most likely, the figurative comprehension stage begins as soon as the reader has realized that the sentence is intended figuratively. If the reader was expecting a proverb, then the reader might initiate a search for the figurative meaning much sooner. What is important is that even under these circumstances the figurative interpretation of unfamiliar figurative language does not appear to be processed in an obligatory manner.

To determine the extent to which the sentence-level meaning is comprehended when it is contextually inappropriate, participants could be presented with proverbs in context. After the proverb is presented, a target word could be presented which would either be related to the word-level literal meaning, the sentence-level literal meaning or the figurative meaning of the proverb. Sentence-level targets would have to be found that are not directly associated with any individual word, but should only be primed if a person had interpreted the sentence. If the reader begins to interpret the sentence-level literal meaning before interpreting the figurative meaning then words that are related to the sentences level literal meaning should be primed by the proverb. If only the word-level literal meaning is processed in an obligatory manner, then the sentence-level targets should not be primed by the proverb. Furthermore, words related to the sentence-level figurative meaning of a proverb should not be primed unless the proverb is familiar or the context is figurative.

Generalizability

Another important issue that needs to be considered is the extent to which the primacy of literal meaning and of the contextually inappropriate arousal of conventional meaning found here with proverb stimuli, can be generalized to other forms of figurative language such as metaphors,

similes, idioms and metonymies. It could be argued that the inconsistency between the results found here and those reported in the literature (e.g., Ortony et al., 1978; Glucksberg et al., 1982) are simply due to the difference in the figure of speech under investigation. Proverbs may be processed in a more serial manner than metaphors. To some extent Experiment 3 was an attempt to address this issue. The results of Experiment 1 and 2 were replicated with sentences which conveyed the same figurative meaning, but had a different surface form. However, although these target sentences differed somewhat from the original proverbs, it could be argued that they were still proverb like.

There is some evidence that suggests that literal meaning is processed during the comprehension of other figures of speech. Gibbs (1980) has shown that literal cues were successful at accessing memory for idioms. Bolden and Turner (in preparation) have shown that a French idiom translated literally into English is read faster by bilinguals than by monolinguals. This finding suggests that an idiom from one language can be accessed through its literal meaning when presented in the other language. Glucksberg (1992) has argued that literal meaning plays an important role in idiom and metaphor comprehension. However the possibility remains that literal meaning is particularly important for proverb comprehension. Proverbs are for the

most part concrete situations that embody a general truth. That is, the conceptual basis for the abstract figurative meaning is based on a concrete specific instance. As such, the derivation of figurative meaning of novel proverbs may be dependent initially on induction from the literal instance as has been postulated by quite different theories of proverb understanding (see Honeck, Kibler, & Sugar, 1985; Lakoff & Turner, 1989). Literal meaning may play a crucial role in proverb comprehension, but may be of lesser importance in other figures of speech. Thus, the processing of specific figures of speech should be examined in detail so that similarities and differences between different figures of speech may be uncovered.

Finally, there is by now a growing body of evidence that familiarity is an important variable not just in the comprehension of proverbs, but in the comprehension of figurative language in general (Blank, 1988; Blasko & Connine, 1993; Bolden and Turner, in preparation; Geiger, 1994; Schweigert & Moates, 1988; Temple, 1993; Turner, 1989). The data from these studies are consistent with the proverb data in showing that familiarity is a crucial variable in the comprehension of figurative language. In summary, the findings on the issues of familiarity and the processing of literal meaning appear to be true for figurative language in general. However, more research is needed to determine the extent to which these proverb

findings can be replicated with other figures of speech.

Conclusion

In conclusion this dissertation has demonstrated that a proverb's literal meaning has some kind of special status. Furthermore, these experiments have shown that both the literal meaning and the conventional meaning of a proverb are processed in an obligatory manner. Finally, this dissertation has provided some weak evidence that imagery is processed during proverb comprehension; the functional role of this imagery however has yet to be determined. Directions for future research might include exploring the role of context, the nature of familiarity, the importance (if any) of imagery to proverb processing, and the generalizability of these findings to other figures of speech.

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APPENDIX A: List of Proverbs in Context, Used in Experiments 1, 2 and 3.

The following is a list of the proverbs and context paragraphs used in study 1, 2 and 3. The items were first written for Turner, 1989 and have only been modified slightly for the studies presented here.

On each page the first paragraph is the literal context and the second paragraph is the figurative context. The proverb and paraphrase are printed in the middle of the context where they would appear during the experiment. Participants in these studies would read either the proverb or the paraphrase, but not both. The proverb is always printed first, with its paraphrase is printed directly beneath it. They are separated
from the preceding and following context sentences by a space.

At the bottom of each page are listed the alternative versions of the target proverb, used in study 3.

Familiar Proverb #1

"As you make your bed, so you must lie in it."

Literal Context

"Mom, how come my bed is a mess, and there are no clean sheets?" asked a boy.
"I thought you were washing the laundry today."
"John, we've been through this before," replied his mother.
"You're nearly seventeen years old now."
"I'm not going to pick up after you any more."

"As you make your bed, so you must lie in it." (target proverb)
"Your bed is a mess because you haven't made it." (target paraphrase)

"I'll tell you what, if you put your laundry together in sorted piles."
"And take them down to the laundry room."
"I'll show you how to use the washing machine."

Figurative Context

"Suspended from the club for life! they can't do this to me," said a man.
"Why didn't you defend me on this matter."
"John, we've been through this before," replied his friend.
"You can't keep abusing your privileges"
"And expect to get away with it all the time."

"As you make your bed, so you must lie in it." (target proverb)
"If you misbehave you have to accept the consequences." (target paraphrase)

"I'll tell you what, if you wait a few months, until things have calmed down."
"I'll see if I can get your membership renewed."
"Maybe they'll accept you on a probationary basis."

Modified Proverbs used in Study 3
"You'll find your bed in whatever condition you left it."
"The condition of your bed, is your responsibility."

Familiar Proverb #2
"Man cannot live on bread alone."

Literal Context

"Son, what did you have for breakfast?" asked a father.
"I had some toast," replied his son.
"And I drank a glass full of juice."
"That's not enough nutrition," continued the father.

"Man cannot live on bread alone." (target proverb)
"A growing boy needs more than bread." (target paraphrase)

"You need something more substantial."
"I don't have time to eat anything else," replied the boy.
"How can you grow to be a man, without proper nutrition?"

Figurative Context

"My son, what did you do this Easter?" asked a priest.
"We ate turkey," replied a boy.
"Then my dad gave us chocolate eggs."
"That's not what Easter's all about," continued the priest.

"Man cannot live on bread alone." (target proverb)
"There is more to life than food." (target paraphrase)

"What about your spiritual life?"
"We didn't have time to go to church," replied the boy.
"How can you experience God if you're stuffing yourself?"

Modified Proverbs used in Study 3
"A growing boy needs more than bread."
"Just bread, is not a balanced meal."

Familiar Proverb # 3
"Lightning never strikes the same place twice."

Literal Context

"Let's take shelter from the rain under this broken tree", said Ann
"But it's dangerous to hide under a tree during a storm", replied George.
"Look, the tree has been hit once already."
"Don't worry, we'll be alright," she assured him.

"Lightning never strikes the same place twice." (target proverb)
"The same tree won't get struck more than once." (target paraphrase)

"How can you be certain," he asked.
"Its true, once the energy dissipates, it takes a while to rebuild."
"Who told you that?", he asked.
"I don't know, I read it somewhere," she replied.

Figurative Context

"What you need now is an investment to shelter your profit", said Ann.
"But it's a been a volatile market since the crash",replied George.
"Look, I lost a lot of money last year."
"Don't worry, you'll be alright," she assured him.

"Lightning never strikes the same place twice." (target proverb)
"There won't be another market crash for a while." (target paraphrase)

"How can you be certain," he asked.
"Its true, the market goes in cycles; it won't crash again for years."
"Who told you that," he asked.
"I don't know, I read it somewhere," she replied.

Modified Proverbs used in Study 3
"The same tree won't get struck more than once."
"This tree won't get hit by lightning again."

Familiar Proverb #4
"I bang my head against a brick wall."

Literal Context
"I have a very small apartment," said a young man.
"I want to make the room comfortable."
"But there are so many obstacles in my room."
"I have a bare wall beside my bed."
"Everytime I try to get up in the morning."

"I bang my head against a brick wall." (target proverb)
"I bump my head into the wall." (target paraphrase)

"I had to go to the hospital for stitches last week."
"I still have a bad headache."
"I'm hoping to get a bigger apartment but they're hard to find."
"Meanwhile I guess I'll just have to suffer."

Figurative Context

"I have a very small office," said a young man.
"I want to make it big in this business."
"But my boss doesn't seem to like me."
"He never compliments or praises my work."
"Everytime I try to get up in the world."

"I bang my head against a brick wall." (target proverb)
"My attempts fail and I get nowhere." (target paraphrase)

"I had to work overtime every night last week."
"But, I'm barely keeping up."
"I'm hoping to get a better job, but they're hard to find."
"Meanwhile I guess I'll just have to suffer."

<u>Modified Proverbs used in Study 3</u>
"I injure my head by hitting the wall."
"A brick wall keeps getting in my way."

Familiar Proverb #5
"The grass is always greener on the other side of the fence."

Literal Context

"Our neighbour's at it again, this time adding fertilizer," observed a man.
"The amount of effort he puts into lawn care astonishes me."
"If he's not mowing, he's pulling the weeds or spraying for bugs."
"It's incredible, he must spend a fortune on his lawn."
"I ask you, is it worth it?"
"I don't know dear", replied his wife, "but you must admit,"

"The grass is always greener on the other side of the fence." (target proverb)
"Our neighbour's lawn always looks much healthier than our lawn." (target paraphrase)

"I don't understand why he wastes his time with the lawn," continued the man.
"I'm happy with our simple lawn, and I have time to enjoy it."
"Are you really sure you're proud of your garden?" replied his wife.

Figurative Context

"Our neighbour's at it again, showing off his new sports car," observed a man.
"The amount he spends on frivolous things astonishes me."
"If its not cars, he's buying a yacht, or building an extension."
"It's incredible, he must spend a fortune on things."
"I ask you, is it worth it?"
"I don't know dear," replied his wife, "but you must admit"

"The grass is always greener on the other side of the fence." (target proverb)
"What other people have always seems better than what you have." (target paraphrase)

"I don't understand why he works overtime just to show off," continued the man.
"I'm happy with our simple home, and I have time to enjoy it."
"Are you really sure you're proud of what you have?" replied his wife.

<u>Modified Proverbs used in Study 3</u>
"Our neighbour's lawn always looks much healthier than our lawn."
"Neighbours often seem to have greener lawns."

Familiar Proverb #6

"Don't count your chickens before they hatch."

Literal Context

"Honey, I think this time we'll be successful."
"Soon we'll have a large flock of chickens."
"I was just checking on the hens this morning."
"Five more of the breeding hens have laid eggs."

"Don't count your chickens before they hatch," replied his wife. (target proverb)
"Don't assume that all the eggs will hatch," replied his wife. (target paraphrase)

"Some of those eggs might be infertile." (target proverb)
"We won't know for certain until the chicks are born."

Figurative Context

"Honey, I think this time we'll be successful."
"Soon we'll have a secure source of income."
"I've re-read the projected sales figures for this year."
"We'll make five times the profits I originally thought."

"Don't count your chickens before they hatch," replied his wife. (target proverb)
"Don't presume success before you're certain," replied his wife. (target paraphrase)

"Many a good business idea has gone nowhere"
"We won't know for certain for at least a couple of months."

<u>Modified Proverbs used in Study 3</u>
"Don't assume that all the eggs will hatch," replied his wife.
"We won't know how many chicks we'll have until they hatch," replied his wife.

Familiar Proverb #7

"It never rains, but it pours."

Literal Context

"I don't mind a little rain."
"It keeps the fields green."
"But, this year has been very erratic."
"Most of the summer has been so dry, few crops have survived."
"Now the surviving crops have been swamped."

"It never rains, but it pours." (target proverb)
"For months a drought, now a flood." (target paraphrase)

"We can't seem to get the right weather."
"Either not enough, or too much water."
"I doubt it could get much worse."
"Perhaps next year will be better."

Figurative Context

"The small problems I can handle."
"They can make life interesting."
"But, this year has been very erratic."
"Most of the summer has been so boring, with nothing to do."
"Now everything is falling apart."

"It never rains, but it pours." (target proverb)
"Things go wrong, at the same time." (target paraphrase)

"I can't seem to get an even flow of problems."
"Either nothing, or everything goes wrong."
"I doubt it could get much worse."
"Perhaps next year will be better."

<u>Modified Proverbs used in Study 3</u>
"Its been very dry, but now its pouring."
"We never get showers, but we get storms."

Familiar Proverb #8

"Don't put all your eggs in one basket."

Literal Context

"Could you take these eggs to the store?" asked the farmer's wife.
"Alright mother, I'll get a basket to carry them in," replied her daughter.
"Pack the eggs very carefully," continued the mother.

"Don't put all your eggs in one basket." (target proverb)
"Don't carry them all in one bag." (target paraphrase)

"Once, because I didn't pack them properly the whole basket of eggs broke."
"You must separate them so they won't bang against each other."
"If the eggs touch each other in the basket they might break."
"We can't afford to lose any eggs."

Figurative Context

"You should put your money in the bank," said the farmer's wife.
"Alright mother, I'll probably open an account," replied her daughter.
"Choose your bank carefully," continued the mother.

"Don't put all your eggs in one basket." (target proverb)
"Don't put all your savings into one account"
(target paraphrase)

"In 1929 your granddaddy nearly lost the farm because a bank closed."
"You should put your money into several accounts."
"If you only invest in one bank, you could lose it all."
"You can't afford to lose any money."

<u>Modified Proverbs used in Study 3</u>
"Its best not to pack all the eggs together."
"Make sure you leave plenty of space between each egg."

Familiar Proverb #9
"You can't get blood from a stone."

Literal Context

"Daddy, last week when I cut my finger, blood came out," said a young boy.
"I just broke a rock in half."
"How come the rock didn't bleed?"
"Only living things like animals, can bleed," replied his father.

"You can't get blood from a stone." (target proverb)
"Stone's don't contain any blood." (target paraphrase)

"Rocks and stones are simply not living things."
"Do plants and trees have blood?" asked the boy.
"Instead of blood, trees have sap, like maple syrup," continued the father.

Figurative Context

"We've asked almost everyone to buy girlguide cookies," said a girlguide.
"We still haven't sold enough."
"I think we should try at the brick house."
"You mean the Harlow's, he won't give anything," said her counsellor."

"You can't get blood from a stone." (target proverb)
"Some people aren't generous." (target paraphrase)

"That old miser never gives anything."
"But won't he give for charity?" asked the girl.
"Once we tried to sell him cookies, he slammed the door," said the counsellor.

<u>Modified Proverbs used in Study 3</u>
"Stones don't contain any blood."
"Rocks won't give any blood."

Familiar Proverb #10

"We're not out of the woods yet."

Literal Context

"We've been hiking through this forest all day."
"I think its about time we went home," said a weary hiker.
"How can we, we're in the middle of the park," replied his companion.

"We're not out of the woods yet." (target proverb)
"We're still in this large forest." (target paraphrase)

"Once we reach the clearing, the journey will go much faster."
"Couldn't we cut through the trees and head straight home," said the hiker.
"That's impossible, we've got to stay on this path," continued the companion.
"If we take a short cut we could get lost."

Figurative Context

"We've been working on this problem all day."
"I think its about time we gave up," said a stock broker.

"How can we, we're still being investigated," replied his co-worker.

"We're not out of the woods yet." (target proverb)
"We could still be in a lot of trouble." (target paraphrase)

"Once we've set up a false account, we can hide the transactions."
"Couldn't we erase the file and remove all record of it," said the broker.
"That's impossible, we've got to disguise it somehow," continued the co-worker.
"If this story gets out it could mean prison."

<u>Modified Proverbs used in Study 3</u>
"We're still surrounded by trees."
"We are not in a clearing yet."

Familiar Proverb # 11

"You can lead a horse to water but you can't make it drink."

Literal Context

"I'm worried about the grey mare," said the stable boy.
"I groomed her, and gave her fresh bedding and water,"
"But she hasn't drunk yet."
"Don't worry, animals know when they need water," replied the trainer.

"You can lead a horse to water but you can't make it drink." (target proverb)
"You can give the horse water, but you can't force her to drink." (target paraphrase)

"She'll drink when she wants to."
"I think we should call a veterinarian," continued the stable boy.
"She must be thirsty, all the other horses drank water."
"And she's been practicing on the race track all day."

Figurative Context

"I'm worried about my students," said the english professor.
"I've opened up the greatest works of literature for them."
"But no one seems to care."
"Don't worry, some student's will learn from you," replied the dean.

"You can lead a horse to water but you can't make it drink." (target proverb)
"You can offer them knowledge but you can't make them learn." (target paraphrase)

"They learn what they want to."
"I think we should call a faculty meeting," continued the professor.
"This is unusual, in past years some students were eager."
"None of them have shown any interest at all."

<u>Modified Proverbs used in Study 3</u>
"A horse won't drink if it doesn't want to."
"You can't force a horse to drink if it isn't thirsty."

Familiar Proverb # 12

"There are plenty of fish in the sea."

Literal Context

"I thought I'd hooked a big one," said a fisherman.
"It was a huge, beautiful salmon."
"I wrestled with it for over an hour."
"But the line broke and it swam away."
"Well, don't worry about it," said a second fisherman.

"There are plenty of fish in the sea." (target proverb)
"The ocean is filled with salmon." (target paraphrase)

"Try again, I've lost a few big ones before."
"That's what makes the sport exciting."
"If fishing was easy, it would be boring."

Figurative Context

"I thought I'd found my true love," said a teenage girl.
"He was so handsome, and smart too."
"We've been dating for two whole months."
"But we broke up, he's found someone else."
"Well don't worry about it," said second teenage girl.

"There are plenty of fish in the sea." (target proverb)
"There are a lot of great guys out there."
(target paraphrase)

"Try again, I've broken up with guys before."
"You'll get over it, that's how you learn."
"Without heartbreaks, romance would get boring."

<u>Modified Proverbs used in Study 3</u>
"The sea has many salmon."
"In the sea, the fish are everywhere."

Unfamiliar Proverb # 1
"There are no birds in last years nest."
Literal Context

"Hello, welcome to Yellowstone National Park," said a ranger.
"Daddy, can we see the eagle's nest today," said a young boy.
"I'm sorry, I hope you won't be too disappointed," said the ranger.

"There are no birds in last years nest." (target proverb)
"The eagles have abandoned that nest." (target paraphrase)

"Oh, and the children have waited all year to see it again," said the father.
"I thought eagles always mated for life?"
"Yes, and they return to the same nest year after year," said the ranger.
"Generation, after generation, each adding material to the nest."
"But they haven't returned this year, and we're not sure why."

Figurative Context

"John, is that you? Wow! Its so great to see you again," said a friend
"How long has it been? You know, back then, I thought I had it all."
"I had a house, a car, a good job, and a perfect wife, but it's all gone."

"There are no birds in last years nest." (target proverb)
"Everything has changed since we last met."
(target paraphrase)

"What happened? You always seemed to have an ideal marriage," said John.
"You were always so happy together."
"My wife left me, because I wasn't doing enough housework," said the man.
"Now I have to sell the house because I can't pay the mortgage and alimony."
"Five years of marriage wasted because I wouldn't wash the dishes."

<u>Modified Proverbs used in Study 3</u>
"The eagles have abandoned that nest."
"The birds have not returned this year."

Unfamiliar Proverb # 2
Raw leather will stretch."

Literal Context

"The secret to making a good shoe is to use fresh leather."
"You need to buy it when it's new and soft."

"Raw leather will stretch." (target proverb)
"New leather is easier to shape." (target paraphrase)

"You mould it into the form of a shoe while its new."
"When it hardens it forms a strong and smooth exterior."
"If you do it right, there will be no wrinkles."

Figurative Context

"The secret to raising children is to train them from day one."
"You need to start training before bad habits form."

"Raw leather will stretch." (target proverb)
"Young children are easily trained." (target paraphrase)

"You mould the children when they're young."
"When they mature they will be well mannered adults."
"If you do it right, they will love and respect you."

<u>Modified Proverbs used in Study 3</u>
"New leather is easier to shape."
"Untanned leather is stretchable."

Unfamiliar Proverb # 3
"But, while the grass grows, the horse lies dying."

Literal Context

"You haven't heard, we've had a drought all summer."
"All the crops failed and the grass turned brown and died."
"Now that the summer's over, it's started to rain again."

"But, while the grass grows, the horse lies dying." (target proverb)
"But, while we now have food, the horse won't eat."
(target paraphrase)

"It's very weak, but now refuses to eat."
"Many of the other animals have already died."
"I guess the horse doesn't have the strength to eat."
"We might even have to put it to sleep."

Figurative Context

"You haven't heard, my uncle's gone insane."
"He always wanted to be a famous artist."
"After years of failure, now he's won critical acclaim."

"But, while the grass grows, the horse lies dying." (target proverb)
"His dreams came true, but perhaps its too late."
(target paraphrase)

"He refuses to go near a paint brush."
"He's shut himself off from the world and won't talk to us."
"We can't even tell him about his triumph."
"I guess the stress finally got to him."

<u>Modified Proverbs used in Study 3</u>
"Even though there is now food, the horse is still starving."
"The horse is still not eating even though the drought is over."

Unfamiliar Proverb # 4

"A creaking door hangs longest."

Literal Context

"That door makes an awful squeak, maybe I should fix it," said a man.
"You don't need to fix the door," replied his aging mother.
"The squeaking hinges aren't all that bad."
"Besides if it isn't broken, why should you fix it."

"A creaking door hangs longest." (target proverb)
"Squeaking doors can last for years." (target paraphrase)

"This door will be fine for many years."
"Are you sure the noise won't bother you?" asked the son.
"I think that I can put up with a little noise," continued the mother.
"At least I know when someone enters the room."

Figurative Context

"That's an awful sneeze, maybe you should see a doctor," said a man.
"It's just a touch of hayfever," replied his aging mother.
"These allergies aren't all that bad."
"Besides, a little sneeze won't kill me, so why worry."

"A creaking door hangs longest." (target proverb)
"The weak can live to an old age." (target paraphrase)

"I'll be around for many years to come."
"Are you sure you don't want allergy shots?" asked the son.
"I think that I can put up with a little discomfort," continued the mother.
"It's inconvenient but otherwise my health is good."

<u>Modified Proverbs used in Study 3</u>
"Squeaking doors last for years."
"A door that squeaks, last for years."

Unfamiliar Proverb #5

"Hard rocks are hollowed out by soft water."

Literal Context

"The cliff is being gradually undermined," explained the tour guide.
"Over to your left is a beautiful example of a sea cave."
"The caves begin as small cracks, or soft areas in the rock."
These gradually widen until the top collapses."
"Sir, what causes all this erosion?" a boy asked.

"Hard rocks are hollowed out by soft water," explained the tour guide. (target proverb)
"The sea water erodes the granite cliffs," explained the tour guide. (target paraphrase)

"The ocean waves wear away the rock."
"The water picks up particles of sand and flings them against the cliff."
"Pebbles lodged in cracks are ground into the rock."
"It is the energy of the waves that creates these beautiful sea caves."

Figurative Context

"Persuading a judge must be done discretely," explained the lawyer.
"He's a stubborn man and convincing him won't be easy."
"I'll begin by finding a weakness, or soft spot in his views."
"Gradually win him over to our point of view."
"But, how can we get him to give in?" the client asked.

"Hard rocks are hollowed out by soft water," explained the lawyer. (target proverb)
"Gentle words will change stubborn men," explained the lawyer. (target paraphrase)

"We must avoid a confrontation."
"Instead we'll reason with him, perhaps using a little flattery."
"And make him think it was his own idea."
"I'll persist until he agrees that this is the correct course of action."

<u>Modified Proverbs used in Study 3</u>
"Water causes the erosion of hard rocks,"
"Soft water wears away solid rock,"

Unfamiliar Proverb # 6
"Straight trees have crooked roots."

Literal Context

"This is a valuable tree, we have to dig it up and transplant it."
"It's tall and slender so it must have extensive roots," said the landscaper.
"How extensive do you think th. roots system is?" asked his assistant.
"It's hard to say, for this family of plants," replied the landscaper.

"Straight trees have crooked roots." (target proverb)
"The roots are twisted in all directions."
(target paraphrase)

"Perhaps two meters deep, but they might be spread out in all directions."
"Alright, we'll start digging around its base," replied the assistant.
"Dig carefully, I want the entire root system," continued the landscaper.
"That way the tree is most likely to survive."

Figurative Context

"It is essential that we dig up some kind of corruption connected with him."
"He looks clean but there must be something in his past," said the Senator.
"I can't find anything at all that indicates dishonesty," replied a clerk.
"What about his family, anything there we can use?" asked the Senator.

"Straight trees have crooked roots." (target proverb)
"Honest men might have corrupt backgrounds."
(target paraphrase)

"Perhaps a mafia connection through some friend or distant relative?"
"Negative, his family and friends are clean as well," replied the clerk.
"Keep looking for something we can use against him," continued the Senator.
"If he gets into office we'll all be out of a job."

<u>Modified Proverbs used in Study 3</u>
"Twisted roots hold up straight trees."
"The tree is straight but the roots are bent."

Unfamiliar Proverb # 7
"Blue are the faraway hills."

Literal Context

"Creating an illusion of depth is essential in art," said the art teacher.
"There are a number of methods of achieving this illusion.
"For example, trees near you are dark green, while distant trees are lighter."

"Blue are the faraway hills." (target proverb)
"Distant hills have a bluish tone." (target paraphrase)

"To make objects look far away, you have to subdue the colours."
"Add a small amount of the complimentary colour and some light blue paint."
"The complimentary colour for green, is of course red."
"Mix a little red and blue into the green paint and a tree look miles away."

Figurative Context

"Father you're deceiving yourself, there were no good old days," said a man.
"Everyone remembers good times better than bad times."
"You've forgotten the hard times you suffered through during the depression."

"Blue are the faraway hills." (target proverb)
"The past always seems better." (target paraphrase)

"But, people haven't changed, the world's pretty much the same."
"There were wars and famine and poverty then and we still have these problems."
"Today's young will look back at the present as a golden age."
"So don't go on about how wonderful everything was because it's not true."

<u>Modified Proverbs used in Study 3</u>
"Distant hills have a bluish tone."
"From far off, hills look blue."

Unfamiliar Proverb # 8
"White silver draws black lines."

Literal Context

"Here we are, ship wrecked on a island with nothing to do," said a castaway.
"It would be perfect, if only I had saved some pens and paper from the ship."
"I'm a writer, but I've nothing to write with."
"Why don't you improvise, and make your own writing material," said a friend.

"White silver draws black lines." (target proverb)
"Pure silver makes black marks." (target paraphrase)

"You could use that silver coin you found, as a pencil."
"And you could strip the bark off trees to use as writing paper."
"That's silly, where will I store a pile of bark manuscripts," said the writer.
"At least you'd be writing, rather than complaining about the island," replied his friend

Figurative Context

"Mom, you're wrong about my boyfriend, he's not using me," said a teenage girl.
"Our relationship is based on a real understanding of each other."
"Besides I'm seventeen and I can do what I want."
"People are not always what they appear to be," said her anxious mother.

"White silver draws black lines." (target proverb)
"Be a little suspicious of his actions." (target paraphrase)

"You can never completely know another person."
"He's nice to you but he might have an ulterior motive."
"Don't be silly, he's not like that, and we love each other," said the daughter.
"At least get to know him a little more, before becoming serious," replied her mother.

<u>Modified Proverbs used in Study 3</u>
"Black marks can be made using silver."
"Shiny silver leaves black streaks."

Unfamiliar Proverb # 9
"A river needs a spring"

Literal Context

"It will be a mighty river when it reaches the sea."
"But it starts out as a tiny trickle of water."
"Run off water from thunder showers adds greatly to the volume of water."
"But a river needs a constant supply of water, even during dry summers."

"A river needs a spring" (target proverb)
"Streams begin with a spring." (target paraphrase)

"Some rain water soaks into the ground."
"This ground water feeds trees and keeps fields green."
"Some of this underground water oozes out of hillsides."
"It is this spring water that keeps rivers flowing all year."

Figurative Context

"You are an important and powerful man today."
"But you should never forget your family."
"The friends you have made during your rise to power have helped greatly."
"But you must remember those that have nourished you since birth."

"A river needs a spring" (target proverb)
"Everyone needs their family." (target paraphrase)

"They will love you and believe in you."
"Never questioning your motives, or your beliefs."
"Always supporting you, when everyone abandons you."
"It is your family that will be there when you need them."

<u>Modified Proverbs used in Study 3</u>
"Streams begin with a spring."
"A spring is the start of all rivers."

Unfamiliar Proverb # 10

"An empty sack cannot stand upright."

Literal Context

"Come here and hold this bag open," said a worker.
"I'm too busy to help right now," said his co-worker.
"How am I supposed to do my job without your help,"continued the first man.

"An empty sack cannot stand upright." (target proverb)
"A bag won't stay open by itself." (target paraphrase)

"I can't put leaves into it and hold it open at the same time."
"We've got a lot of work to do this afternoon."
"Unless I get some co-operation we'll be here all week."

Figurative Context

"Come here and eat your lunch," said a worker.
"I'm too busy to eat right now," said his co-worker.
"How are you going to do your job without food,"continued the first man.

"An empty sack cannot stand upright." (target proverb)
"A hungry worker can't do his job." (target paraphrase)

"You can't work this hard all day without a good meal."
"We've got a lot of work to do this afternoon."
"You'll need all your energy or we'll be here all week."

<u>Modified Proverbs used in Study 3</u>
"An unfilled sack will fall over."
"A sack that is empty cannot stand up."

Unfamiliar Proverb # 11

A straight stick looks crooked in the water."

Literal Context

"Watch it, we're going to hit that rock," said a man.
"Relax, the water's deep enough for this canoe," replied his friend.
"The rock just looks close to the surface."
"Refraction makes everything in the water seem distorted."

"A straight stick looks crooked in the water." (target proverb)
"Water will make a straight stick appear bent."
(target paraphrase)

"Refraction or not, I don't want to canoe over a rock,"said the man.
"There's no way, we're going to hit that rock,"continued the friend.
"It must be eight or nine feet below the surface."

Figurative Context

"Why are you withdrawing from the election?" asked a friend.
"My brother and Uncle were arrested for fraud," replied the candidate.
"Everyone has now turned against me."
"The public assumes that I'm also involved in this scandle."

"A straight stick looks crooked in the water." (target proverb)
"It's a case of guilt by association." (target paraphrase)

"You should stand up and loudly proclaim your innocence," suggested the friend .
"It's not as easy as you think," continued the candidate.
"I've lost their trust, it will be hard to regain it."

<u>Modified Proverbs used in Study 3</u>
"Water will make a straight stick appear bent."
"Under the water, a stick looks bent."

Unfamiliar Proverb # 12
"Empty bottles make the most sound."

Literal Context

"In this music school we start music education with the basics."
"We want future musicians to know their instruments intuitively."
"Rather than teaching music on conventional instruments,"
"We'll teach you to make music with tin cans, jugs and other scraps."

"Empty bottles make the most sound." (target proverb)
"Hollow jugs make the loudest noise." (target paraphrase)

"If you fill it with various amounts of water you can make different tones."
"A row of partly filled bottles becomes a xylophone."
"That's the type of instrument you'll be working with this year."

Figurative Context

"In this factory we listen to all the suggestions from our workers."
"We want the employees to feel like they are members of a team ."
"Unfortunately it's not the guys with good ideas that speak up."
"More often it's trouble makers who waste our time with complaints."

"Empty bottles make the most sound." (target proverb)
"Those without ideas talk the most." (target paraphrase)

"Some of their suggestions are simply absurd, few are practical."
"Yet they talk as if no one in management can think, or plan."
"They seem to believe that complaining will lead to promotion."

<u>Modified Proverbs used in Study 3</u>
"If a bottle is empty, it makes a louder sound."
"You get more sound from a hollow jug"

APPENDIX B: List of Cues Used in Experiments 2, 3 & 4

Listed below are the recall cues used in study 2, 3 and 4. The literal cues are related to the literal meaning of the proverb. The figurative cues are related to the figurative meaning of the proverb (i.e., they are not actually figures of speech, but are related to the figurative meaning). The numbers correspond to the items numbers given in Appendix A and C, for familiar and unfamiliar proverbs.

Familiar Proverbs

1 Literal Cue
changing the linen
Figurative Cue
accepting the consequences

2 Literal Cue
you need more nutrition
Figurative Cue
you need a spiritual life

3 Literal Cue
the flow of electricity
Figurative Cue
catastrophes are rare

4 Literal Cue
self inflicted injury
Figurative Cue
constant frustration

5 Literal Cue
fertilized field
Figurative Cue
envy of other

6 Literal Cue
baby birds
Figurative Cue
visions of success

7 Literal Cue
droughts and floods
Figurative Cue
multiple troubles

8 Literal Cue
crowded containers
Figurative Cue
spreading out the risk

9 Literal Cue
property of minerals
Figurative Cue
being stingy

10 Literal Cue
inside a forest
Figurative Cue
still at risk

11 Literal Cue
may not be thirsty
Figurative Cue
may be stubborn

12 Literal Cue
the ocean is filled
Figurative Cue
there are other lovers

Unfamiliar Proverbs
1 Literal Cue
built of straw and feathers
Figurative Cue
the circumstances have altered

2 Literal Cue
making shoes
Figurative Cue
training children

3 Literal Cue
starvation could be avoided
Figurative Cue
help will come too late

4 Literal Cue
hinges need oil
Figurative Cue
weak but enduring

5 Literal Cue
mountains washed away by rivers
Figurative Cue
flattery works better than threats

6 Literal Cue
they support the plant
Figurative Cue
corruption in background

7 Literal Cue
haze in distance
Figurative Cue
good old days

8 Literal Cue
precious metal
Figurative Cue
deceptive appearance

9 Literal Cue
source of a stream
Figurative Cue
everyone has a family

10 Literal Cue
a bag needs to be held open
Figurative Cue
one can't work without eating

11 Literal Cue
refraction of light
Figurative Cue
guilt by association.

12 Literal Cue
makes a loud noise
Figurative Cue
are without ideas

APPENDIX C: List of Proverbs in Context Used in Experiments 4 and 5.

On the following pages is a complete list of the items used in study 4 and study 5. These passages are essentially identical to those used in study 1, 2 and 3, but the target sentence has been placed at the end of the passage in order to simplify the design. The simplified passages were necessary because of the inclusion of the distraction patterns in study 4 and 5.

FAMILIAR PROVERB ITEM # 1

LITERAL PASSAGE
'Mom, how come my bed is a mess, and there are no clean sheets?' asked a boy.
'I thought you were washing the laundry today.'
'John, we've been through this before,' replied his mother.
'You're nearly seventeen years old now.'
'I'm not going to pick up after you any more.'
PROVERB
'As you make your bed, so you must lie in it.'
PARAPHRASE
'Your bed is a mess because you haven't made it.'

FIGURATIVE PASSAGE

'Suspended from the club for life! they can't do this to me,' said a man.
'Why didn't you defend me on this matter.'
'John, we've been through this before,' replied his friend.
'You can't keep abusing your privileges'
'And expect to get away with it all the time.'
PROVERB
'As you make your bed, so you must lie in it.'
PARAPHRASE
'If you misbehave you have to accept the consequences.'

TEST PHRASES USED IN STUDY 5
TRUE
accepting responsibility
FALSE
envy of others

FAMILIAR PROVERB ITEM # 2

LITERAL PASSAGE
'Son, what did you have for breakfast?' asked a father.
'I had some toast,' replied his son.
'And I drank a glass full of juice.'
'That's not enough nutrition,' continued the father.
'You need something more substantial.'
PROVERB
'Man cannot live on bread alone.'
PARAPHRASE
'A growing boy needs more than bread.'

FIGURATIVE PASSAGE
'My son, what did you do this Easter?' asked a priest.
'We ate turkey,' replied a boy.
'Then my dad gave us chocolate eggs.'
'That's not what Easter's all about,' continued the priest.
'What about your spiritual life?'
PROVERB
'Man cannot live on bread alone.'
PARAPHRASE
'There is more to life than food.'

TEST PHRASES USED IN STUDY 5
TRUE
need a spiritual life
FALSE
accepting responsibility

FAMILIAR PROVERB ITEM # 3

LITERAL PASSAGE

'Let's take shelter from the rain under this broken tree', said Ann
'But it's dangerous to hide under a tree during a storm', replied George.
'Look, the tree has been hit once already.'
'Don't worry, we'll be alright,' she assured him.
PROVERB
'Lightning never strikes the same place twice.'
PARAPHRASE
'The same tree won't get struck more than once.'

FIGURATIVE PASSAGE

'What you need now is an investment to shelter your profit', said Ann.
'But it's a been a volatile market since the crash', replied George.
'Look, I lost a lot of money last year.'
'Don't worry, you'll be alright,' she assured him.
PROVERB
'Lightning never strikes the same place twice.'
PARAPHRASE
'There won't be another market crash for a while.'

TEST PHRASES USED IN STUDY 5
TRUE
catastrophes are rare
FALSE
may be stubborn

FAMILIAR PROVERB ITEM # 4

LITERAL PASSAGE

'I have a very small apartment,' said a young man.
'I want to make the room comfortable.'
'But there are so many obstacles in my room.'
'For example I have a bare wall beside my bed.'
'Everytime I try to get up in the morning.'

PROVERB
'I bang my head against a brick wall.'
PARAPHRASE
'I bump my head into the wall.'

FIGURATIVE PASSAGE
'I have a very small office,' said a young man.
'I want to make it big in this business.'
'But my boss doesn't seem to like me.'
'For example he never compliments or praises my work.'
'Everytime I try to get up in the world.'
PROVERB
'I bang my head against a brick wall.'
PARAPHRASE
'My attempts fail and I get nowhere.'

TEST PHRASES USED IN STUDY 5
TRUE
constant frustration
FALSE
flattery and persuasion

FAMILIAR PROVERB ITEM # 5

LITERAL PASSAGE

'Our neighbour's at it again, this time adding fertilizer,' observed a man.
'The amount of effort he puts into lawn care astonishes me.'
'If he's not mowing, he's pulling the weeds or spraying for bugs.'
'It's incredible, he must spend a fortune on his lawn.'
'I ask you, is it worth it?'
'I don't know dear', replied his wife, 'but you must admit,'
PROVERB
'The grass is always greener on the other side of the fence.'
PARAPHRASE
'Our neighbour's lawn always looks much healthier than our lawn.'

FIGURATIVE PASSAGE
'Our neighbour's at it again, showing off his new sports car,' observed a man.
'The amount he spends on frivolous things astonishes me.'
'If its not cars, he's buying a yacht, or building an extension.'
'It's incredible, he must spend a fortune on things.'
'I ask you, is it worth it?'
'I don't know dear,' replied his wife, 'but you must admit'
PROVERB
'The grass is always greener on the other side of the fence.'
PARAPHRASE
'What other people have always seems better than what you have.'

TEST PHRASES USED IN STUDY 5
TRUE
envy of others
FALSE
spreading out the risk

FAMILIAR PROVERB ITEM # 6

LITERAL PASSAGE
'Honey, I think this time we'll be successful.'
'Soon we'll have a large flock of chickens.'
'I was just checking on the hens this morning.'
'Five more of the breeding hens have laid eggs.'
'Some of the eggs might not be fertile,' replied his wife.
PROVERB
'Don't count your chickens before they hatch,' replied his wife.
PARAPHRASE
'Don't assume that all the eggs will hatch,' replied his wife.

FIGURATIVE PASSAGE
'Honey, I think this time we'll be successful.'
'Soon we'll have a secure source of income.'
'I've re-read the projected sales figures for this year.'
'We'll make five times the profits I originally thought.'
'Many a good business idea has gone nowhere, replied his wife.
PROVERB
'Don't count your chickens before they hatch'.
PARAPHRASE
'Don't anticipate too much before you're certain'.

TEST PHRASES USED IN STUDY 5
TRUE
visions of success
FALSE
deceptive appearance

FAMILIAR PROVERB ITEM # 7

LITERAL PASSAGE
'I don't mind a little rain.'
'It keeps the fields green.'
'But, this year has been very erratic.'
'Most of the summer has been so dry, few crops have survived.'
'Now the surviving crops have been swamped.'
'We can't seem to get the right weather.'
PROVERB
'It never rains, but it pours.'
PARAPHRASE
'For months a drought, now a flood.'

FIGURATIVE PASSAGE
'The small problems I can handle.'
'They can make life interesting.'
'But, this year has been very erratic.'
'Most of the summer has been so boring, with nothing to do.'
'Now everything is falling apart.'
'I can't seem to get an even flow of problems.'
PROVERB
'It never rains, but it pours.'
PARAPHRASE
'Things go wrong, at the same time.'

TEST PHRASES USED IN STUDY 5
TRUE
multiple troubles
FALSE
frail but enduring

FAMILIAR PROVERB ITEM # 8

LITERAL PASSAGE
'Could you take these eggs to the store?' asked the farm woman.
'Alright mother, I'll get a basket to carry them in,' replied her daughter.
'Pack the eggs very carefully,' continued the mother.
'You must separate them so they won't bang against each other.'
PROVERB
'Don't put all your eggs in one basket.'
PARAPHRASE
'Don't carry them all in one bag.'

FIGURATIVE PASSAGE
'You should put your money in the bank,' said the farm woman.
'Alright mother, I'll probably open an account,' replied her daughter.
'Choose your bank carefully,' continued the mother.
'If you only invest in one bank, you could lose it all.'
PROVERB
'Don't put all your eggs in one basket.'
PARAPHRASE
'Don't put all your savings into one account'

TEST PHRASES USED IN STUDY 5
TRUE
spreading out the risk
FALSE
constant frustration

FAMILIAR PROVERB ITEM # 9

LITERAL PASSAGE
'Daddy, last week when I cut my finger, blood came out,' said a young boy.
'I just broke a rock in half.'
'How come the rock didn't bleed?'
'Only living things like animals, can bleed,' replied his father.
'Rocks and stones are simply not living things.'
PROVERB
'You can't get blood from a stone.'
PARAPHRASE
'Stone's don't contain any blood.'

FIGURATIVE PASSAGE
'We've asked almost everyone to buy girlguide cookies,' said a girlguide.
'We still haven't sold enough.'
'I think we should try at the brick house.'
'You mean the Harlow's, he won't give anything,' said her counsellor.
'That old miser never gives to charity.'
PROVERB
'You can't get blood from a stone.'
PARAPHRASE
'Some people aren't generous.'

TEST PHRASES USED IN STUDY 5
TRUE
being stingy
FALSE
need a spiritual life

FAMILIAR PROVERB ITEM # 10

LITERAL PASSAGE
'We've been hiking through this forest all day.'
'I think its about time we went home,' said a weary hiker.
'How can we, we're in the middle of the park,' replied his companion.
'We've got to stay on this path or we could get lost'.
PROVERB
'We're not out of the woods yet.'
PARAPHRASE
'We're still in this large forest.'

FIGURATIVE PASSAGE
'We've been working on this problem all day.'
'I think its about time we gave up,' said a stock broker.
'How can we, we're still being investigated,' replied his co-worker.
'We've got to disguise this file somehow, or we may be arrested'.
PROVERB
'We're not out of the woods yet.'
PARAPHRASE
'We could still be in a lot of trouble.'

TEST PHRASES USED IN STUDY 5
TRUE
maybe risky
FALSE
support of loved ones

FAMILIAR PROVERB ITEM # 11

LITERAL PASSAGE
'I'm worried about the grey mare,' said the stable boy.
'I groomed her, and gave her fresh bedding and water,'
'But she hasn't drunk yet.'
'Don't worry, animals know when they need water,' replied the trainer.
'She'll drink when she wants to.'
PROVERB
'You can lead a horse to water but you can't make it drink.'
PARAPHRASE
'You can give the horse water, but you can't force her to drink.'

FIGURATIVE PASSAGE
'I'm worried about my students,' said the english professor.
'I've opened up the greatest works of literature for them.'
'But no one seems to care.'
'Don't worry, some student's will learn from you,' replied the dean.
'They learn what they want to.'
PROVERB
You can lead a horse to water but you can't make it drink.'
PARAPHRASE
You can offer them knowledge but you can't make them learn.'

TEST PHRASES USED IN STUDY 5
TRUE
may be stubborn
FALSE
multiple troubles

FAMILIAR PROVERB ITEM # 12

LITERAL PASSAGE
'I thought I'd hooked a big one,' said a fisherman.
'It was a huge, beautiful salmon.'
'I wrestled with it for over an hour.'
'But the line broke and it swam away.'
'Well, don't worry about it,' said a second fisherman.
PROVERB
'There are plenty of fish in the sea.'
PARAPHRASE
'The ocean is filled with salmon.'

FIGURATIVE PASSAGE
'I thought I'd found my true love,' said a teenage girl.
'He was so handsome, and smart too.'
'We've been dating for two whole months.'
'But we broke up, he's found someone else.'
'Well don't worry about it,' said a second teenage girl.
PROVERB
'There are plenty of fish in the sea.'
PARAPHRASE
'There are a lot of great guys out there.'

TEST PHRASES USED IN STUDY 5
TRUE
other lovers
FALSE
maybe risky

UNFAMILIAR PROVERB ITEM # 1

LITERAL PASSAGE
'Hello, welcome to Yellowstone National Park,' said a ranger.
'Daddy, can we see the eagle's nest today,' said a young boy.
'I'm sorry, I hope you won't be too disappointed,' said the ranger.
'Eagles usually return to the same nest year after year,' continued the ranger.'But they haven't returned this year, and we're not sure why.'
PROVERB
'There are no birds in last years nest.'
PARAPHRASE
'The eagles have abandoned that nest.'

FIGURATIVE PASSAGE
'John, is that you? Wow! Its so great to see you again,' said a friend
'How long has it been? You know, back then, I thought I had it all.'
'I had a house, a car, a good job, and a perfect wife, but it's all gone.'
'My wife left me, because I wasn't doing enough housework,' said the man.
'So now everything is gone.'
PROVERB
'There are no birds in last years nest.'
PARAPHRASE
'Everything has changed since we last met.'

TEST PHRASES USED IN STUDY 5
TRUE
altered circumstances
FALSE
success not soon enough

UNFAMILIAR PROVERB ITEM # 2

LITERAL PASSAGE
'The secret to making a good shoe, is to use fresh leather.'
'You need to buy it when it's new and soft.'
'You mould it into the form of a shoe while its new.'
'When it hardens it forms a strong and smooth exterior.'
PROVERB
'Raw leather will stretch.'
PARAPHRASE
'New leather is easier to shape.'

FIGURATIVE PASSAGE
'The secret to raising children, is to train them from day one.'
'You need to start training before bad habits form.'
'You mould the children when they're young.'
'When they mature they will be well mannered adults.'
PROVERB
'Raw leather will stretch.'
PARAPHRASE
'Young children are easily trained.'

TEST PHRASES USED IN STUDY 5
TRUE
training kids
FALSE
judged by others

UNFAMILIAR PROVERB ITEM # 3

LITERAL PASSAGE
'I guess, you haven't heard, we've had a drought all summer.'
'Our horse has had little to eat, and is very weak.
'All the crops failed and the grass turned brown and died.'
'Now that the summer's over, it's started to rain again.'
'The fields are now green
PROVERB
'While the grass grows, the horse lies dying.'
PARAPHRASE
'But, while we now have food, the horse won't eat.'

FIGURATIVE PASSAGE
'I guess you haven't heard, my uncle's gone insane.'
'He's shut himself off from the world and won't go near a brush.'
'He always wanted to be a famous artist.'
'After years of failure, now he's won critical acclaim
'I guess the stress finally got to him.'
PROVERB
'While the grass grows, the horse lies dying.'
PARAPHRASE
'His dreams came true, but perhaps its too late.'

TEST PHRASES USED IN STUDY 5
TRUE
success not soon enough
FALSE
without thinking

UNFAMILIAR PROVERB ITEM # 4

LITERAL PASSAGE
'That door makes an awful squeak, maybe I should fix it,' said a man.
'You don't need to fix the door,' replied his aging mother.
'The squeaking hinges aren't all that bad.'
'Besides if it isn't broken, why should you fix it.'
'This door will be fine for many years.'
PROVERB
'A creaking door hangs longest.'
PARAPHRASE
'Squeaking doors can last for years.'

FIGURATIVE PASSAGE
'That's an awful sneeze, maybe you should see a doctor,' said a man.
'It's just a touch of hayfever,' replied his aging mother.
'These allergies aren't all that bad.'
'Besides, a little sneeze won't kill me, so why worry.'
'I'll be around for many years to come.'
PROVERB
'A creaking door hangs longest.'
PARAPHRASE
'The weak can live to an old age.'

TEST PHRASES USED IN STUDY 5
TRUE
frail but enduring
FALSE
good old days

UNFAMILIAR PROVERB ITEM # 5

LITERAL PASSAGE
'The cliff is being gradually undermined,' explained the tour guide.
'Over to your left is a beautiful example of a sea cave.'
'The caves begin as small cracks, or soft areas in the rock.'
These gradually widen until the top collapses.'
'Sir, what causes all this erosion?' a boy asked.
'The ocean waves wear away the rock,' explained the tour guide.
PROVERB
'Hard rocks are hollowed out by soft water.'
PARAPHRASE
'The sea water erodes the granite cliffs.'

FIGURATIVE PASSAGE
'Persuading a judge must be done discretely,' explained the lawyer.
'He's a stubborn man and convincing him won't be easy.'
'I'll begin by finding a weakness, or soft spot in his views.'
'Gradually win him over to our point of view.'
'But, how can we get him to give in?' the client asked.
'We must use flattery rather than confrontation,' explained the lawyer.
PROVERB
'Hard rocks are hollowed out by soft water.'
PARAPHRASE
'Gentle words will change stubborn men.'

TEST PHRASES USED IN STUDY 5
TRUE
flattery and persuasion
FALSE
no food, no energy

UNFAMILIAR PROVERB ITEM # 6

LITERAL PASSAGE
'This is a valuable tree, we have to dig it up and transplant it.'
'It's tall and slender so it must have extensive roots,' said the landscaper.
'How extensive do you think the roots system is?' asked his assistant.
'It's hard to say, for this family of plants,' replied the landscaper.
PROVERB
'Straight trees have crooked roots.'
PARAPHRASE
'The roots are twisted in all directions.'

FIGURATIVE PASSAGE
'It is essential that we dig up some kind of corruption connected with him.'
'He looks clean but there must be something in his past,' said the Senator.'I can't find anything at all that indicates dishonesty,' replied a clerk.
'What about his family, anything there we can use?' asked the Senator.
PROVERB
'Straight trees have crooked roots.'
PARAPHRASE
'Honest men might have corrupt backgrounds.'

TEST PHRASES USED IN STUDY 5
TRUE
skeletons in closet
FALSE
altered circumstances

UNFAMILIAR PROVERB ITEM # 7

LITERAL PASSAGE
'Creating an illusion of depth is essential in art,' said the art teacher.
'There are a number of methods of achieving this illusion.
'For example, trees near you are dark green, while distant trees are lighter.'
'Add a small amount blue paint to make it look far away.'
PROVERB
'Blue are the faraway hills.'
PARAPHRASE
'Distant hills have a bluish tone.'

FIGURATIVE PASSAGE
'Father you're deceiving yourself, there were no good old days,' said a man.
'Everyone remembers good times better than bad times.'
'There were wars and famine and poverty then and we still have these problems.'
'But time has made you forget the bad and exaggerate the good.'
PROVERB
'Blue are the faraway hills.'
PARAPHRASE
'The past always seems better.'

TEST PHRASES USED IN STUDY 5
TRUE
good old days
FALSE
skeletons in closet

UNFAMILIAR PROVERB ITEM # 8

LITERAL PASSAGE
'Here we are, ship wrecked on a island with nothing to do,' said a castaway.
'It would be perfect, if only I had saved some pens and paper from the ship.'
'I'm a writer, but I've nothing to write with.'
'Why don't you improvise, and make your own writing material,' said a friend.
'You could use that silver coin you found, as a pencil.'
PROVERB
'White silver draws black lines.'
PARAPHRASE
'Pure silver makes black marks.'

FIGURATIVE PASSAGE
'Mom, you're wrong about my boyfriend, he's not using me,' said a teenage girl.
'Our relationship is based on a real understanding of each other.'
'Besides I'm seventeen and I can do what I want.'
'People are not always what they appear to be,' said her anxious mother.
'You can never completely know another person.'
PROVERB
'White silver draws black lines.'
PARAPHRASE
'Be a little suspicious of his actions.'

TEST PHRASES USED IN STUDY 5
TRUE
deceptive appearance
FALSE
visions of success

UNFAMILIAR PROVERB ITEM # 9

LITERAL PASSAGE
'It will be a mighty river when it reaches the sea.'
'But it starts out as a tiny trickle of water.'
'Run off water from thunder showers adds greatly to the volume of water.'
'But a river needs a constant supply of water, even during dry summers.'
'It is this spring water that keeps rivers flowing all year.'
PROVERB
'A river needs a spring'
PARAPHRASE
'Streams begin with a spring.'

FIGURATIVE PASSAGE
'You are an important and powerful man today.'
'But you should never forget your family.'
'The friends you have made during your rise to power have helped greatly.'
'But you must remember those that have nourished you since birth.'
'It is your family that will be there when you need them.'
PROVERB
'A river needs a spring'
PARAPHRASE
'Everyone needs their family.'

TEST PHRASES USED IN STUDY 5
TRUE
support of loved ones
FALSE
training kids

UNFAMILIAR PROVERB ITEM # 10

LITERAL PASSAGE
'Come here and hold this bag open,' said a worker.
'I'm too busy to help right now,' said his co-worker.
'How am I supposed to do my job without your help,'
continued the first man.
'I can't put leaves into it and hold it open at the same
time.'
'We've got a lot of work to do this afternoon.'
PROVERB
'An empty sack cannot stand upright.'
PARAPHRASE
'A bag won't stay open by itself.'

FIGURATIVE PASSAGE
'Come here and eat your lunch,' said a worker.
'I'm too busy to eat right now,' said his co-worker.
'How are you going to do your job without food,' continued
the first man.
'You can't work this hard all day without a good meal.'
'We've got a lot of work to do this afternoon.'
PROVERB
'An empty sack cannot stand upright.'
PARAPHRASE
'A hungry worker can't do his job.'

TEST PHRASES USED IN STUDY 5
TRUE
no food, no energy
FALSE
catastrophes are rare

UNFAMILIAR PROVERB ITEM # 11

LITERAL PASSAGE
'Watch it, we're going to hit that rock,' said a man.
'Relax, the water's deep enough for this canoe,' replied his friend.
'The rock just looks close to the surface.'
'Refraction makes everything in the water seem distorted.'
'It must be eight or nine feet below the surface.'
PROVERB
'A straight stick looks crooked in the water.'
PARAPHRASE
'Water will make a straight stick appear bent.'

FIGURATIVE PASSAGE
'Why are you withdrawing from the election?' asked a friend.
'My brother and Uncle were arrested for fraud,' replied the candidate.
'Everyone has now turned against me.'
'The public assumes that I'm also involved in this scandal.'
'I've lost their trust, it will be hard to regain it.'
PROVERB
'A straight stick looks crooked in the water.'
PARAPHRASE
'It's a case of guilt by association.'

TEST PHRASES USED IN STUDY 5
TRUE
judged by others
FALSE
being stingy

UNFAMILIAR PROVERB ITEM # 12

LITERAL PASSAGE

'In this music school we start music education with the basics.'
'We want future musicians to know their instruments intuitively.'
'Rather than teaching music on conventional instruments,'
'We'll teach you to make music with tin cans, jugs and other scraps.'
'A row of partly filled bottles becomes a xylophone.'
PROVERB
'Empty bottles make the most sound.'
PARAPHRASE
'Hollow jugs make the loudest sound.'

FIGURATIVE PASSAGE
'In this factory we listen to all the suggestions from our workers.'
'We want the employees to feel like they are members of a team.'
'Unfortunately it's not the guys with good ideas that speak up.'
'More often it's trouble makers who waste our time with complaints.'
'Some of their suggestions are simply absurd, few are practical.'
PROVERB
'Empty bottles make the most sound.'
PARAPHRASE
'Those without ideas talk the most.'

TEST PHRASES USED IN STUDY 5
TRUE
without thinking
FALSE
other lovers

APPENDIX D: A complete table of cell means and standard deviations found in study 4.

Table 11

Reading Time, Cued Recall, and Distraction Recognition Data from Study 4.

VERBAL TASK						
CONTEXT APPROPRAITE CUES						
Literal Context	**Familiar Proverb**			**Unfamiliar Proverb**		
Reaction Time	16	1997.1	712.3	16	2559.6	847.7
Cued Recall	16	0.390	0.300	16	0.410	0.340
Distraction Recognition	16	0.890	0.260	16	0.890	0.260
Figurative context						
Reaction Time	16	2317.3	775.5	16	3197.2	2110.5
Cued Recall	16	0.297	0.250	16	0.220	0.270
Distraction Recognition	16	0.906	0.201	16	0.940	0.112
Literal Context	**Paraphrases of Familiar Proverb**			**Paraphrases of Unfamiliar Proverb**		
Reaction Time	18	2373.4	972.2	18	2524.4	977.7
Cued Recall	19	0.447	0.258	19	0.461	0.325
Distraction Recognition	19	0.868	0.174	19	0.947	0.178
Figurative Context						
Reaction Time	18	2559.4	1285.4	18	2562.0	1135.0
Cued Recall	19	0.130	0.170	19	0.355	0.280
Distraction Recognition	19	0.868	0.255	19	0.921	0.205

Table 11 cont.

VERBAL TASK						
CONTEXT INAPPROPRIATE CUES						
Literal Context	**Familiar Proverb**			**Unfamiliar Proverb**		
Reaction Time	20	2795.8	1254.4	20	3887.3	1660.2
Cued Recall	20	0.188	0.267	20	0.088	0.147
Distraction Recognition	20	0.900	0.170	20	0.875	0.236
Figurative Context						
Reaction Time	20	2989.2	1302.1	20	4056.4	1655.1
Cued Recall	20	0.238	0.236	20	0.263	0.250
Distraction Recognition	20	0.925	0.183	20	0.900	0.170
Literal Context	**Paraphrases of Familiar Proverb**			**Paraphrases of Unfamiliar Proverb**		
Reaction Time	13	2114.7	658.1	13	2572.2	960.2
Cued Recall	13	0.115	0.165	13	0.019	0.069
Distraction Recognition	13	0.885	0.194	13	0.981	0.069
Figurative Context						
Reaction Time	13	2336.9	663.2	13	2335.3	633.4
Cued Recall	13	0.038	0.094	13	0.000	0.000
Distraction Recognition	13	0.981	0.069	13	0.942	0.150

Table 11 cont.

VISUAL TASK						
CONTEXT APPROPRIATE CUES						
Literal Context	**Familiar Proverb**			**Unfamiliar Proverb**		
Reaction Time	19	2650.0	1307.1	19	2960.6	1289.9
Cued Recall	19	0.500	0.250	19	0.434	0.310
Distraction Recognition	18	0.792	0.214	18	0.819	0.144
Figurative Context						
Reaction Time	19	2685.8	1178.2	19	3217.8	1401.7
Cued Recall	19	0.368	0.305	19	0.250	0.204
Distraction Recognition	18	0.833	0.191	18	0.792	0.196
Literal Context	**Paraphrases of Familiar Proverb**			**Paraphrases of Unfamiliar Proverb**		
Reaction Time	16	2537.2	1295.8	16	2598.5	1405.7
Cued Recall	16	0.359	0.273	16	0.344	0.221
Distraction Recognition	16	0.890	0.157	16	0.844	0.180
Figurative Context						
Reaction Time	16	2640.9	1289.8	16	2411.1	1074.2
Cued Recall	16	0.297	0.228	16	0.438	0.250
Distraction Recognition	16	0.844	0.221	16	0.844	0.202

Table 11 cont.

VISUAL TASK

CONTEXT INAPPROPRIATE CUES

Literal Context	**Familiar Proverb**			**Unfamiliar Proverb**		
Reaction Time	15	2803.37	846.3	15	3926.5	2073.3
Cued Recall	15	0.167	0.154	15	0.050	0.140
Distraction Recognition	15	0.817	0.176	15	0.850	0.158
Figurative Context						
Reaction Time	15	2850.0	1143.9	15	3618.3	1286.0
Cued Recall	15	0.250	0.211	15	0.333	0.262
Distraction Recognition	15	0.766	0.240	15	0.7667	0.221
Literal Context	**Paraphrases of Familiar Proverb**			**Paraphrases of Unfamiliar Proverb**		
Reaction Time	14	2463.7	925.2	14	3024.5	1077.9
Cued Recall	14	0.125	0.130	14	0.00	0.00
Distraction Recognition	14	0.839	0.158	14	0.803	0.200
Figurative Context						
Reaction Time	14	2568.5	882.7	14	2797.6	1470.2
Cued Recall	14	0.036	0.091	14	0.018	0.067
Distraction Recognition	14	0.875	0.163	14	0.857	0.162

Table 11 cont.

CONTROL TASK						
CONTEXT APPROPRIATE CUES						
Literal Context	**Familiar Proverb**			**Unfamiliar Proverb**		
Reaction Time	15	2857.2	1176.1	15	3107.6	943.9
Cued Recall	15	0.500	0.283	15	0.417	0.336
Distraction Recognition	14	0.929	0.153	14	0.928	0.117
Figurative Context						
Reaction Time	15	2550.6	679.0	15	3226.4	991.2
Cued Recall	15	0.250	0.250	15	0.250	0.267
Distraction Recognition	14	0.928	0.153	14	0.946	0.145
Literal Context	**Paraphrases of Familiar Proverb**			**Paraphrases of Unfamiliar Proverb**		
Reaction Time	16	2377.5	847.8	16	2732.3	972.5
Cued Recall	16	0.407	0.301	16	0.453	0.228
Distraction Recognition	16	0.906	0.256	16	0.938	0.144
Figurative Context						
Reaction Time	16	2276.9	961.9	16	2639.5	1527.6
Cued Recall	16	0.250	0.303	16	0.464	0.322
Distraction Recognition	16	0.938	0.144	16	0.906	0.272

Table 11 cont.

CONTROL TASK						
CONTEXT INPPROPRIATE CUES						
Literal Context	**Familiar Proverb**			**Unfamiliar Proverb**		
Reaction Time	16	2651.2	685.4	16	3117.0	703.6
Cued Recall	16	0.234	0.213	16	0.078	0.151
Distraction Recognition	16	0.969	0.085	16	0.906	0.180
Figurative Context						
Reaction Time	16	2912.6	713.4	16	3734.1	1430.6
Cued Recall	16	0.375	0.289	16	0.359	0.258
Distraction Recognition	16	0.891	0.258	16	0.906	0.221
Literal Context	**Paraphrases of Familiar Proverb**			**Paraphrases of Unfamiliar Proverb**		
Reaction Time	14	2511.5	1562.1	14	2438.0	864.2
Cued Recall	14	0.125	0.214	14	0.018	0.067
Distraction Recognition	14	0.929	0.153	14	0.929	0.153
Figurative Context						
Reaction Time	14	1960.8	600.0	14	2141.3	669.4
Cued Recall	14	0.05[illegible]	0.106	14	0.00	0.00
Distraction Recognition	14	0.929	0.153	14	0.929	0.117