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Mary-elizabeth Walsh

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THE ROLE OF IMAGERY AND ABSTRACTION IN PROVERB
COMPREHENSION: A DUAL-CODING ANALYSIS
OF FIGURATIVE LANGUAGE

by

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Submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy

Faculty of Graduate Studies
The University of Western Ontario
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ABSTRACT

Five studies evaluated the claim (Reichman and Coste, 1980) that a dual coding approach to language representation cannot explain interpretation of figurative language. That claim was based on earlier findings that were interpreted as showing that memory representations of the figurative meanings of proverbs are abstract and imagery-free.

Study 1 used a rating task to measure figurativeness of 240 proverbs that varied in rated imagery. As proverbs became increasingly abstract, they were rated as increasingly literal in the relation between surface wording and inferred intended meaning. The dual coding explanation is that concrete language has associated non-verbal representations which are necessary to provide a basis for non-conventionalized figurative interpretations.

A dual coding analysis of figurative language predicted differences in interpretation processes for concrete and abstract proverbs. Study 2 showed, in support, that rated comprehension ease and verbal interpretation ease were more highly correlated for abstract proverbs ("Punishment is lame but it comes") than for concrete proverbs ("A little pot is soon

hotⁿ).

Study 3 evaluated concrete-abstract differences in the relation between proverbs and their interpretations by 1) measuring the frequency with which the topic of the proverb was also the topic of its interpretation and 2) by having judges sort proverb interpretations into groups based on similarity of ideas. Results confirmed that the topic of the interpretation of an abstract proverb was more often the same topic named in the proverb than occurred for interpretations of concrete proverbs. In addition, abstract proverbs tended to be interpreted more similarly across individuals than were concrete proverbs. These results were interpreted as showing that the contribution of literal associative processes to proverb interpretation is greater in the case of abstract than concrete proverbs.

Studies 4 and 5 examined cued recall for concrete and abstract proverbs and showed that replication of previous failures to find concrete/abstract differences in cued recall of proverbs depends on who generates the interpretation recall cue. When recall cues were self-generated interpretations of the proverbs, recall of concrete proverbs was superior as predicted by dual coding.

The results taken together favor a model based on

the dual coding distinction between imaginal and
verbal interpretive processes in figurative language
comprehension..

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The Role of Imagery and Abstraction In Proverb
Comprehension: A Dual Coding Analysis of Figurative
Language

Statement of the Problem

As casual language users, we might think of the distinction between "concrete" and "abstract" language as clear and absolute. Concrete language has specific, real world referents, readily evokes images and feelings, and is used and easily understood by even beginning speakers of the language. Abstract language is opposite in every way; it refers to ideas rather than things, is hard to imagine and often difficult to understand, and is typically used in specialized ways by people like philosophers or academics. Semanticists have argued about the best way to conceptualize this distinction (e.g. Lyons, 1981) and it is a source of argument in psychology as well, with the discussion focusing on the nature of mental processes that occur when we comprehend concrete and abstract words and sentences (Paivio, 1986). An interesting paradox, however, complicates this concrete-abstract distinction, and may ultimately help to clarify its nature. Some concrete sentences seem to suggest abstract

interpretations. For example, the sentence

"A full cup must be carried carefully" can be interpreted literally as spoken to a child racing across a room spilling lemonade from an overfilled cup. However, the same sentence can be interpreted figuratively when spoken to someone who has just won an unexpected windfall in a lottery. In this case, a full interpretation of the sentence would be an abstraction, because the specific referents named in the sentence (carrying a full cup) must be generalized to a more general idea (extreme good fortune can be easily lost if not managed cautiously).

In the first context, the interpretation of the above sentence is guided directly by a literal interpretation of the concrete referents named in the sentence. In contrast, the interpretation of the same sentence in the second context seems more abstract or "derived;" comprehension is not guided by a literal interpretation of sentence referents, and as a result, those referents must be interpreted figuratively. Thus, the meaning of this simple, concrete sentence differs according to how sentence referents are interpreted, with abstract interpretation of referents resulting in figurative meaning.

The problem I am concerned with in this thesis is the nature of the relationship between linguistic

concreteness on the one hand and the abstraction process that results in a figurative interpretation on the other. Importantly, however, many psychologists currently investigating comprehension of figurative language would disagree with the two main assumptions that underly this particular approach to the problem. Those two assumptions are that first, there is a distinction between cognitive processing of figurative and literal meanings, and second, that that distinction arises because figurative meanings are more "abstract" or "derived" than literal meanings.

Such a distinction is contentious on both theoretical grounds (e.g. Rumelhart, 1979; Pylyshyn, 1979) and especially on empirical grounds (e.g. Gibbs, 1984). For example, Rumelhart disagrees, on logical grounds, that there can be any principled distinction between processes governing literal language use and those governing figurative language use, primarily because it is difficult to observe, in natural language, cases that are specifically and only literal. By way of an example, Rumelhart (1979) uses the sentence

"The policeman raised his hand and stopped the car" as illustrating the point that even literal language comprehension seems to require inferential processes that "go beyond" that which would be determined by a

componential analysis of the meanings of individual words in the sentence. That is, the interpretation of the "policeman stopped the car" requires extra-sentential knowledge which must be applied in order to determine the correct relation between "policeman," "raised his hand," and "stopped the car." The problem with Rumelhart's analysis as it applies to figurative language is that, although inference may be required in comprehension of literal language, the interpretation of the sentence about the policeman stopping the car does not appear to yield a "figurative" interpretation. Rumelhart has not shown that figurative and literal interpretation processes are similar because his analysis has not been directed by a theoretical or empirical definition of figurative language; his argument is that it is impossible to establish the properties of literal meanings, so in principle they must not be different from figurative meanings. The argument I will present here is that a theoretical analysis of what constitutes figurative interpretation may help to clarify some of the important issues in empirical investigations of language comprehension processes in general. Therefore, it remains appropriate to look for empirical evidence of a figurative-literal distinction in comprehension processes.

The central issue is whether there is a difference between comprehension of figurative and literal language, and whether the basis for this distinction is that figurative meanings are more derived or require more "abstraction" than literal meanings. The concept of "abstraction" seems to imply a psychological process in which a general feature or principle is "extracted" from a more concrete or specific entity. Many current psychological analyses of figurative language refer, either implicitly or explicitly, to such an abstraction process. Consider for example, the description of figurative comprehension offered by Verbrugge and McCarrell (1977) which describes metaphor comprehension as construction, by the comprehender, of an "abstract resemblance" between the topic of the metaphor and the entity to which that topic is figuratively linked. This conclusion arose from results of experiments which showed that memory for a metaphor such as "Billboards are warts on the landscape" was effectively cued by a statement of the feature shared by "billboards" and "warts", that is, "ugly protrusions on a surface". This relation is considered to be abstract because it is not stated explicitly in the words of the metaphor, nor is it apparently derived directly from dominant verbal

associations to either of the terms of the metaphor (Verbrugge & McCarrell, 1977). Further, the effectiveness of this "abstraction" as a memory cue suggests it was generated by the subjects as part of the original metaphor comprehension process.

An abstraction process is similarly implied in the "domains interaction" theory of metaphor comprehension described by Tourangeau and Sternberg (1981) and extended by Trick and Katz (1986). According to this theory, people understand metaphoric relationships expressed in sentences such as "The Ayatollah Khomeini is a praying mantis" by examining properties of each term named in the metaphor, in order to find a dimension which is shared by both terms. This selection of properties is controlled by information the comprehender has about how each of the terms is related to other members of its class; in this case, how praying mantises are related to other insects, and how the Ayatollah is related to other political leaders. The process of selection and comparison of relevant properties could be said to involve "abstraction" in the sense that the relevant dimension must be selected from a potentially much larger set. Other models of figurative language processing which emphasize the role of selection of relevant semantic features as the basis of

comprehension could be similarly described as involving abstraction processes (e.g., Katz, 1982; Johnson and Malgady, 1980).

While the above approaches to figurative language comprehension could be said to rely implicitly on some kind of abstraction process, the link between abstraction and figurative language would not be considered as unique, or special, according to these models. After all, such abstraction could underly many kinds of cognitive tasks, such as solving analogies and perceiving similarity in literally related concepts. However, the argument that I would like to present is that the concept of abstraction may be productively used in a more specific sense than one which describes processes that are common to many kinds of cognitive operations. Rather, linguistic abstraction may be the feature of figurative language that distinguishes it from literal language.

Figurative Language as Linguistic Abstraction

In the following sections, the concept of linguistic abstraction will be outlined in more detail, along with a critical analysis of current views of figurative comprehension .

According to one definition abstraction is a process that derives, extracts, or draws out a feature or general principle common to a number of instances and presents it as a new entity (Arnheim, 1966). This process has been of particular concern to the psychology of art, where theorists have been interested in the process by which a concrete representation, such as a painting of a Dutch landscape , is interpreted by an observer as representing something quite abstract, such as "peace", "tranquility" or "order." That the interpretation of works of art requires such an abstraction process is illustrated by contrasting the abstract interpretation with the more literal response of a viewer, who on observing the painting, remarks that it brings back memories of a European vacation taken last summer (example adapted from Arnheim, 1966). In the case of the abstract interpretation, the viewer has identified a quality (tranquility) in the concrete representation of a rural scene, which could not

itself be physically represented. Thus, it could be said that the painting figuratively, or metaphorically, represents peace and tranquility, whereas one would not say that it metaphorically represents a view of a particular river in Holland.

Arnheim has suggested that processes similar to those involved in representation and interpretation of art may underly the use of metaphor in language.

With respect to abstraction and language, the issue is particularly complex because language is fundamentally an abstract system for representing information. At its most basic, concrete, literal level, language is abstract because even those words that have tangible referents in the external world are only symbolically related to those referents (Paivio and Begg, 1981): Further, the same word can be used in a variety of senses (Laird, 1966) illustrating the abstractness of the relation between words and "meanings". The syntactic rules that govern language use are also commonly seen as abstract in nature, by definition (e.g. Glass, Holyoak & Santa, 1980).

The abstractness of the linguistic system, then, makes it particularly intriguing to consider how that abstract system may be used in a further symbolic or figurative sense as when a word like "refrigerator" is used to refer to a football player. In particular,

a psychological analysis seems to distinguish between the abstractness of representation in the linguistic system, on the one hand, and abstraction as a cognitive process which might be undertaken by listeners in trying to understand novel linguistic inputs that suggest "abstract" interpretations.

The distinction is made clear by considering the nature of "metaphorical extension" in the development of word meanings in a particular language community. For example, the word "escape", now understood in the general sense of "getting away from" some type of entanglement, originally meant, literally, to get out of one's cape (ex cappa), as in the case of "a prisoner, held by his coat, who slips out of the garment and flees" (Picturesque Word. Origins, G & C Merriam Co., 1933). The word "escape" is now apparently more abstract, or general in meaning than its original use, yet we need not undertake elaborate inferential processing to understand its meaning; presumably, however, the first use of the word in a more general sense than "out of one's coat" may have required more "abstraction" by both speaker and listener for comprehension. The implication here is that as a linguistic expression is consistently used within the community in a particular context, its referential meaning becomes conventionalized and its

non-literal origin is forgotten. As Langer (1957) has observed

"In a genuine metaphor, an image of the literal meaning is our symbol for the figurative meaning - the thing that has no name of its own. If we say that a brook is laughing an idea of laughter intervenes to symbolize the activity of the brook. But if a metaphor is used very often we learn to accept the word in its metaphorical context as though it had a literal meaningconstant figurative use has generalised its sense."

An abstract, or figurative, interpretation of a linguistic unit, then, differs from a literal interpretation, precisely because it is not defined by the conventionalized rules that govern literal reference. Simply put, an interpretation within the conventionalized patterns of reference would result in literal, but not figurative meaning. To illustrate, consider the metaphor,

No man is an island.

This example has been cited as support for the view that figurative meaning cannot be clearly distinguished from literal meaning, because it is both figuratively and literally true that no man is an island. (Gibbs, 1984; Glucksburg, Gildea & Bookin, 1982).

It can be argued however, that "No man is an island" is literally true only if the predicate term, "island", is interpreted in its conventional, dictionary definition sense. In contrast, it is figuratively true, only if the predicate "island",

(typically termed the "vehicle" in a metaphor), is interpreted in an abstract sense, as for example, "exists completely unconnected to others". The metaphorical meaning for "no man is an island" is derived from a different source than the literal meaning of the same word; it cannot be part of the normal, literal interpretive processes, otherwise a literal interpretation would result.

In addition, the example suggests that the distinction between metaphorical and literal interpretation is based on differences in referential processing of individual words in a sentence. In the literal sentence, "island" refers to a piece of land surrounded by water; in the metaphorical sentence it refers to something more abstract. This raises the question of whether words which differ in abstractness of reference ("island" compared to "existence", for example) differ also in their potential for abstractness of interpretation which, according to the analysis I have presented, seems to underly figurative meaning.

To summarize to this point then, the argument is that figurative interpretation can be described as a process distinct from literal interpretation; specifically, a figurative interpretation requires abstract interpretation of a more concrete referent.

This argument is based on two assumptions; first, that figurative interpretation is more abstract than literal interpretation, and second, that figurative interpretation may require a concrete referent.

Neither of these assumptions has been empirically supported to date. Before reviewing reasons for this apparent lack of support, it is important to establish a stronger theoretical basis for the link between figurative interpretation and linguistic abstraction.

Linguistic Abstraction and Searle's Model of
Figurative Language Comprehension

A way of formalizing the concept of linguistic abstraction, and of linking it specifically with figurative language comprehension, has been provided by Searle (1979). In discussing how figurative and literal language differ, Searle distinguishes between utterance meaning (what a speaker intends to communicate with a sentence) and sentence meaning (what a speaker's words alone suggest). For example, the proverb

"A full cup must be carried carefully"
can be understood on both a literal and figurative level.

According to the general principles of Searle's analysis, utterance meaning and sentence meaning correspond at the literal level. The speaker's intended meaning is directly expressed in the words of the sentence in that the referents named in the sentence can be interpreted in a conventional, literal sense and abstract processing is not involved. In contrast, utterance meaning (i.e. manage your good fortune wisely or you will lose it) and sentence meaning (be careful when carrying a full cup) diverge at the figurative level. The process which would resolve this apparent divergence is initiated by the

recognition that the sentence meaning is not what the speaker intends to say, as for example, when the sentence is uttered in a context which makes the literal interpretation inappropriate. In this case sentence referents will be interpreted figuratively rather than literally. The figurative interpretation follows upon a failed attempt to understand the sentence under the rules of conventional reference. Thus, Searle's analysis very clearly distinguishes between literal and figurative interpretation and suggests that a figurative interpretation arises after a literal "reading" has been attempted by the comprehender.

One potentially important problem with Searle's analysis of figurative interpretation is that it does not appear to distinguish between metaphorical language and other forms of non-literal speech such as idioms, indirect speech acts, and sarcasm. For example, comprehension of an idiom such as "over the hill" appears to be based on resolution of the "expressed" and "intended" meaning of the utterance, much as does comprehension of a metaphor such as "The football player is a refrigerator".

In fact, many recent studies of comprehension of idioms and conventionalized indirect requests (such as "Can you tell me the time?" when the speaker means

"What time is it?"), have shown that these apparently non-literal expressions can be understood just as quickly as literal language (Gibbs, 1986). This finding has been widely interpreted as evidence against the whole idea that figurative language comprehension is more "derived", or less direct than literal language comprehension. However, a more appropriate deduction from Searle's analysis is that idioms, and other conventionalized speech patterns are comprehended in a similar fashion to literal language because they have lost their figurative sense through consistent use in a linguistic community.

Nonetheless, Searle's distinction between sentence and utterance meaning provides only an incomplete account of cognitive processes involved in figurative interpretation; for one thing, it does not specify the nature of the relationship between intended and expressed meaning in a figurative expression. One important goal of this thesis is to more clearly specify the nature of that relationship. What Searle's linguistic analysis does provide is a potential starting point for construction of a model of figurative language comprehension. The fundamental assumption underlying such a model would be that figuratively intended expressions are processed differently than literally intended expressions

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because they must be derived from a literal base, rather than being directly available in semantic memory. Although this assumption has been tested in a number of experiments in recent years and has not been supported, I will review the relevant studies here to show that they may have been wrongly interpreted as evidence against the figurative-literal distinction.

Review of Empirical Evidence Against The Distinction
Between Figurative and Literal Language Comprehension

Pollio, Fabrizi, Sills and Smith (1984) tested the prediction that subjects will take longer to assess metaphoricity than to assess literal features of sentences, because, according to Searle (1979), metaphors are recognized only after sentence meaning is processed literally and found to be uninterpretable in a literal sense. They had subjects classify different types of sentences into five categories, four of which were assumed to require processing of the literal features of sentences, and one of which was the category "metaphor".

The results showed that metaphors were classified as quickly as other types of (literal) sentences, leading the authors to conclude that metaphoric comprehension need not take longer than literal comprehension, and therefore, that the idea that metaphoric comprehension follows upon literal

comprehension, is incorrect. However, since half the "metaphors" used in the study were well known cliches, subjects could have classified them quickly as metaphors without actually interpreting them.

Interestingly, other aspects of the Pollio et al. data do seem to support the Searle model of abstraction for figurative language. For example, metaphoric sentences produced the lowest percentage of correct placements overall-- those sentences not recognized as metaphors were generally categorized as "anomolous" by the subjects. Being under time pressure, perhaps the subjects did not take long enough to actually derive an interpretation for the "novel" metaphors, and, recognizing they were not literally interpretable, placed them in the anomolous category. This result could be predicted from Searle's description of figurative processing, which suggests that anomoly is recognized before a metaphorical interpretation is generated. In any case, the Pollio et al. results do not show conclusively that the distinction between literal and figurative processing is incorrect.

Another experiment that yielded results that appear to suggest that figurative comprehension is no more derived or inferential than literal comprehension was conducted by Kemper (1981). She used proverbs

1

that can be understood on both a literal level and a figurative level--for example, "Diamonds come in small packages". She reasoned that if figurative expressions require more inferential processing than literal language, then proverbs used in a context suggesting a figurative reading should take longer to comprehend than proverbs used in a context suggesting a literal reading. Subjects in the experiments were asked to read short paragraphs (either figurative or literal) and to decide whether the proverb sentence at the end of the story was appropriate to the preceding context. The results consistently showed that proverbs used in a figurative sense were understood more rapidly than proverbs used in a literal sense. Kemper suggested that figurative language must not require inferential processes over and above those required by literal comprehension. Instead, she argued that a better way to think about figurative comprehension is that the context in which figurative expressions are used generates particular expectations that permit the figurative meaning to be comprehended in the same way that a literal meaning is comprehended. The problem with this interpretation is, that it does not address her surprising finding that literal meanings were comprehended with more difficulty than the figurative meanings. This result

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suggests that the important finding of rapid comprehension of figurative meanings may have been artifactual. Inspection of the example materials provided by Kemper suggests that the proverbs in fact sounded somewhat strained used in literal contexts.

For example

Frank gave Beth a tiny box for their anniversary. The box was tiny, but the present was expensive. Frank wanted Beth to have a new ring so he didn't need a large box.
Diamonds come in small packages.

The entire passage sounds somewhat strained, probably as a result of trying to fit the proverb to a literal context. This possible failure to conform to normal literal conversational patterns may have in fact suggested to subjects that a figurative reading was intended and thus momentarily confused the participants. Because of this potential problem with the literal contexts, it cannot be concluded that the Kemper experiments demonstrate that figurative language is comprehended in the same manner as literal language, even when a sentence context is provided.

Another experiment has been generally taken to show that providing an appropriate context for figurative expressions allows them to be comprehended as rapidly as literal uses of the same expressions. Ortony, Schallert, Reynolds and Antos (1978) showed that comprehension reaction time does not differ

significantly for a sentence such as "The troops marched on" in a figurative context about children annoying their babysitter compared to a literal context about soldiers marching in battle. This experiment has been recently criticized on methodological grounds by Janus and Bever (1985). They showed that the dependent measure used by Ortony et al. --comprehension reaction times taken at the end of the target sentences-- is not sensitive to the additional, but momentary processing load resulting from comprehension of figurative expressions. Using the same materials as Ortony et al., Janus and Bever (1985) showed that when on-line processing measures were taken, figurative comprehension took more time than literal comprehension. Apparently, by the time subjects reached the end of a figurative sentence, they had resolved the ambiguity and thus appeared not to have engaged in extra processing. Therefore, the Ortony et al experiment, like those previously cited, has not provided clear support for the view that figurative comprehension processing is equivalent to literal comprehension.

Glucksberg, Gildea, and Bookin (1982) conducted a study which they interpreted as evidence against the view that figurative comprehension is an abstraction of intended meaning from the literally expressed

meaning in a metaphor. The implication of Searle's hypothesis is that figurative meaning is derived only after the comprehender recognizes that the speaker does not mean what is said - that is, after it is recognized that what is said fails as a literal statement. Searle argues that a linguistic expression fails as a literal statement if it does not meet certain truth conditions; these truth conditions represent what speaker and listener both implicitly recognize as a possible state of affairs in the real world (Searle, 1979, p.95).

Glucksberg et al. argued that Searle's model "seems wrong", because it suggests that a literal meaning must be first apprehended and then rejected, before a figurative meaning can be "optionally" processed. To test this idea, Glucksberg et al. had subjects perform a sentence verification task in which they were required to make true or false judgments about a list of sentences, half of which were true and half false. It was found that if a sentence had a readily available metaphorical interpretation (e.g. Some jobs are jails) subjects took longer to respond that they were literally false than if the sentence had no metaphorical interpretation (e.g. Some birds are apples). The authors' analysis of this result was that the truth of the metaphorical meanings

automatically intruded upon the subjects' awareness, interfering with the ability to respond that the sentence was literally false. Thus, they argue, figurative comprehension can be automatic; the idea that it is more derived than literal comprehension is false.

This conclusion can be questioned, however. Glucksberg et al found a "metaphor interference effect" on the true/false judgments only for some of their metaphors - apparently those which express familiar ideas in cliched ways (Some surgeons are butchers; Some jobs are jails). Such conventionalized expressions may be processed in the same manner as literal sentences and therefore do not reflect processing characteristic of metaphors as described by Searle. Further, the metaphor interference effect observed by Glucksberg et al. may depend on the fact that they did not compare the interference effect for metaphors with that elicited by literal sentences with highly related subjects and predicates such as "All cats are dogs". We know from the large literature on the sentence verification task that people have difficulty rejecting as false many kinds of false sentences which have highly related subjects and predicates (e.g. Holyoak & Glass, 1975); the metaphor interference effect may reflect that same process,

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rather than demonstrating anything about figurative interpretation in particular.

In addition, consider how a slight change in procedure might have altered the interpretation that metaphors are comprehended "automatically". Had subjects been asked to respond "true" if the sentences were true in any sense, so that metaphors such as "Some surgeons are butchers" were to be given a true response as were the literal sentences such as "Some robins are birds", a metaphor interference effect may still have been observed. Subjects may well take longer to respond "true" to metaphors than to literal sentences. If we accept the Glucksberg et al. claim that it was "automatically" derived figurative meaning which interfered with subjects ability to respond "false" in the original experiment, it would be difficult to explain why that "automatically" derived figurative truth would not allow rapid responding when subjects are assessing truth in the more general pragmatic sense as opposed to the logician's sense of "literal" truth.

The important implication of Searle's model is that it emphasizes that people are sensitive to the difference between literally and figuratively intended communication, and it provides a description of how this difference can be signalled in conversation.

Searle proposes simply that failure of conventional comprehension processes at some point signals a need for metaphorical processing; the signal presumably could occur quite early in comprehension and the metaphor could be rapidly understood. The Glucksberg et al. experiment therefore does not seem to provide an unambiguous test of the implications of Searle's approach.

In a follow-up experiment Gildea and Glucksberg (1983) used the same sentence verification procedure to explore context effects on the sentence verification task. Recall that a number of metaphors, for example "smiles are razors", presented in isolation in the earlier study were rapidly rejected as false—they did not show a metaphor interference effect. Gildea and Glucksberg were specifically interested in obtaining a metaphor interference effect on these metaphors which could not have been "automatically" understood in the absence of a supportive context.

The authors found that priming these metaphors with appropriate context sentences produced the metaphor interference effect. For example, priming the metaphor "smiles are razors" with either a figurative sentence ("some remarks are cutting") or with a literal sentence ("tools are cutting") that was

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related to the figurative interpretation of the target metaphor slowed subjects "false" responses to the metaphor compared to the effect of those priming sentences on unrelated false sentences. The important feature of these results for the distinction between literal and figurative interpretation is that since both the literal and figurative sense of "cutting" in the above example primed the meaning of "Smiles are razors," Gildea and Glucksburg interpret this as evidence against a difference in literal and figurative processes in language comprehension.

However, it could be argued that the distinction between literal and figurative primes in this study needs to be clarified. Gildea and Glucksberg reasoned that their literal sentence primes activated a literal sense of the crucial word forming the metaphor interpretation and the figurative sentence prime activated the figurative sense of that word. However, by examining the example of metaphor and prime types given above, one can see that both prime sentences are figuratively related to the metaphor; that is, both prime sentences are about cutting which is involved in the figurative meaning of the metaphor. In contrast, a literally related prime would be one that is literal with respect to the content words in the metaphor—"smiles", or "razors". Gildea and

Glucksberg's conclusion that figurative and literal meanings are derived from the same process would be justified only if they showed that primes literally related to the metaphor content words (for example, "beard," "shave", or "grin," activated the meaning of the metaphor as effectively as words that were related to the figurative meaning of the metaphor.

In fact there is some evidence to indicate that primes literally related to metaphoric vehicles do not speed comprehension time for metaphors. Paivio and Clark (1986) primed interpretation time for poetic metaphors by presenting the topic noun or vehicle (predicate) noun prior to presentation of the metaphor to be interpreted. They found that the literal presentation of the topic noun speeded interpretation time compared to a no-prime condition, but presentation of the vehicle noun actually slowed interpretation time. This result suggests that vehicle nouns in metaphors may not be interpreted by the same process as topic nouns in those metaphors since prior experience with a literal representation of the vehicle noun slowed interpretation time. Further, it seems reasonable to suggest that the Paivio and Clark (1986) results indicate that topic nouns in metaphors may be literally interpreted, since interpretation times were primed by prior experience with the topic

nouns.

Paivio and Clark used interpretation time as the dependent measure in their priming studies which showed a positive effect for a topic-related prime. In contrast, Shinjo and Myers (1987, Experiment 3) found that primes semantically related to the topics of metaphors slowed reading times for those metaphors compared to a baseline no prime condition. For example, the word "bridal" presented prior to the metaphor "Mary's marriage was an icebox" slowed reading time for that sentence. The apparently conflicting results between the two experiments may be attributable either to the different dependent measures used, or to the difference between the prime types. For example the prime word "bridal" in the above example, seems to bear a different relationship to the metaphor itself than would a literal presentation of that topic noun- "marriage".

Importantly, however, Shinjo and Myers found that this interference effect of topic-related primes was also observed for literal sentences that were paraphrases of the metaphors (e.g. "Mary's marriage was disastrous".) They interpreted this result as showing that "comprehension mechanisms" for figurative and literal language "may be very similar". Although this result does suggest that topics of metaphors and

their literal paraphrases may be comprehended by a similar process, the Shinjo and Meyers results do not permit the conclusion that the entire sentence is interpreted similarly in both figurative and literal cases. For example, metaphors were consistently rated as more difficult to understand than were their literal paraphrases and took longer to read and/or comprehend in two experiments. This seems inconsistent with the similar process explanation. In addition, inspection of the priming results (Experiment 3) for figurative and literal sentences indicates that priming effects were not the same for the two types of sentences when the predicate (vehicle) nouns were primed. For the metaphors, a positive priming effect on reading time (111 msec on average) was observed when primes were words that were derived from the vehicles of the metaphors. For example, subjects were faster at reading "Mary's marriage was an icebox" when it was preceded by the prime "cold". In contrast, reading time for literal paraphrase sentences such as "Mary's marriage was disastrous" showed an average inhibition effect of 30 msec when preceded by the same word ("cold") that primed reading times for the related metaphor.

The conclusion that priming effects reveal no difference in figurative and literal comprehension

processes is therefore not warranted by the results of these priming experiments taken together. For example, it appears that different effects are observed for primes related to metaphor topics and vehicles. If subjects are primed with a literal repetition of the topic word in a metaphor, they show speeded interpretation time; this effect does not occur for literal presentation of vehicle noun (Paivio and Clark, 1986).

When comprehension of a metaphor is compared to comprehension of its literal paraphrase, priming by a word related to the topic noun has the same effect in both cases; in contrast, priming with a word related to the predicate of the metaphor and literal paraphrase shows a different effect for the metaphor and literal sentence (Shinjo & Meyers, 1987).

These priming results suggest that figurative and literal prime types will differentially influence comprehension of topics and vehicles in metaphors.

Further, the results suggest that the idea of what constitutes a figurative prime compared to a literal prime needs clarification. For example, in addition to the previously discussed failure of this distinction to emerge in the Gildea and Glucksberg (1983) study, the Shinjo and Meyers study may be criticised on the same grounds. Primes for literal

sentences could themselves be considered to be figuratively related to those sentences. For example, the prime "cold" is figuratively, not literally, related to the predicate of the literal sentence "Mary's marriage was disastrous". In contrast, the prime "cold" appears to be more literally related to the vehicle noun in the metaphor "Mary's marriage was an icebox". It becomes difficult, therefore to unambiguously interpret priming differences for figurative and literal sentences when the relation between primes and sentences are confounded in this manner.

The review of the above experiments raises questions about the conclusion that figurative and literal comprehension results from similar processes. Consider how one final experiment can be re-interpreted to support the idea that figurative meanings are comprehended by a different process than literal meanings. Meuller and Gibbs (1987) were concerned with differences in comprehension time for two different kinds of idioms. One type of idiom, represented by "hit the sack" has both a literal and non-literal meaning. A second type of idiom, represented by "to poke fun at" apparently has only one level of meaning- the non-literal, or idiomatic meaning. Meuller and Gibbs predicted that idioms with

two levels of meaning should be comprehended more rapidly than those with only one level.. They based this prediction on findings which suggest that lexical access for words with several meanings is faster than access for words with only one meaning (e.g. Swinney and Cutler, 1979). The argument is that when a language unit has more than one representative in semantic memory probability of accessing any one of those representatives is increased over the case where a single representation must be found. Meuller and Gibbs obtained the predicted result that idioms with both a literal and figurative reading were understood faster than those with only a non-literal meaning. However, it could also be the case that the more rapid responses in the case of the first type of idiom was due to the literal meaning alone allowing rapid comprehension, rather than the dual meanings combined. Therefore, these results are consistent with the hypothesis that figurative meanings are derived secondarily from literal meanings. Idioms with only a figurative meaning take longer to understand because the literal interpretation is not available to allow a rapid sense of comprehension.

It appears, therefore, that there may be little justification for the ready acceptance of the view that the literal-figurative distinction is incorrect.

This conclusion has also been drawn recently by Reyna (1986) and by Dascal (1987) who similarly argue that much of the research that has been taken as failure to support the figurative/literal distinction in language processing has suffered from a lack of a clear theoretical conception of that distinction. It remains quite plausible that figurative interpretation may be more abstract in the sense described by Searle-- that is, that figurative interpretations must reconcile the divergence between the literal meaning of the words of a sentence and the intended meaning that a speaker wishes to convey.

Searle's approach, then, may provide a reasonable basis for construction of a model of figurative processes in language, but the appropriateness of the approach remains to be confirmed empirically. Significantly, it is likely that the current rejection of Searle's distinction between figurative and literal comprehension has resulted in a limitation on the kinds of questions that are asked about figurative language comprehension.

For example, the view has been expressed that any sentence has the potential to be figuratively interpreted (e.g. Verbrugge, 1980). Therefore, it has seemed "pointless" to ask about what features of utterances allow them to be metaphorically interpreted

(Verbrugge, 1980). Interestingly, however, Searle's account of the figurative interpretation process does suggest that figurative interpretations would not be potentially available for "any" linguistic expression.

The crucial point in Searle's analysis is that in figurative interpretation, a language comprehender derives a non-literal interpretation from a conventionalized, literal level of linguistic representation. Thus, in cognitive processing terms, a literal representation has been activated prior to figurative processing, but processing does not end with that activation. The next stage, according to Searle, requires that some aspect of the literal representation be abstracted to form the basis of the figurative interpretation.

This presents a problem for the idea that any linguistic unit could function in a figurative capacity. The problem lies in specifying how this hypothesised abstraction process could occur with abstract words which presumably exist because they label abstract relations, and would therefore presumably lack the potential for further figurative abstraction. Given this limitation, it seems reasonable to argue that only concrete words have the potential to be figuratively interpreted. The distinction between figurative and literal language

may therefore rest in part on the distinction between the cognitive representation of concrete and abstract language.

The Role of Imagery-Concreteness in the Distinction
between Figurative and Literal Interpretation

No existing psycholinguistic theory of metaphor has explicitly identified concreteness as a necessary aspect of figurativeness, although a number of theorists (e.g. Lakoff and Johnson, 1980) refer to the idea that metaphors allow the comprehender to understand abstract experience in terms of the more concrete. To use an example given by Lakoff and Johnson, the metaphor "Argument is war", allows us to cognitively structure the abstract concept of "argument" by the more concrete and well delineated concept of war. The link between figurative language and imagery in particular is supported by the observation that figurative language is highly suggestive of mental imagery which in turn is strongly associated with the concreteness of words and phrases (Paivio, 1971). In fact the word "imagery" in literary analysis frequently refers explicitly to the use of metaphor and non-literal language in general (e.g. Webster's New World Dictionary). It is widely asserted from the perspective of literary analysis that imagery is in some way crucially involved in figurative representation. For example, the following quote from Langer (1957) suggests that figurative

meanings are specifically derived from the images suggested by literal meanings.

"In a genuine metaphor, an image of the literal meaning is our symbol for the figurative meaning—the thing that has no name of its own. If we say that a brook is laughing an idea of laughter intervenes to symbolize the activity of the brook" (p. 57)

Literary analyses consistently refer to the role of "images" in the figurative representations of poets, but it remains a problem to specify what functional role those images might have in the process of linguistic expression (Nemerov, 1978).

Psychological investigations of the role of imagery in figurative language raise similar issues. While it has frequently been recognized that figurative language tends to evoke images (e.g. Harris, Layhey & Marsalek, 1980) it has remained an on-going challenge to demonstrate a relationship between mental imagery and figurative language comprehension despite the arguments for this association given above and also reported by language comprehenders (cf. Harris, Lahey & Marsaleck, 1980).

Review of Empirical Studies of Relation between Imagery and Figurative Interpretation

Fainsilber and Kogan (1984) had subjects rate the imagery, novelty, and appropriateness of relations named in metaphors such as "The morning dew is a

bride's veil". They hypothesised that if imagery is functional in figurative interpretation, then high imagery metaphors should be higher quality metaphors than metaphors low in imagery evoking value. In their study they defined metaphoric quality as a product of rated novelty of expression and rated appropriateness of the idea in the metaphor. They found imagery was unrelated to quality of metaphors defined in this way. However, they did find that imagery had an opposite relation with the two variables comprising "quality". Imagery was negatively related to novelty; high imagery metaphors seemed more "familiar" than low imagery metaphors. In contrast, imagery was positively related to appropriateness; the relations named in high imagery metaphors seemed more appropriate than those named in low imagery metaphors. The most defensible conclusion arising from these results seems to be that imagery has a complex role in figurative interpretation processes, and a more careful theoretical delineation of what that role might be is in order.

In general, other studies which have investigated the role of imagery in figurative language interpretation have been taken to show that imagery is not involved in a significant way. These studies, carried out by R. Heneck, R. Hoffman, P. Reichmann and

their colleagues (Honeck, 1973; Honeck, Reichmann & Hoffman, 1975; Honeck & Dorfmueller, 1978, cited in Honeck et al. 1980; Reichmann & O'Mara, 1977, cited in Reichmann & Coste, 1980; Honeck & Kibler, 1984) have used proverbs as experimental materials. In the first of these experiments, Honeck (1973) found that proverbs that were paired with their abstract interpretations during the learning phase in his experiment were recalled better than proverbs that were simply repeated. Since the effect of having an interpretation was the same regardless of whether the proverbs were high or low in imagery, Honeck concluded that the abstract interpretive process and not the imagery suggested by the words of the proverb is the important feature of figurative comprehension and memory.

However, the data supplied by Honeck (1973) suggests a different conclusion. The results presented show that the effect of imagery on free recall for proverbs is at least as important as the effect of having an interpretation at learning (see table 1). Although Honeck noted the main effect of imagery on recall of proverbs in his study, pointing out that high imagery proverbs were consistently recalled better than low imagery proverbs, he did not comment on the result that high imagery proverbs

Table 1

Effects of Imagery and Interpretation on Free Recall of Proverbs

(Data from Honeck, 1973)

<u>Learning Condition</u>	<u>Proverb Imagery Level</u>		Mean Recall Across Imagery Condition
	High	Low	
Interpretation	16.90	9.88	26.78
<u>Repetition</u>	13.50	6.75	20.25
Mean Recall			
Across Learning Condition	30.40	16.75	

without an interpretation were recalled better than low imagery proverbs with an interpretation.

Inspection of the data supplied by Honeck reveals that overall the effect of imagery on memory for proverbs appears to be about twice that of the effect of having an interpretation at learning. This study therefore cannot be taken to support the idea that imagery is less important than interpretation in figurative comprehension and memory.

This re-interpretation of Honeck's results suggests that imagery may be important in memory for figurative ideas. However, the role for imagery in the figurative interpretation process itself has been questioned on the basis of further proverb studies which investigated cued recall rather than free recall for proverbs. In these studies, (a prototypical one would be Reichmann & O'Mara, 1977; reviews are in Reichmann & Coste, 1980; Honeck, Voegtle, Dorfmueller & Hoffman 1980) subjects were instructed either to comprehend or image proverbs which varied in imagery level. Memory for figurative meaning was tested later by having subjects say whether they recognized interpretations of the experimental sentences, or to sometimes to generate the proverb itself in response to the interpretation. The typical findings were that instructions to comprehend produced better

interpretation recognition than instructions to image, and recognition of interpretations for low imagery proverbs was at least as good as recognition for high imagery proverb-interpretations. These results were taken to show that figurative interpretation involves the generation of an "abstract conceptual base" which is imagery free; and that imagery could actually encourage a "literal level of comprehension" and make figurative interpretation more difficult.

This Conceptual Base Hypothesis (Honeck, Reichmann & Hoffman, 1975) of figurative interpretation, then, has been developed as a response to findings of lack of apparent imagery effects in memory for figurative meanings. The basic premise of the hypothesis is that figurative interpretation entails generation of an abstract representation when it is recognized that a problem in literal interpretation has occurred. The general framework of the conceptual base hypothesis is therefore quite similar to the idea that I have derived from Searle's model that figurative interpretation is abstract interpretation from a literal base. The important difference between the two approaches concerns the functional role of non-verbal processes in the generation of a figurative interpretation. According to Honeck et al (1980) and to Reichman and Coste (1980), imagery occurs at the

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literal level of meaning and it "is neither necessary nor sufficient as a means of figurative interpretation" (Honeck et al., p. 155). According to the proposal here, however, figurative interpretations require a concrete, high imagery base.

The inference that imagery-concreteness may play a critical role in figurative interpretation is actually supported by an examination of the proverb materials used in the conceptual base studies cited above. It is important to note that in these studies, the experimenters did not obtain empirical measures of the figurativeness of their proverbs; they were relying on their intuitive notion that "the basic property of proverbs is that they can be understood on both a literal and a figurative level" (Honeck et al. p.129). However, it could be suggested that low imagery proverbs do not have a "figurative level" of meaning.

For example, a low imagery proverb from Reichmann & Coste (1980) was "A friendly denial is better than an unwilling compliance". This proverb does not seem to have any figurative meaning. If abstract proverbs lack the potential to be figuratively interpreted, then comparing high and low imagery proverbs on any cognitive task would require that the confounding of imagery with figurativeness be accounted for. With

respect to the conclusions of the proverb studies cited above, if low imagery proverbs lead to literal interpretations and high imagery proverbs lead to figurative interpretations, the different relation between proverb and interpretation for the two imagery levels may be the variable that influences cued recall performance. For example, a literal interpretation may be related to the (abstract) proverb in such a way that a relative memory advantage results.

Thus, a demonstration of a relationship between imagery and figurativeness would clarify issues related to the distinction between figurative and literal language both empirically and theoretically.

Study 1

Mental Imagery and Levels of Figurativeness in Comprehension of Proverbs

Part 1: Measuring Figurativeness in Proverbs

The general aim of this thesis is to demonstrate empirically a relationship between linguistic concreteness and figurative interpretation processes and to generate a cognitive account for that relation. To that end there are two questions directing this first study: a) whether differences in figurativeness-levels of proverbs suggested by the critique of the Reichmann and Coste (1980) materials can be measured empirically; and b) whether concreteness of reference, measured by subjectively experienced imagery, is associated with the potential for a proverb to be interpreted figuratively.

The usual procedure for measuring figurativeness of language materials has been to ask subjects to rate metaphors on the degree to which they seem metaphorical, with metaphoricity defined as "a type of sentence in which one object is compared to another in a non-literal way" (Katz et al. 1985, p. 381; Marschark et al, 1983). However, an examination of proverbs as experimental materials, as well as arguments by

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metaphor scholars (e.g. Ortony, 1979; Ortony, Reynolds and Arter, 1978; Reyna, 1986) suggest that sentences differ in the way they are metaphorical. Proverbs, for example, which have been defined as "short, pithy sayings in general use" (Concise Oxford Dictionary of English Use, 1951) seem to represent a range of figurativeness of expression.

It can be observed that many proverbs have two levels of meaning--they are sensible literal sentences, and they have a figurative interpretation as well (e.g. You never miss the water till the well runs dry; A little pot is soon hot). This type of proverb is typically concrete in wording; but its intended meaning diverges from the concrete, readily imaged words of the sentence. These sentences are figurative, not in relations described within the sentence, but specifically in the relation between the expressed meaning of the sentence, and the (apparent) intended meaning of the speaker. Therefore, the putative distinction between expressed and intended meaning in figurative language appears relevant to particular aspect of figurativeness-- the extent to which a sentence means something other than what it says on the surface.

This difference in expressed and intended meaning for the proverb "A little pot is soon hot" is

illustrated in Table 2. The expressed meaning of that proverb is represented by the words of the proverb. The intended meaning is represented by a verbal interpretation of the "meaning" of the proverb. Note that while some words making up the expressed or surface meaning are retained in the intended meaning, others are not. Presumably, the degree of figurativeness of the relation between expressed meaning and intended meaning would be a function of the number of key words in the proverb which are not key words in the interpretation. This analysis identifies the relation between the proverb and its interpretation as crucial in defining the degree of figurativeness of a linguistic expression.

The divergence of expressed and intended meaning may be a different aspect of figurativeness than that measured by the degree to which a sentence compares one object to another in a non-literal way. For example, a relatively large group of proverbs express metaphorical relations within the sentence itself by comparing (often implicitly) one object to another in a non-literal way (e.g. Poetry is truth in its Sunday clothes; Necessity is the mother of invention). Proverbs of this type do not have a "literal" level of meaning; they are metaphorical in the relations expressed within the sentence itself. For proverbs of

Table 2

Figurativeness of Proverbs Shown by the Relation Between"Expressed" and "Intended" MeaningProverb Type

- 1 Expressed Meaning: A little pot is soon hot.
Intended Meaning: Small people are more emotionally volatile than big people.
- 2 Expressed Meaning: Necessity is the mother of invention.
Intended Meaning: New ideas and solutions come from necessity.
- 3 Expressed Meaning: No one is more profoundly sad than he who laughs too much.
Intended Meaning: People who are always laughing are hiding feelings of deep unhappiness.

this type, the intended topic of the sentence appears to be more directly expressed in the words of the proverb than for proverbs of the type represented by "A little pot is soon hot". That is, in the example of the first type of proverb given above, the intended meaning (Table 2) is not about pots or quickness of cooking; in the proverb about "Necessity" the intended meaning is about necessity-- figurative reference is involved only in interpreting the vehicle--the predicate term that comments on the topic (see Table 2 for illustration). Thus while proverbs of this type may be highly figurative in terms of relations named within the sentence, they may be less figurative than the first type in terms of the relation between expressed and intended meaning.

It has been observed by other students of metaphor that structural differences in metaphors have been too often ignored in investigations of the psychological processes involved in comprehension of figurative language (e.g. Reyna, 1986; Honeck, 1986). The difference in structural aspects of proverbs noted above could be very important for the theory of figurative processes proposed here which suggests that concreteness of reference is necessary for figurative abstraction. This is because, in specifying that only concrete language is interpretable in a figurative

sense, the theory distinguishes between concrete and abstract words in their role in the figurative process and suggests that proverbs about abstract concepts such as "responsibility" and "necessity" may require less figurative processing than those about concrete concepts. In this sense then, the more abstract the sentence, the more literally it would be interpreted, and the less likely it would be tapping processes assumed to underly figurative representation and interpretation.

The relation between abstractness of wording and literalness of expressed meaning is clearly seen in a third type of proverb shown in Table 2 (e.g. No one is more profoundly sad than he who laughs too much; He who always complains is never pitied). This type of proverb, while abstract in wording, seems quite literally intended, and thus represents the other end of the figurative-literal dimension. Proverbs of this type seem to be literal both in the relations named in the sentence itself (they reflect a real-world state of affairs) and in the relation between the expressed and intended meaning of the speaker.) Again this particular class of proverbs, if their generality can be empirically confirmed, supports the idea that abstractness of reference is associated with literalness of interpretation processes.

In summary, it can be suggested, that two aspects of figurativeness seem to be represented in proverbs. The first aspect is whether a sentence means something other than what it says on the surface. This aspect is of major importance to the theory that figurative interpretation requires an abstraction from the expressed meaning of an utterance to its "intended" meaning. The following proverbs would presumably reflect, in decreasing order, the degree to which figurative processing in this sense would be required:

- 1) The dog in his kennel barks at his fleas, but the dog who hunts does not feel them.
- 2) Experience is the father of wisdom and memory the mother.
- 3) Our pleasures are mostly imagined but our griefs are real.

The second aspect of figurativeness is whether the relations described in the sentence are literally plausible. Figurativeness in this respect would be a characteristic of the second of the above proverbs, which does not describe real world relations, but would not be a characteristic of proverb examples 1 and 3 which are literally acceptable sentences. In

itself, this aspect of figurativeness may be less directly related to the degree to which a sentence requires the non-literal processing described by the abstraction theory, for reasons described above. Therefore it remains an important question as to what extent these two aspects of figurativeness can be empirically distinguished.

Subjects in this study engaged in a rating task that was designed to see if proverbs differed in the hypothesised manner with respect to degrees of figurativeness.

Method

Subjects

Forty-eight adult students in an evening section of an introductory psychology course participated for course credit.

Materials

Two hundred and forty proverbs were selected from standard anthologies such as The Concise Oxford Dictionary of Proverbs; and The Oxford Dictionary Of English Proverbs. Only proverbs which earlier pilot testing had suggested would be unfamiliar to most introductory psychology students were selected. In selection, I tried to ensure that the three types of proverbs noted above were equally represented in the sample. The 240 proverbs were divided into 4 lists with 20 proverbs of each "type" of proverb on each list. In addition, 20 literal sentences taken from encyclopedias and characterized by the short "general statement" style of the proverbs were placed on each list. (e.g. Bread is a nutritious food). Finally, 12 items on the lists were repeated test items, used in order to check for internal reliability of subject responses. In all then, there were 92 sentences on each list.

A questionnaire form was made up, with two questions on the top of each page. These two

questions, designed to measure figurative-literality, along with an elaborated explanation were:

1. Is the intended meaning of the sentence directly expressed in the words of the sentence?

(Explanation: Compare the following two sentences.

"No man can give what he hasn't got". "You can't get blood out of a stone". The intended meaning of both these sentences is the same. In the first sentence it is directly expressed in the words of the sentence but in the second sentence the meaning is not directly expressed, it must be inferred).

2. Could this sentence be used to describe a state of affairs in the real world?

(Explanation: Compare the following two sentences.

"The child is father to the man." "The burnt child avoids the fire." The first sentence does not describe a state of affairs in the real world. It does not make sense in a literal way. The second sentence, however, does make good literal sense-it could be used to describe a state of affairs in the real world.)

A list of sentence numbers appeared on the left column of each questionnaire page, corresponding to the sentence numbers in the booklet of proverb sentences. A scale, numbered 1-5 was given under both questions

for subjects to rate the degree to which the question was true of each sentence in the accompanying booklet. A "no" answer would be given a 1 rating and a "yes" answer was to be given a 5. A sheet of written instructions accompanied each booklet.

Subjects were instructed to rate each sentence in turn on the two questions before proceeding to the next sentence. All materials are in appendix 1.

Procedure

The experimenter met with subjects in a group and told them that their task in the experiment would be to rate sentences on two questions. The questions were read, and illustrative examples were given showing subjects how intended meaning was not always expressed in the words of a sentence, and how a sentence did not always express a state of affairs that could be possible in a literal sense. Booklets were then handed out to subjects; they were asked to complete them and return them to class the following week. The experimenter's phone number was included in each set of materials in case problems should arise when answering the questions (only one person used it). Subjects were asked to write down the time required to complete the questionnaire. (The average time was one hour with times ranging from 50 minutes to 90 minutes.)

In a second part of the study, another group of 40 subjects (10 per list) rated each sentence for ease of imagery and then for ease of comprehension.

Results, and Discussion

Part 1: Literalness Ratings

Mean ratings on the two dimensions of literalness were calculated for each sentence by averaging subject responses (12 per sentence) for each of the two questions. Recall that it was assumed that each question measured a different aspect of figurativeness and that increasing literalness on either measure would be reflected in high ratings for the relevant question.

To confirm this assumption mean ratings on both questions for the proverbs were compared against the mean ratings for the literal sentences. For question 1, which measured divergence of expressed from intended meaning, the mean rating for proverbs as a group was 2.78, and for literals was 4.41 on the 5-point scale. Analysis of variance revealed that the group differences were significant ($F=191.2, df1, 317, p<.001$). Subjects believed that the intended meaning of the proverbs was less directly expressed in the words of those proverbs than was the

intended meaning of the literal sentences.

For question 2, which measured the literal plausibility of the sentences, the mean rating for proverbs (3.35) was again significantly lower than for literal sentences (mean rating 4.52, $F=135.81, df=1, 317, p<.001$). As a group, proverbs were recognized as less plausible in within-sentence relations than were the literal sentences. Thus, the questionnaire format devised for the study was tapping an aspect of sentence meaning that differentiated proverbs from literal sentences, as it was intended to do.

A second, more important concern was whether a wide range of figurativeness could be observed in the proverb sentences. This issue is particularly important because proverb interpretation studies have been based on the apparent assumption that all proverbs are equally figurative. The proverbs varied widely in obtained ratings on question 1 which measured figurativeness as a function of divergence of intended meaning from expressed meaning. Mean ratings for individual proverbs ranged from lows of less than 1.5 (e.g. A blunt wedge succeeds where a sharp axe may fail) to highs of over 4.5 (e.g. War destroys many for the benefit of a few.). Similarly, the proverbs ranged widely in the obtained ratings for the question

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measuring literal plausibility, with lows of less than 2 (Early wed; early dead) to highs of more than 4.5 (Admonish your friends in private; praise them in public). The proverbs varied more on both dimensions of figurativeness than did literal sentences (see table 3 for standard deviations).

Another question of interest was whether the ratings on the two measures of literalness would be independent. The simple correlation between ratings for each question revealed that the two measures of literalness were significantly related ($r = .51, p < .001$). The nature of this relationship was further explored by examining the pattern of the literalness ratings yielded by grouping proverbs according to whether they fell above or below the relevant means (2.78, 3.35) on the two 5-point scales. Thus, four groups of proverbs were established with high and/or low values on each scale. The percentage of total proverbs falling into each group are shown in the top panel of Table 4. Examples of each type are given in the text following the relevant descriptions.

The four groups of proverbs formed by this classification correspond largely but not completely with the theoretical typology that led to the study. Accordingly, it seems appropriate to describe the groupings as proverb types. These types may be

Table 3

Means and Standard Deviations For Proverbs and Literal Sentences
on Two Measures of Literalness

<u>Sentence</u> <u>Type</u>	<u>Literalness 1*</u>		<u>Literalness 2 **</u>	
	<u>Mean</u>	<u>S.D.</u>	<u>Mean</u>	<u>S.D.</u>
Proverb	2.78	.98	3.35	.85
Literal	4.41	.62	4.52	.45

* Literalness 1: Literalness of relation between expressed and intended meaning

**Literalness 2: Literalness of within-sentence relations

Table 4

Proportion of 240 Proverbs Identified by Mean Scores on
Rated Literalness of Relation Between Expressed and Intended
Meaning and Rated Literalness of Within-Sentence Relations

Literalness of Expressed/Intended Meaning

	<u>Low</u>	<u>High</u>
<u>Literalness of</u> <u>Within-Sentence</u> <u>Relations</u>	<u>High</u> .17 (Type 1)	.32 (Type 3)
	<u>Low</u> .38 (Type 2)	.12 (Type 4)

understood in the following manner.

Types 1 and 3 (Literal in within-sentence relations):

Type 1:

(Examples: Don't have your cloak to make when it begins to rain.

A cook is not taught in his own kitchen.)

This group of proverbs is rated as highly figurative in the relation between expressed and intended meaning but as literal in the relations named within the sentence. These proverbs, then, are a group of sentences which are literal at the level of sentence structure but which can potentially have a figurative interpretation.

Type 3:

(Examples: Virtues are often vices disguised.

When two persons do the same thing it is not the same thing:)

This group of proverbs was rated as literal on both measures of figurativeness. They express within-sentence relations in a literal fashion and the relation between expressed and intended meaning is seen as correspondent. In this way they differ from Type 1 proverbs, which, while similarly rated as literal in sentence structure, were seen as figurative in their potential for another level of meaning.

Types 2 and 4 (Figurative in within-sentence relations)

Type 2:

(Examples: A man's manners are the mirror in which he shows his portrait.

Experience is the father of wisdom and memory the mother.)

These proverbs are like Type 1 proverbs in that they are rated as figurative in the relation between expressed and intended meaning, but in contrast to Type 1 proverbs, they are rated as figurative also in the logical relations expressed within the sentence. Therefore, Type 2 proverbs are those in which the sentence structure itself signals that a figurative interpretation is required. Recall that the rationale for this classification study suggested that proverbs that were figurative in sentence structure should be rated as somewhat literal in the relation between expressed and intended meaning. However, the large number of proverbs comprising this group which was rated as highly figurative both in within-sentence relations and in the relation between expressed and intended meaning suggests that a re-evaluation of this conclusion is required.

In retrospect, it is easy to see that if a sentence is low in literal plausibility of

within-sentence relations, this will tend to influence ratings of how directly the words of the sentence express its intended meaning. For example, consider the proverb

"Punishment is lame but it comes."

A proverb of this type theoretically could be regarded as only moderately divergent in the relation between expressed and intended meaning, since part of the intended meaning is directly identified in the sentence topic-- in this case, "punishment." However, precisely because the "punishment" proverb is clearly non-literal in within-sentence relations, subjects would tend to disagree that the words of the proverb directly express its intended meaning; therefore, they would tend to give such a proverb a lower rating on this aspect of literalness. This suggests that the rating task may not accurately reflect the degree of figurative processing required by proverbs which are clearly metaphorical in sentence structure. This possible failure may be part of a larger phenomenon: Language comprehenders may be quite able to recognize that some sentences are not literally intended without necessarily engaging in figurative processing when comprehending those sentences. For example, when asked, most people would probably notice that a familiar idiom such as "kick the bucket" does not

directly express its intended meaning; ordinarily, however, they may process it in an automatic conventionalized fashion (Gibbs, 1981), indicating that figurative processing may not always be predicted by ratings of figurativeness, particularly when a sentence is clearly metaphorical.

Type 4:

(Examples: Novelty always appears handsome.
A friend to everyone is a friend to no one.)

Finally, this relatively small group of proverbs was rated as highly figurative in sentence structure, but quite literal in the relation between expressed and intended meaning. Like group 2 proverbs, metaphoricity is signalled in the sentence structure, but subjects believed that their intended meanings were more directly expressed in the words of the proverb than was the case for Type 2 proverbs.

The results of this classification study can potentially help to clarify some issues that have been recently identified by metaphor researchers. For example, Honeck (1986) has stated that he no longer considers some proverbs as proverbs at all, but rather as "maxims" or "aphorisms." The example he gives is "Industry is fortune's right hand and stinginess her left." Honeck claims that this is not a proverb because it is "literally" about stinginess and hard

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work. Thus, Honeck seems to be claiming that in order to conform to his present definition of "proverb" a proverb must be interpretable in a completely figurative sense; none of the proverb vocabulary should have literally interpretable referents. According to the classification proposed on the basis of results of this study then, only Type 1 proverbs would meet Honeck's definition.

However, according to the results of the present study, Honeck is not entirely correct in his assumption about the literalness of the "non-proverb" example he gives. This proverb would be a Type 2 proverb - metaphorical in within-sentence relations (i.e., Fortune does not have hands) but somewhat literal in the relation between expressed and intended meaning. In addition, it seems likely that the "literalness" of the relation between expressed and intended meaning would be revealed only when an interpretation of the proverb was actually generated and compared with the wording in the proverb itself. Because the interpretation repeats some of the words of the proverb (e.g. fortune, stinginess and industry) the proverb is less figurative in the relation between expressed and intended meaning than would be a proverb in which no words of the proverb were literally interpreted. Thus the distinction between the two

kinds of metaphoricity found in proverbs could clarify some of the controversy that Honeck identifies as surrounding the nature of materials used in figurative language research. The sense of "metaphoricity" that appears to be of particular interest is that sense identified by Searle's analysis--the divergence of expressed meaning and intended meaning.

The results demonstrate that figurative language can be distinguished from literal language on at least two dimensions; the two dimensions are first, the divergence of intended meaning from expressed meaning and second, the logical relations named in the sentence. Recently, Lakoff (1986) has proposed that there are at least four senses of "literal" that must be distinguished when defining metaphorical language as contrasting with literal language. The four senses of "literal" that Lakoff notes are: 1) the extent to which language is "conventional"; 2) the extent to which language is typically used to talk about a particular subject; 3) the extent to which language is directly meaningful--that is, it is not expressed in terms of something else; and 4) the extent to which language is capable of "fitting the world"--that is, it corresponds to logical truth conditions.

The two measures of literalness used in the present study correspond quite closely to Lakoff's

fourth sense of literal (literal 2 in this study) and a combination of the other 3 senses of "Literal" all of which seem to be centered on the notion of "conventionality" (measured by Literal 1 in this study). Thus it appears possible to empirically distinguish figuratively interpreted sentences from literally interpreted sentences on at least these two dimensions.

The result of major interest arising from the classification study is that the potential for having a figurative meaning can be separated from the kind of figurativeness that is signalled by a sentence structure that requires a metaphorical interpretation. Type 1 proverbs are rated as literally acceptable sentences but they suggest figurative meanings. On the other hand, Type 3 proverbs are also literally acceptable sentences, yet they do not suggest figurative interpretations. What features of the materials explain the difference in potential for a figurative interpretation? In particular, the role of imagery-concreteness as an important contributor to figurative potential is the focus of the following investigation.

Part 2: Aspects of Language Associated with Figurative Potential: Imagery and Comprehensibility

The results of the first part of this study showed that proverbs can be classified according to two aspects of figurativeness. One aspect of figurativeness, measured by Literalness 1 in the study, refers to the degree of divergence between the meaning expressed by the words of the proverb and its intended meaning. This measure of figurativeness was derived directly from Searle's (1979) analysis of figurative interpretation. Figurative proverbs, according to this measure, are those which received low ratings of agreement for the question "Is the intended meaning of the sentence directly expressed in the words of the sentence?" Therefore, I will refer to this variable as literalness of expressed meaning throughout the following sections of the thesis.

The second measure for figurativeness in proverbs was called Literalness 2 and may be regarded conceptually as the literalness of relations named within the sentence. Proverbs are figurative by this measure if they received low ratings of agreement for the question, "Does the sentence express a state of affairs that is plausible in the real world?" Therefore, I will refer to this variable as literalness of within-sentence relations throughout the rest of the thesis.

The next question concerns whether imagery - concreteness is associated with the potential for proverbs to be figuratively interpreted. According to the proposed theory, concreteness of reference is necessary to support an interpretation that is not literally expressed by the words of the sentence. This assumption is made because the "abstraction" process described in the theory entails that the linguistic source of the abstraction-- in this case the words of the proverb-- is not itself a completely abstract representation. The theory then, permits a precise statement about how imagery-concreteness could be related to rated figurativeness of language materials as measured by Literalness 1 and Literalness 2 in the present study.

Imagery-concreteness should be negatively related to the literalness of expressed meaning (Literalness 1). A low-imagery abstract proverb should not permit figurative abstraction defined in this way; such proverbs should be given high scores on literalness of expressed meaning. On the other hand, when a proverb is given a low score for literalness of expressed meaning, it should be rated as high in imagery.

Consider now the relation between imagery-concreteness and Literalness 2 which reflects the literalness of relations named in the proverb.

The theory of figurative abstraction does not suggest a specific association between imagery and literalness of within-sentence relations. Presumably both abstract and concrete sentences could describe relations that are "plausible in the real world". In fact, in contrast to the predicted negative association between imagery and literalness of expressed meaning, imageability could presumably positively contribute to the literalness of within-sentence relations.

By way of an illustration for the different role of imagery-concreteness for the two measures of figurativeness, consider the high imagery proverb Dirt is dirtiest on the fairest spot.

This proverb is rated as highly figurative in the relation between expressed and intended meaning and highly literal in the plausibility of relations named in the sentence. Presumably, concrete high imagery sentences express relations that "sound literally true" or plausible. Nevertheless, such proverbs are figurative in that the intended meaning is not directly expressed in the words of the proverb.

In contrast, the abstract proverb He who has property has relations is rated as literal in the relation between expressed and intended meaning, but as more figurative in within-sentence relations, presumably because it is

not always literally true in the real world that wealthy people come from big families.

The prediction is therefore that as proverbs become increasingly abstract in wording, they should become increasingly literal in the relation between expressed and intended meaning; this negative association between imagery-concreteness and literalness should not be observed for literalness of within sentence relations.

Method For Obtaining Imagery and Comprehension Ratings
For Proverbs

A new group of 40 subjects, (10 per list) was asked to provide ease of imagery and ease of comprehension ratings for the lists of sentences used in part 1. Imagery ratings appear to be the appropriate measure of concreteness of reference in view of the well established strong association between imagery and word concreteness (Paivio, 1971; 1986; Richardson, 1981). Subjects were instructed to read the provided list of sentences (60 proverbs and 20 literal sentences) and to rate each sentence on a 7-point scale for first, how readily it suggested a mental image, with 7 representing the easy end of the scale.. Following the imagery rating task, the same subjects were asked to read each sentence a second time, and this time to rate the ease with which it could be understood-again on a 7-point scale. Comprehension ratings always followed imagery ratings in order to minimize effects of previously comprehending the proverb on rated imagery.

Results and Discussion of Imagery and
Comprehensibility Rating Task for Proverbs

Pearson correlation coefficients for both literalness ratings and imagery and comprehensibility ratings were computed for the proverbs. The results of this analysis (Table 5) showed that as predicted, imagery was significantly related to only one aspect of figurativeness. As proverbs increased in literalness in the relation between expressed and intended meaning (Literalness 1) their rated imagery values decreased ($r = -.27, p = .001$). There was no significant correlation ($r = .08, p > .1$) between imagery values and rated figurativeness of relations named in the sentence.

Since results from the first part of the study revealed that the ratings of the two theoretically different measures of figurativeness were empirically confounded, partial correlations between imagery and each of the two measures of literalness were calculated with the second measure partialled out. Results of these partial correlations, reported in Table 5, revealed that when the relation between imagery and Literalness 1 was unconfounded by Literalness 2, the negative correlation between imagery and Literalness 1 increased in strength; in

Table 5

Pearson Correlation Coefficients for Literatness Ratings,
Rated Ease of Imagery, and Rated Ease of Comprehension

	Lit 1	Lit 2	Imagery
Lit2	.51		
Imagery	-.27(-.36)	.08(.26)	
Comprehensibility	.34(.16)	.42(.30)	.36

Note: Bracketed Figures are partial correlations with control for overlap between Lit1 and Lit2.

contrast, the partial correlation between imagery and Literalness 2 was significantly positive with Literalness 1 controlled. This result shows that imagery contributes to figurativeness precisely as stated by the abstraction theory; increasing literalness in the relation between intended and expressed meaning is associated with decreasing imagery-concreteness of the linguistic material. In contrast, increasing literalness of within-sentence relations is associated with increasing imagery-concreteness.

In contrast with the different relation between imagery and the two measures of literalness, ease of comprehension was consistently positively correlated with literalness, for both measures (r 's = .34 and .42, both p 's < .001). Further, imagery and comprehensibility were themselves significantly related such that overall high imagery proverbs tended to be more easily understood (r = .36, p < .001).

These correlation patterns highlight the particular role for imagery in figurative interpretation; Imagery separates from comprehensibility and literalness only on the measure of literalness of expressed meaning where a negative relation between imagery and literalness and a positive relation between comprehensibility and

literalness was observed.

These correlational results suggest that the role for imagery is quite specific to the aspect of figurativeness which is measured by divergence of expressed from intended meaning--that is with the potential for language to mean something other than what it says on the surface. This result can be clarified by looking at the rating patterns for the individual proverb groups (Table 6).

Consider first proverbs which are literally acceptable sentences; that is they were rated as highly literal in within-sentence relations. These literally plausible proverbs differed however, in their potential for a figurative interpretation; Type 1 proverbs were rated as figurative in the relation between expressed and intended meaning, while Type 3 proverbs were rated as literal in this regard. By comparing imagery ratings for these two groups of proverbs, a clear comparison for the role of imagery in figurative interpretation may be made. The prediction is that rated imagery should be higher for Type 1 proverbs which are divergent in the relation between expressed and intended meaning. In agreement with this prediction, Type 1 proverbs were rated as significantly higher in imagery than Type 3 proverbs ($t = 4.33, df = 64, p < .001$).

Table 6

Mean Imagery and Comprehensibility Ratings for Proverbs
as a Function of Patterns of Rated Literalness

Literalness of Expressed/Intended Meaning

		Low		High	
		<u>Imagery</u>	<u>Comp.</u>	<u>Imagery</u>	<u>Comp.</u>
<u>Literalness of</u>	High	4.51	5.17	3.02	5.46
		(1.18)	(.86)	(1.44)	(.95)
<u>Relations</u>	Low	3.52	4.44	2.89	5.00
		(1.29)	(1.11)	(1.17)	(.99)

Note: Standard Deviations in parentheses

Recall that ease of comprehension was shown to be positively correlated with literalness of expressed meaning for the proverbs. Therefore, it could be predicted that Type 1 proverbs should be rated as harder to understand than Type 3 proverbs since in contrast to the latter type of proverb, they require abstraction of the intended meaning from the expressed meaning. While the mean comprehensibility rating for Type 3 proverbs was slightly higher than the mean rating for Type 1 proverbs (mean ratings 5.45 and 5.16 respectively) the difference was not significant ($t = -1.66, p > .1$). The increased abstraction required for comprehension of Type 1 proverbs does not result in increased difficulty in comprehension; therefore, this result suggests that people do not find figurative abstraction "difficult".

Now consider those proverbs in which figurativeness is clearly signalled in the sentence structure, (i.e. those proverbs with low ratings on literalness of within-sentence relations). I have argued that the literalness ratings may fail to isolate the actual degree to which "figurative" processing is undertaken by comprehenders for these proverbs. The argument was that proverbs which are clearly metaphorical in structure of within-sentence relations may be rated as meaning something other than

what the words of the sentence directly express, but that they may sometimes require relatively less metaphorical processing because the topic of the interpretation is directly expressed in the words of the proverb (e.g. Necessity is the mother of invention). Group 2 and Group 4 proverbs were both rated as metaphorical in within-sentence relations, but patterns of figurativeness ratings showed that some proverbs (Type 4) were rated as more literal in expressed meaning than Type 2 proverbs. According to the theory, the Type 2 proverbs, which are rated as figurative in the relation between expressed and intended meaning, should be rated as higher in imagery, since figurative abstraction should be characterized by referential concreteness.

The predicted pattern with respect to imagery and figurative interpretation potential emerged with proverbs in which metaphoricity is signalled in within-sentence relations. For proverbs of this type, mean imagery ratings were significantly higher for those more likely to suggest intended meanings that are not directly expressed in the words of the sentence ($t=2.52, df=53, p=.01$).

Comparing ease of comprehension for these two groups, comprehension ratings were significantly lower for the high imagery, highly figurative

group ($t = -2.58, df = 51, p = .01$).

These results may be briefly summarized:

Abstract proverbs are reliably rated as more literal in the relation between expressed and intended meaning than are concrete proverbs. This difference in degree of divergence between expressed and intended meaning for concrete and abstract proverbs occurs both for proverbs which are acceptable literal sentences and for those in which metaphoricity is clearly signalled in the sentence.

Abstractly worded proverbs therefore appear to be relatively unable to support figurative interpretations. Moreover, imagery and comprehensibility are related to figurativeness in opposite ways, suggesting that the contribution of imagery to the figurative potential of proverbs can be separated from its relationship with comprehensibility.

The results of Study 1 have shown that it is appropriate to distinguish figurative and literal language in terms of the degree of divergence between expressed and intended meaning as suggested by Searle's (1979) analysis. Further, the results have shown that imagery-concreteness is implicated in the figurative/literal distinction described in this manner. Imagery-concreteness is associated with the potential for a proverb to mean something other than

what it says on the surface.

Dual Coding Interpretation of Results

To summarize, the significant empirical result from the rating study is that rated ease of imagery is correlated with the potential of a proverb to mean something other than what it says on the surface. The most abstract proverbs are rated as relatively literal in the relation between expressed and intended meaning. These abstract proverbs are perceived as "saying what they mean"--in this sense they are low in figurative potential. This finding is consistent with the hypothesis that concreteness of reference may be a necessary attribute of figurative language. The theoretical significance of this finding is that it may implicate representational differences for concrete and abstract words in explaining the use of figurative language, and it identifies a property of figurative language which has up to now not been definitively associated with figurative processing.

The association between imagery concreteness and the figurative potential for language can be given a more precise cognitive explanation.

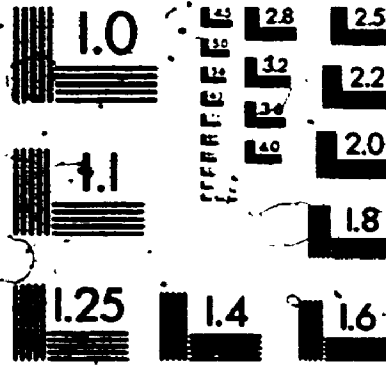
Paivio's (1971; 1979; 1986) dual coding theory of cognitive representation of language can be directly

applied to an analysis of figurative language comprehension. According to the theory, words can differ in their potential for flexibility of cognitive processing. A rich, flexible system for representing and processing meaning is available for concrete words because these words are directly linked in memory to non-verbal representations of experiences associated with the real world referents of those words. For example, the verbal representation of a concrete noun like "milk", or a concrete verb like "drink" can make direct contact with non-verbal representations of the sensory qualities (appearance, sound, feel, taste etc.) of their real world referents. In contrast, abstract words such as "justice" or "patience" are primarily represented as linguistic units and only indirectly access non-verbal representations, mainly through verbal associations which might themselves have non-verbal associated representations.

The implications of the theory for figurative language comprehension range from simple statements of potential differences in cognitive functioning for concrete and abstract words, to a more complex analysis of how the abstract linguistic system can support the further abstraction that underlies figurative interpretation.

A dual-coding based explanation augmented by

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linguistic insights offered by Searle (1979) explains the figurative potential associated with concrete words in the following manner:

1) Linguistic units symbolize, or stand for their referents in a conventionalized, rule governed manner (e.g. "dog" refers to a particular class of things rather than another class); therefore, at some level, all literal reference is conventionalized.

2) Figurative reference (according to Searle's analysis) requires that the referential meaning of linguistic units be de-conventionalized. This de-conventionalization would be possible only to the extent that non-linguistic representations are available for the referential meaning of language units. This is because in order to generate a non-conventional referent, some aspect of the referential meaning of the language unit which is not part of conventionalized referential process needs to be verbally labelled.

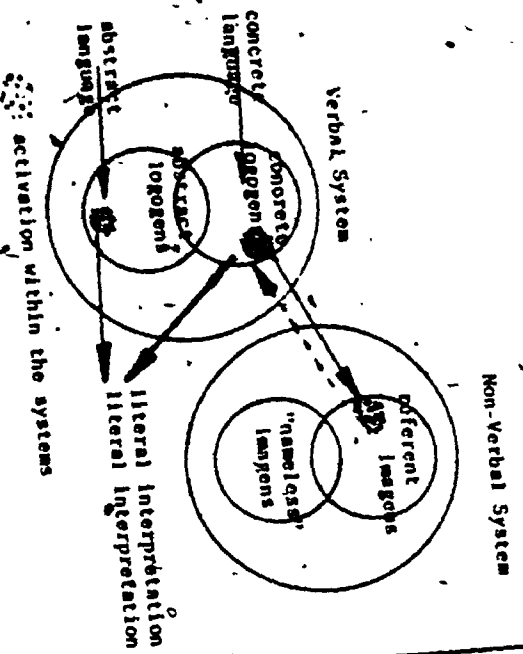
3) Therefore, abstract words, which do not have readily available non-linguistic representations cannot serve a figurative function.

If this analysis is correct, it would serve as support both for a dual coding interpretation of mental representation and for the theory that figurative interpretation requires cognitive

abstraction. Searle's linguistic analysis, and the dual coding analysis, combine to give an interesting and sufficiently complex framework for understanding figurative language. Searle's analysis suggests that figurative and literal interpretation of language differs in that figurative interpretation is an abstract interpretation derived from a conventional, literal base. Paivio's theory about representational differences in concrete and abstract words suggests cognitive mechanisms for such an abstraction process for language. (See figure 1).

One of the primary assumptions arising from the dual coding analysis of representational differences for concrete and abstract words is that concreteness of reference is necessary for figurative processing to occur, and that the generation of a figurative meaning would necessarily involve a non-verbal or imaginal representation of some kind. The findings reported in Study 1 are consistent with this hypothesis; at the same time however, many of the experiments conducted by Honeck and colleagues have seemed to suggest that the role of imagery in figurative interpretation is quite limited. Their research suggests in particular that whatever the role of imagery in figurative language, images do not generate figurative interpretations of proverbs.

Flow of Activation Between Cognitive Systems
for Literal Interpretation



Flow of Activation Between Cognitive Systems
for Figurative Interpretation

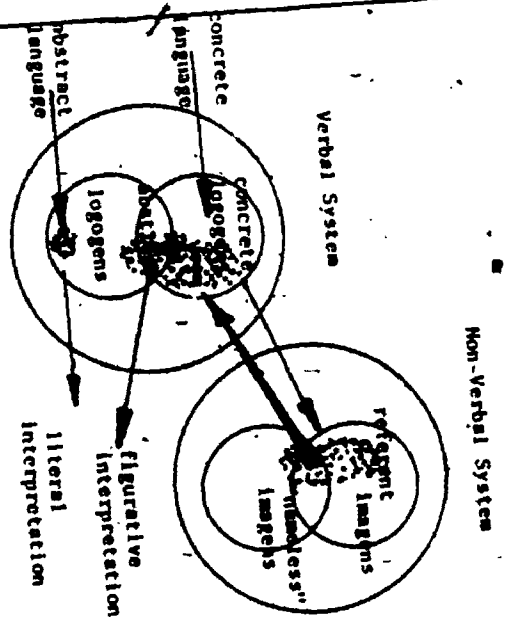


Figure 1: The distinction between literal and figurative interpretation characterized by Dual Coding theory

There are two main sources of support for this assumption (for a review see Reichman & Coste, 1980). First, the instruction to use mental imagery during a proverb learning task appears to interfere with subjects' later recognition memory for figurative meanings expressed in the proverbs. Second, imageability of proverbs is unrelated to cued recall of those proverbs by their abstract interpretations. These findings have been considered as evidence against a dual coding model of figurative language comprehension (Reichman & Coste, 1980) and it is therefore important to critically evaluate the empirical basis for the position that representations of figurative meanings are abstract and imagery free.

Review of Studies Interpreted as Evidence Against Dual Coding Theory of Figurative Language Comprehension

1. Negative Effects of Imagery Instructions on Memory For Figurative Meanings

The negative effect for imagery instructions is demonstrated by the results of experiments in which memory for a list of proverbs was cued by abstract, experimenter-generated interpretations of those proverbs. Subjects who had been instructed to interpret the proverbs during the learning task were more likely to indicate that the interpretation cues reminded them of the original proverbs than were subjects who had learned the proverbs under instructions to focus on and remember the images the proverb suggested. It appeared that imaginal representations of proverbs generated by subjects in the imagery condition were not successfully cued by abstract interpretations of those same proverbs; therefore the authors concluded that representations of figurative meanings are abstract and imagery free. They argue that imagery is appropriate to literal meanings not figurative meanings.

A dual coding analysis of the cued recall task employed by Reichmann and Coste would yield a prediction for exactly the result obtained in their experiments. According to a dual coding analysis, an

imaginal representation suggested by the concrete words of a proverb and an abstract verbal interpretation for that proverb would arise from different cognitive systems. Imagery instructions essentially tell a subject to ignore the interpretation process. When a subsequent recall cue is an abstract interpretation, it therefore does not access the non-verbal representations which the subject generated in response to the experimenter's instructions.

Similarly, dual coding theory is able to handle another demonstration of negative effects of imagery instructions on apparent failure to "recognize" the figurative meanings of proverbs. Honeck and Kibler (1984) conducted experiments where subjects were presented with proverbs and were instructed either to generate an image suggested by the proverb, or were given, along with the proverb, an analogy that was created by the experimenters to be directly related to an interpretation of the proverb. Later the subjects' recall for the proverbs was cued by concrete sentences that instantiated the meaning of the proverbs. Subjects in the imagery condition were less likely than subjects in the analogy condition to recognize the new instance as related to the proverb meaning, again presumably demonstrating that the images they

generated in the proverb learning condition were not part of the figurative meaning of the proverb.

However the conclusion that figurative interpretation processes are completely abstract with no important role for imagery in the meaning representation is weakened by a potential confound in Honeck and Kibler's experiment. The proverb instantiations which served as memory cues were generated by the experimenters, as were the analogies that were presented to some of the subjects at acquisition. Subjects in the imagery group were not presented with any relevant experimenter-generated information. Since Honeck and Kibler did not have a control condition where baseline memory performance without experimenter-generated information could be assessed against imagery instructions, it cannot be concluded that imagery instructions alone were limiting subjects ability to recognize new related instances of the proverbs. The advantage of the analogy condition over the imagery condition could simply have been that the analogies were experimenter-generated as were the interpretations of the proverbs and their instantiations.

In dual coding terms, the above experiment does support the idea of a separation of imaginal and verbal interpretive processes in figurative

interpretation by virtue of the differential effects of imaging and abstractly understanding proverbs on apparent memory representations for those proverbs. However, it does not demonstrate that representations of figurative meanings are imagery free.

To this point then, dual coding and the Conceptual Base Hypothesis make identical predictions with respect to the effect of imagery instructions on cued recall performance for the figurative meanings of proverbs. Both theories predict that imagery instructions will reduce the effectiveness of an abstract verbal interpretation to cue memory for the original proverb. The theories differ, however, in where they place the locus of this effect. According to the Conceptual Base Hypothesis the negative effect of imagery instructions arises because imagery is not part of the representation of abstract, figurative meanings. According to Dual Coding however, the effect arises because imagery instructions in essence "mislead" subjects about what aspect of the dual representation of the proverbs will be tested in the memory test. Dual coding states that the abstract verbal interpretation of a proverb must be constructed in a different cognitive system from the system that constructs the image. Presumably, subjects under imagery instructions believe they are being explicitly

asked to ignore the verbal interpretive process in encoding the proverbs. Therefore, negative effects of imagery on cued recognition for proverb meanings are a result of failure of subjects to integrate both aspects of the figurative interpretation process into a memory representation of the proverb.

By this analysis, negative effects of instructions to image are consistent with the hypothesis that in figurative interpretation, there is a separation of imaginal and verbal-interpretive processes, with both necessary for a figurative interpretation to occur. Results of the first study presented in the thesis suggested that absence of an imaginal component, as occurs with abstract language, will result in a literal interpretation of a proverb. The Reichmann and Coste results can be interpreted to show that the reverse situation--absence of an abstract interpretive component as would occur with imagery instructions-- similarly results in a literal memory representation for a proverb. That is, when a subject is implicitly asked to ignore the interpretive process for a concrete proverb such as "The cow gives good milk but she kicks over the pail", the memory representation will contain only the uninterpreted non-verbal information which presumably reflects the literal relations named in the sentence.

2. Absence of Imagery Effects in Recognition Memory for Proverb Meanings

A second source of support for the conclusion that imagery is unrelated to figurative interpretation processes comes from experiments which show that rated imageability of proverbs is unrelated to cued recognition and recall of the meanings expressed in proverbs when the cues are abstract interpretations of the proverbs. Cued recall of abstract proverbs is either superior to or equal to that of concrete proverbs (Reichman & Coste, 1980). Reichman and Coste find this result to be in striking contrast to the usual positive effect of concreteness on memory for language demonstrated by experiments conducted to develop dual coding theory (see Paivio, 1986 for a review). They reason that dual coding theory would make the following prediction for cued recall of concrete and abstract proverbs. If imagery is part of the representation of figurative meanings, then recall cues that presumably express those figurative meanings should access the image component and result in enhanced memory for concrete proverbs over abstract proverbs which would not have the advantage of the dual representation. Because cued recall of concrete proverbs is not superior to that of abstract proverbs

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Reichman and Coste conclude that imaginal representations must be peripheral to the representation of figurative meanings.

However, this conclusion is derived from the incorrect assumption that a dual coding analysis invariably predicts positive effects for imagery on memory for language. Instead, according to dual coding theory, the locus of imagery effects is in the direct connections in semantic memory between concrete words and their non-verbal representations. In a cued recall task, the advantage of an imaginal representation for a to-be-recalled word is dependent on the extent to which that imaginal representation is directly accessed by the recall cue (e.g. Begg, 1973) and also on the extent that the to-be recalled word is itself directly connected to its imaginal representation. This has strong implications for the way in which imagery functions as a recall mediator for concrete and abstract language.

A study by Day and Bellezza (1983) provides a relevant example. They asked subjects to form images to abstract pairs of words. Subjects could produce images high in rated vividness when the abstract words were highly related semantically, but when recall for one word was later cued by presentation of the other, the images produced in the first part of the task did

not boost recall performance relative to recall of concrete word pairs which had been rated as less vivid in image evoking value. Paivio (1986; Paivio, Clark & Khan, in press) explained the apparent failure of imagery to benefit memory in terms consistent with dual coding theory by suggesting that an image associated with a pair of abstract words would be less closely related to either one of the words used as a recall cue and would therefore be less useful as a strong recall mediator than an image activated with a concrete word pair. Extending this reasoning to the Reichman and Coste cued recall paradigm, it is not surprising from a straightforward application of dual coding principles that the abstract words of the experimenters' interpretations of the proverbs failed to access the imaginal representations suggested by the words of concrete proverbs. According to dual coding the failure of the abstractly worded recall cues to access the images does not necessarily mean that images were not part of the representation itself. The dual coding interpretation is simply that the abstract interpretations were less related to the high imagery representations of the concrete proverbs than they were to the abstract verbal representations of the abstract proverbs, thereby reducing the usually observed memory advantage for an imaginal

representation.

Study 2

Imagery, Comprehension and Interpretation of Proverbs

The preceding analysis reveals an important distinguishing feature between dual coding and the conceptual base hypothesis. Unlike the conceptual base hypothesis, dual coding theory differentiates between the verbal and non-verbal aspects of language representation and interpretation. In doing so, the theory gives a basis for understanding how interpreting a proverb may be different from comprehending that proverb. In particular, dual coding suggests that the relation between comprehension and interpretation for proverbs would differ as a function of the availability of non-verbal representations to serve as basis for comprehension.

Consider first the process of generating an interpretation for an abstract proverb such as "Admiration is the daughter of ignorance".

According to the theory, the meaning of this proverb is represented primarily in the verbal system and comprehension occurs as a result of verbal associative processing of verbal representations. The process of generating a verbal interpretation of an abstract proverb would similarly take place within the verbal

system. Therefore, for abstract proverbs, comprehension and interpretation would be very closely related processes.

Consider the contrasting case for concrete proverbs such as "Eagles fly alone".

According to the theory, the meaning of a concrete proverb can be represented non-verbally; the images associated with concrete proverbs provide a readily comprehended representation; in order to figuratively "interpret" that representation, however, some feature of the non-verbal representation must be verbally labelled. Therefore, ease of interpretation for concrete proverbs need not be closely predicted by ease of comprehension for those proverbs, since processes in two different systems are involved in comprehension and interpretation. This hypothesised difference in comprehension and interpretation processes as a function of proverb concreteness would be shown by a demonstration that proverb imagery level is more related to ease of comprehension than to ease of interpretation for proverbs and that ease of comprehension and ease of interpretation are more closely related for abstract proverbs than for concrete proverbs.

Study 2 was designed to test the prediction from this dual coding argument that the relation between

comprehension and interpretation ease should vary as a function of proverb imagery level. Subjects were asked to rate proverbs for ease of comprehension before they knew they would be asked to generate a verbal interpretation for those proverbs. Predictions for the relation between ease of comprehension and ease of interpretation derived from Dual Coding are as follows:

- 1) Ease of imagery should in general be more closely associated with ease of comprehension than with ease of interpretation.
- 2) Comparing high and low imagery proverbs specifically, high imagery proverbs should be given higher comprehensibility ratings than low imagery proverbs (a replication of the result obtained in Study 1, part 2).
- 3) Ease of comprehension ratings and ease of interpretation ratings should be more correlated for low imagery proverbs than for high imagery proverbs;
- 4) The difference between ease of comprehension and ease of interpretation ratings should be greater for high imagery than for low imagery proverbs specifically because high imagery proverbs will be rated as relatively easier to understand than they are to interpret.

Subjects

A new group of 36 subjects, who had not participated in the earlier studies were recruited from the pool of students serving as experimental subjects to fulfill course requirements.

Materials

Sixty two proverbs were randomly selected from the pool of 240 with the constraint that none were of the straightforwardly literal type (Type 3) discussed in Study 1. All materials for this study are given in Appendix 2. The proverbs were randomly assigned to 3 lists (20 on two lists and 22 on the third), which were presented in booklets.

Procedure

Subjects were given a list of proverbs and asked to rate each for ease of imagery and then for ease of comprehension as in Study 1 (part 2). Following this task, subjects were given new booklets with the proverbs in a different random order, and given a surprise interpretation task in which they were asked to write interpretations of each of the previously rated proverbs, and then to rate the ease of generating those interpretations.

Results

Correlations between ease of imagery, ease of comprehension and ease of interpretation for the set of proverbs were computed. Ease of comprehension and ease of interpretation was substantially correlated ($r=.73, p<.001$). The first prediction was that imagery should be more related to ease of comprehension for than to ease of interpretation. Inspection of Table 7 reveals that imagery and comprehensibility were somewhat more highly correlated than imagery and ease of interpretation.

Importantly, however, partialling out the overlap between comprehensibility and ease of interpretation showed that imagery was independently related to ease of comprehension only (Table 7).

Recall that the dual coding analysis of comprehension and interpretation differences for concrete and abstract proverbs predicted that for low imagery proverbs, comprehension and interpretation ratings should be more closely related than comprehension and interpretation for high imagery proverbs. In order to maximize the imagery difference, since the proverbs were not pre-selected on that basis, proverbs of the highest imagery level (mean ratings above 5.5 on the 7-point scale, $n=21$) were selected and compared against proverbs of the

Table 7.

Means, Standard Deviations, and Pearson Correlation
Coefficients for Imageability, Comprehensibility and
Interpretability for Proverbs in Study 2

	<u>Mean</u>	<u>S.D.</u>	<u>r with</u> <u>Comp.</u>	<u>r with</u> <u>Interp.</u>
Imageability	4.85	.99	.43(.32)	.30(-.03)
Comprehensibility	5.09	.89		.73
Interpretability	4.96	.78		

Note: Bracketed figures are partial correlations with overlap between comprehensibility and interpretability controlled.

lowest imagery level (mean imagery ratings < 4.5 , $n=21$) on the relation between ease of comprehension and interpretation. Table 8 shows the mean comprehension and interpretation ratings for the two groups of proverbs.

Pearson correlation coefficients for the comprehension and interpretation ratings for the low imagery and high imagery proverbs were $.93$ ($p=.001$) and $.47$ ($p=.01$) respectively. Fisher's Z-score transformation showed the difference in correlations was significant. This result shows, consistent with the dual coding analysis, that comprehension and interpretation of abstract proverbs is much more closely related than comprehension and interpretation of high imagery proverbs.

With respect to relative differences in ease of comprehension and ease of interpretation for both types of proverbs, recall that the interpretation task followed the imagery rating and comprehension rating tasks and was unexpected by the subjects. The prediction was that for the abstract proverbs, since a similar process underlies both comprehension and interpretation, overall ease of interpretation ratings should differ little from overall ease of comprehension ratings. If any difference in the mean ratings for the two dependent variables is observed,

Table 8

Relation Between Mean Ease of Comprehension and Ease of Interpretation
for Concrete and Abstract Proverbs in Study 2

<u>Proverb</u>		(a)	(b)	(c)
		<u>Comprehension</u>	<u>Interpretation</u>	<u>Difference</u> <u>r</u>
<u>Imagery</u>	<u>High</u>	5.35 (.64)	5.14 (.77)	-.21 .47
	<u>Low</u>	4.51 (.99)	4.64 (.80)	.13 .93

Note: Significance tests for Concrete/Abstract differences indicated by superscripts:

(a): $F=10.41, p=.002$

(b) $F= 4.25, p=.046$

(c) $F= 3.41, p=.072$

it should be that ease of interpretation ratings are higher than ease of comprehension ratings, since interpretation of the proverbs followed the comprehension rating task.

For the concrete proverbs, however, proverbs could be comprehended without having been interpreted; the unexpected interpretation task could be more difficult than anticipated given the relative ease of understanding the concrete proverbs.

In accordance with this prediction abstract proverbs were rated as somewhat easier to interpret than they were to understand; concrete proverbs were rated as somewhat harder to interpret than they were to understand (table 8). However, an analysis of variance on the difference scores for comprehension and interpretation of high and low imagery proverbs revealed that the difference in the difference scores only approached statistical significance.

($F=3.41, mse=.34, p=.07$). One reason why a strong imagery-related difference between ease of comprehension compared to ease of interpretation failed to emerge was that the high imagery proverbs were rated as surprisingly easy to interpret overall. High imagery proverbs were rated as significantly easier to interpret than low imagery proverbs.

This result suggests that figurative

interpretation is not always experienced as "difficult" for subjects; interpretive difficulty may not be a characteristic of figurative interpretation at least as compared to the interpretation of abstractly worded language. However, the general pattern of results is completely in accord with the dual coding distinction between verbal and non-verbal processes language comprehension. The results suggest that ease of comprehension is more strongly associated with the availability of non-verbal information than is ease of verbal interpretation. In particular, the different relation between comprehension and interpretation for high and low imagery proverbs suggests, in accordance with dual coding, that concrete and abstract proverbs may be interpreted by a different process. The difference is that interpretations for concrete proverbs may not arise in the same system as the initial representation of the meaning of the proverb. In contrast, for abstract proverbs the evidence suggests that both the initial comprehension and the interpretation are part of the same process.

Study 3: An Analysis of Interpretations of Concrete and Abstract Proverbs

Study 2 showed that the ease of verbally interpreting abstract proverbs is very closely related to ease of comprehending those proverbs. In contrast, ease of verbally interpreting concrete, high imagery proverbs is less well predicted by ease of comprehending those proverbs. This finding was predicted by the dual coding analysis of representational differences for concrete and abstract language and the consequent implications for figurative interpretation. According to that analysis, an abstract proverb is both comprehended and interpreted within the verbal system; in contrast concrete proverbs suggest non-verbal information which is represented in the imagery system and which must be subsequently interpreted in the verbal system. It is this process of verbally interpreting non-verbal information that constitutes figurative interpretation according to the model being developed in the thesis.

According to this model, interpretations of abstract proverbs are not figurative because they are not derived from non-verbal representations of the linguistic input. Instead, interpretations of abstract proverbs are derived from verbal associative responses

to the words of the proverb. Interpretations of abstract proverbs should therefore be more closely related, in a verbal associative sense to those abstract proverbs, than are the figurative interpretations of concrete proverbs. By examining the kinds of interpretations that are generated for high and low imagery proverbs, the relationship between imagery and figurativeness of interpretations may be assessed.

The first question of interest in this study is whether interpretations of high imagery proverbs are less semantically related to the proverb than are interpretations of low imagery proverbs. This question was investigated by examining the proverb interpretations generated by subjects in study 2. One measure of semantic relatedness between proverbs and interpretations is provided by topic similarity; that is, by the extent to which the topic of a proverb is also the topic of its interpretation. The importance of topic similarity as a distinguishing feature for the figurativeness of interpretations is suggested by a problem noted as a result of the figurativeness rating procedure in study 1. Recall that for many proverbs, the topic of the proverb can also be the topic of the interpretation of the proverb. For example, the proverb "Punishment is lame, but it comes"

is typically interpreted to be about punishment, regardless of how the rest of the proverb is interpreted. As discussed earlier, this type of proverb may be rated as highly figurative, but the figurative element occurs in the vehicle only. At the same time, these "partially" figurative proverbs may be rated as relatively low in imagery (because they are about abstract topics) thereby weakening the claim that figurativeness is dependent on imagery. It is important to show then, that proverbs which are low in imagery tend to generate interpretations that are more literal than interpretations of high imagery proverbs; that is, the interpretations of abstract proverbs have the same topics as the proverbs themselves. In contrast, proverbs that are high in imagery such as "A little pot is soon hot", should suggest interpretations that have a different topic than the proverb itself.

Method

I calculated a topic similarity score for each of 50 proverbs randomly selected from the proverbs interpreted in Study 2 by: 1) identifying the topic of each proverb and 2) identifying the topic of each of 12 interpretations of the proverbs. A binary scoring procedure was used such that an interpretation was given a score of 0 if the interpretation had the same

topic as the proverb, for example:

Envy shoots at others and wounds herself (proverb)

Envy is one's own enemy (interpretation)

The interpretation was given a score of 1 if it had a different topic than did the proverb, for example:

Envy shoots at others and wounds herself:

Greed results in personal loss, not gain

Therefore, proverbs which resulted in each of the 12 interpretations having a different topic than the proverb would receive a score of 12 and proverbs which resulted in interpretations that all shared the same topic as the proverb would receive a score of 0.

Occasionally a proverb had fewer than 12 interpretations, resulting from individuals not writing any interpretation for that proverb. In this case, each blank interpretation was credited with a score of 1, as if that interpretation had had a different topic than the proverb.

Results and Discussion

The fifty proverbs were divided into two groups on the basis of mean imagery ratings obtained from Study 2. Mean imagery rating for the proverbs in this study was 4.9; thus, proverbs with a mean rating above 5.0

were classed as high imagery, and those below 5.0 were classed as low imagery. Topic similarity scores were analyzed by means of an analysis of variance with proverb imagery level as the between items variable. Results of the analysis showed that the low imagery proverbs had fewer new topics mentioned in their interpretations than did high imagery proverbs ($F=19.04, mse=10.66, p<.001$; see table 9).

This result clearly confirms that high and low imagery proverbs differ as predicted in the extent to which they suggest highly figurative interpretations. High imagery proverbs are likely to suggest interpretations that differ in topic from the proverb itself than do low imagery proverbs. This finding therefore provides an explanation for one of the crucial findings that has supported the idea that imagery is irrelevant to figurative interpretation. When memory for proverbs is cued by their interpretations, interpretations of low imagery proverbs are at least as effective as interpretations of high imagery proverbs in cuing memory for the proverbs (Reichmann and Coste, 1980). Although this finding has been taken as evidence that imagery is not part of the representation of figurative meanings, the more appropriate explanation may be that interpretations of abstract proverbs are more related

Table 9

Number of Different Topics for 50 High and Low Imagery Proverbs

<u>Proverb Imagery</u>	<u>Mean Number of Different Topics in Interpretations</u>
High (n=23)	9.82 (2.74)
Low (n=27)	5.78 (3.65)

* maximum possible=12; Standard Deviations are in brackets

Mean Number of Different Interpretations Given for 21 Randomly
Selected High and Low Imagery Proverbs.

<u>Proverb Imagery</u>	<u>Mean Number of Different Interpretations</u>
High (n=11)	5.51 (1.16)
Low (n=10)	4.44 (1.42)

semantically to the proverbs than are interpretations of high imagery proverbs. The positive effect of imagery on memory is offset by the reduced verbal-associative relation between the proverb and its interpretation in the case of concrete, high imagery proverbs.

A second question about the difference in interpretations of high and low imagery proverbs can be addressed here. The results of the topic similarity ratings showed that abstract proverbs are more semantically related to their interpretations than are concrete proverbs; in this sense then, interpretations of abstract proverbs are more literal than interpretations of concrete proverbs. One consequence of the more literal relation for abstract proverbs and their interpretations could be that those proverbs are interpreted more similarly across individuals than are the more figurative concrete proverbs. Such increased variability for figurative interpretations is suggested by both the linguistic and cognitive analyses that form the basis of the verbal-imaginal theory of figurative interpretation presented here.

The linguistic approach derived from Searle's model of figurative interpretation allows that since figurative reference is not conventionally defined as is literal reference but must be abstracted from the

literal base, figurative interpretations could be more variable than literal interpretations. In addition, the dual coding approach allows for the possibility that what is interpreted in a figurative interpretation is that aspect of the sentence which is primarily non-verbal or non-linguistic in representation. Variability in interpretation across individuals could arise because the resulting non-verbal representation permits more alternative verbal interpretations than would a strictly verbal representation.

The possibility that high imagery proverbs are more variable in interpretation than are low imagery proverbs allows a re-evaluation of results of proverb interpretation studies which have been claimed as showing that figurative interpretation is an abstract process that does not involve imagery and that therefore cannot be explained in terms of the two representational codes described in dual coding theory.

Negative comprehension and memory effects for high imagery proverbs cited by Reichman and Coste (1980) and attributed to imagery may actually have resulted from greater interpretive variability and figurativeness of high imagery proverbs. In fact, a result supporting the idea that figurative

interpretations are more variable than literal interpretations, and implicating imaginal processes in that variability has been incidentally reported by Reichman and Coste (1980). In some experiments (Reichmann, 1975), it was found that interpretations of high imagery proverbs were less effective than interpretations of low imagery proverbs as memory probes for their respective proverbs. They interpreted this as a demonstration of the interfering effect of imagery in generation of an appropriate meaning representation in figurative comprehension. However, when interpretive variability for proverbs was controlled in a subsequent experiment, (Reichmann & van Wyk, 1977; cited in Reichmann & Coste, 1980) so that only proverbs were used that suggested a single dominant interpretation, the imagery effect disappeared. The interpretations of the selected high imagery proverbs were now as effective as the interpretations of low imagery proverbs at cueing memory for their respective proverbs. It appears then, that the apparent memory disadvantage for high imagery proverbs used in the earlier experiment was caused by interpretive variability for these proverbs. That is, careful selection of materials was necessary to ensure that the sample of high imagery proverbs would generate interpretations that were as consistent among

subjects, and therefore effective memory cues, as were the interpretations of low imagery proverbs.

Interestingly, Reichmann and Coste (1980) give exactly the opposite reason for the change in the pattern of results produced by controlling variability in proverb interpretations. They cite findings reported by Sacks and Eysenck (1977) that suggested that for literal language, concrete high imagery sentences may lead to a single dominant interpretation whereas abstract sentences may be more divergent in meaning. From this they infer that in selecting proverbs with dominant interpretations they must have reduced imagery differences in their materials by eliminating the "variable" abstract proverbs and thus reducing imagery variability, rather than reducing interpretive variability as I have suggested. Their argument does not hold for two reasons. First, concrete literal language may lead to a dominant interpretation, but concrete figurative language may not. Second, if high imagery proverbs lead to a single dominant interpretation as Reichman and Coste argue, then controlling interpretive variability should help recognition of interpretations of low imagery proverbs more than high imagery proverbs, contrary to the result they actually obtained.

Evidence on Interpretive Variability for Concrete and

Abstract Proverbs

The question of greater interpretive variability for concrete compared to abstract proverbs was investigated by having 5 independent judges rate the similarity in meaning for each of 12 interpretations generated for 21 of the proverbs in study 2. Each interpretation was printed on a 5 by 7 index card. The judges were presented with the proverb and the set of interpretations and asked to sort the interpretations into piles according to how similar in meaning each interpretation was to the others, creating as many or few sorted groups as was believed necessary. Thus, each proverb was given a score (from 1 to 12) by each judge based on the judged number of different interpretations. The mean number of interpretations for each proverb was then calculated by averaging the scores provided by each judge in the sorting task. Judges agreed significantly on number of interpretations for each proverb (r 's ranged between .41 and .71, largest $p < .03$).

The proverbs were divided into a low imagery group (those proverbs with mean imagery ratings below 5 on the 7-point scale) and a high imagery group (those with mean ratings above 5

on the 7-point scale). Mean number of interpretations for the low and high imagery proverbs are reported in the bottom panel of Table 9.

As can be seen from table 9, high imagery proverbs tended to have a higher number of interpretations than low imagery proverbs, although analysis of variance revealed that the difference only approached statistical significance ($F=3.67, mse=2.12, p<.07$).

The finding of a trend for greater variability for interpretations of concrete proverbs is particularly revealing because of the obvious contrast with what would be expected for interpretations of literal language. In addition to the Sacks and Eysenck (1977) study already mentioned, there is other evidence that suggests that for literal interpretation, abstract, rather than concrete language is interpreted rather variably across individuals.

For example, Begg, Upfold and Wilton (1978) showed that concrete words are guessed more readily than abstract words when listeners must use speakers clues to come up with a target word in a password game. They concluded that representations of the meanings for concrete words are more similar across individuals than are representations of the meanings of abstract words. Similarly, it is known that associations to abstract words differ more across individuals than do

associations to concrete words (e.g. Kolers, 1963). Thus, the comparison of concrete and abstract proverbs on interpretive variability pits one type of variability (that associated with interpretation of abstract literal language) with another kind of variability (that associated with figurative interpretations of concrete language).

Results from the interpretive variability ratings here suggest that the conclusion of Reichman and Coste that high imagery proverbs lead to a single dominant interpretation whereas low imagery proverbs are interpreted more variably is incorrect. Instead, interpretive variability for high imagery proverbs is a potential explanation of findings reported by Reichmann & Coste (1980) where subjects do better at recognizing interpretations of low imagery compared to high imagery proverbs. The correct interpretation of these findings may be that low imagery proverbs are less figurative and thus less variable in interpretation than high imagery proverbs, rather than the explanation offered by the authors that imagery is irrelevant to figurative interpretation.

Summary of Results to This Point

The main point of this thesis has been that abstract language is not figuratively interpretable, and to explore the resulting implications for theories of figurative interpretation processes.

The results of Study 1 showed that abstractly worded proverbs are rated as more literal than concrete proverbs. Literalness was measured by rated closeness of relation between the meaning directly expressed by the words of a proverb and the apparent underlying intended meaning of that same proverb. This observed literalness of abstract proverbs was taken as support for the theory of figurative interpretation presented here which defines a figurative interpretation as an abstract interpretation of a concrete literal referent. The theory suggests that abstract language should not support figurative abstraction. While this study clearly demonstrated that increasing abstractness in proverbs is associated with a decrease in potential for a figurative interpretation, the strong conclusion that abstract language can never be figuratively interpreted was not warranted because some abstract proverbs were given high figurativeness ratings. This partial failure of rated figurativeness to identify concreteness as a necessary condition for figurative

interpretation was explained in terms of structural differences in the way figurativeness was expressed in concrete and abstract proverbs. The next two studies were undertaken to try to determine if other, theoretically important features of figurative language would support the hypothesis that abstract language is not figuratively interpreted.

The purpose of Study 2 was to investigate concrete/abstract differences in the relation between ease of comprehension and ease of interpretation. It was found that the relation between comprehension ease and interpretation ease was stronger for abstract than for concrete proverbs. This was taken to show that "comprehending" a concrete proverb may not always be the same as interpreting it verbally, an inference which was suggested by application of dual coding principles of representational differences for concrete and abstract language to the theory of figurative language interpretation. A second important finding in Study 2 concerned the relative ease of comprehension and ease of interpretation for concrete and abstract proverbs. Concrete proverbs were rated as easier to comprehend and easier to interpret than abstract proverbs, indicating that imagery may be important in the generation of abstract figurative meanings. This casts doubt on one

inference from the Conceptual Base Hypothesis that imagery is irrelevant to figurative interpretation processes. In addition, the relative ease of interpretation for the concrete proverbs suggested that difficulty of interpretation, although apparently predicted by the linguistic analysis of figurative language as abstraction from a literal base, may not be an important differentiating feature for the psychological processes involved in interpreting figurative language.

Study 3 investigated the relation between proverbs and their interpretations and showed that interpretations of abstract proverbs are more semantically related to those proverbs than are interpretations of concrete proverbs. In addition, interpretive variability for concrete and abstract proverbs was investigated. It was found that concrete proverbs tended to suggest a larger number of different interpretations than did abstract proverbs, which is the opposite result that is found with concrete/abstract differences in literal language. This leads to the suggestion that an important correlate of figurativeness is interpretive variability, an idea which was shown to be consistent with the combined linguistic-cognitive theory of figurative interpretation presented here.

One of the primary assumptions arising from the dual coding analysis of representational differences for concrete and abstract words is that concreteness of reference is necessary for figurative processing to occur, and that the generation of a figurative meaning would necessarily involve a non-verbal or imaginal representation of some kind. Predictions from this model have been supported in Studies 1, 2, and 3, but in order to present the theory as a complete alternative to the Conceptual Base Hypothesis it is important to address more specifically the memory findings from the earlier studies as well.

Recall that the conceptual base hypothesis states that figurative meanings are abstract and imagery free. Support for this hypothesis is obtained from results of experiments which use proverb interpretations as memory probes for proverbs which vary in imagery level. A typical finding is that when subjects are given the interpretation memory probes, abstract proverbs are recalled at least as well as concrete proverbs in response to their interpretation probes. In addition, subjects instructed to encode proverbs under imagery instructions typically show lower levels of recognition for the interpretation memory probes than do subjects instructed to comprehend the proverbs at encoding.

The purpose of the following two studies was to show that the dual coding model of figurative interpretation provides a more precise understanding of imagery factors in the memory paradigm employed by Reichmann and his colleagues.

Study 4: Proverb Interpretations as Memory Cues:

Concrete/Abstract Differences in the Advantage for a Self-Generated Interpretation

According to the dual coding model, a figurative interpretation is not related to the non-verbal base for that interpretation by direct, automatically accessed connections provided by semantic memory structures. Such an interpretation would be literal rather than figurative. Accordingly, it seems plausible to expect that for a figurative interpretation, the exact manner of expression of the imaginal-verbal relation would differ more from person to person than would occur for literally interpreted concrete language, precisely because the relation is not determined by directly connected representations in semantic memory. Theoretically, then, in order for the imaginal component for a concrete proverb to be accessed by an abstract interpretation of that proverb, the interpretation memory cue would have to have been generated by the individual himself or herself. Absence of concreteness effects in cued memory for proverbs is observed because interpretations of experimenters do not necessarily access the non-verbal component associated with concrete proverbs; no effect of an imaginal representation is therefore observed in cued recall.

Consider the contrasting case when an individual's own interpretation of a proverb serves as a memory probe for the proverb. In this case, that interpretation would have been integrated with the imaginal representation suggested by the words of the proverb; thus, when the interpretation is presented as a recall cue, the interpretation provides access to the non-verbal representation which is itself directly connected to the words of the proverb as described by dual coding theory. Thus, concrete proverbs should be very effectively cued by self-generated interpretations compared to the case when the interpretations were generated by another individual. This theoretical analysis can be extended to show that a different mechanism would influence cued recall of abstract proverbs. In the case of abstract proverbs, a non-verbal representational component would not normally be available. According to the theory presented here, one consequence of the primarily verbal representation would be that an interpretation of the abstract proverb would be "literal", with conventionalized semantic relations between proverb and interpretation, regardless of who generated that interpretation. As a result, there should be a smaller advantage for a self-generated interpretation as a recall cue for the abstract proverbs compared to

concrete proverbs. What determines cue access to the memory representation of abstract proverbs is the semantic relation between the words of the proverb and the words of the abstract interpretation; this presumably literal relation would be expected to vary less across individuals and be less influenced by episodic integration effects described in the case of concrete proverbs.

The above arguments, therefore, suggest that an interesting test for the role of imaginal processes in figurative interpretation would be to compare the extent to which experimenter provided interpretations of proverbs fail as recall cues for the proverbs compared to interpretations generated by the individual. According to the theory, when the recall cue is an interpretation provided by another individual, the stronger literal, direct semantic relation between interpretations and abstract proverbs give abstract proverbs an advantage over concrete proverbs which are more figuratively interpretable. However, when the recall cue is a self-generated interpretation and the to-be-recalled proverb is concrete, the integration process described above as the main component in figurative interpretation should allow the interpretation to access the imaginal component of the proverb representation.

In the following experiment, subjects were given a list of proverbs and asked to interpret them under instructions to use imagery or an abstract comprehension strategy in order to generate their interpretations. Later, they were cued to remember each proverb, first by an interpretation generated by someone else, and, following that, by their own interpretation. The predictions concern the effect of instructions and the source of the recall cue on the cue access of memory representations for the proverbs.

Predictions for the Effect of Source of Recall Cues for Cued Recall of Concrete and Abstract Proverbs

The prediction derived from application of dual coding principles of mental representations to the theory of figurative language as linguistic abstraction is that concrete proverbs should benefit more from having a self-generated interpretation as a recall cue than should abstract proverbs. The conceptual base hypothesis does not predict an interaction for proverb concreteness and the source of the recall cue (whether self or other generated). According to the conceptual base hypothesis, memory representations for figuratively interpreted proverbs are abstract and amodal; there is no reason to expect imagery effects in the proposed cued recall task.

Predictions for the Effect of Instructions on Cued
Recall for Concrete and Abstract Proverbs

With respect to the effect of imagery and comprehension instructions on cued recall for the proverbs, previous studies (Reichman & Coste, 1980; Honeck & Kibler, 1984) have shown that the instruction to use imagery to encode proverbs apparently impedes subjects' recognition of the figurative meaning of proverbs. The present analysis of this result suggests that when subjects actually generate a verbal interpretation of a concrete proverb, instructions should have no effect on subsequent recognition for figurative meanings since both imaginal and abstract comprehension processes are automatically involved in constructing a figurative meaning. Therefore memory representations for interpreted concrete proverbs should be the same regardless of whether they were interpreted under imagery instructions or comprehension instructions.

A second assumption of the theory, however, is that abstract proverbs are interpreted by a different process than are concrete proverbs. The process of interpreting an abstract proverb would not normally entail the same "automatic" integration of imaginal and abstract interpretive processes as occurs for concrete proverbs. Therefore, in contrast to what is

expected for the effect of instructions on interpretations of concrete proverbs, imagery and comprehension instructions could presumably have different effects on the kinds of interpretations generated for abstract proverbs. Previous research suggests that comprehension instructions should result in superior cued recall for abstract proverbs. Reichman (1975) and Reichman and Van Wyk (1977, cited in Reichman and Coste, 1980) report that imagery instructions produce comparatively lower interpretation recognition scores than do comprehension instructions for abstract proverbs as well as concrete proverbs. Similarly, findings of Day and Bellezza (1983) could be interpreted as showing that imaging to abstract materials does not enhance memory for those materials. They found that pairs of abstract words that were encoded under imagery instructions and received high imagery ratings were recalled at lower levels than concrete words that were rated as less vivid in imagery. Slack (1983) found that subjects were not helped by imagery encoding instructions over comprehension encoding instructions when their task was to listen to abstract sentences and to later decide whether they had previously heard a target abstract word or its synonym. Research by Marschark (1978) suggests that when subjects are

instructed to comprehend abstract literal sentences they employ a strategy very similar to that employed when they asked to memorize the sentences. This suggests that under comprehension instructions subjects may spontaneously use strategies that enhance memory for abstract language. The studies as a group therefore suggest that comprehension instructions should aid memory for abstract proverbs.

With respect to a precise statement from dual coding theory with respect to the effect of imagery instructions on memory for abstract proverbs it is a clear inference that images to abstract proverbs would be less directly connected to the referential meanings of the words of the proverb than would images to concrete proverbs. One implication could be that even if subjects do generate images to abstract proverbs, those images, in not being as strongly connected to the to-be-recalled words of the abstract proverbs, would not be strongly integrated with either the proverb or the interpretation of the proverb to enhance memory. On the other hand, if subjects remembered the episodic relation between proverb, image and interpretation, given the interpretation recall cue they would be relatively more able to remember the proverb than subjects who did not use images in interpreting the abstract proverb.

In light of lack of a strong theoretical framework from which to make predictions regarding specific effects of comprehension and imagery instructions for abstract proverbs, the most straightforward prediction is that concrete proverbs in particular should show no effect of instructions on cued recall. Instructional differences, if they are observed at all, should occur for cued recall of abstract proverbs only.

Subjects

The subjects were 20 students from an introductory Psychology course who volunteered to participate for course credit.

Materials

The materials were a list of 24 proverbs selected from the items in Study 3. These proverbs had been interpreted by 12 subjects each in that study and had been rated for ease of interpretation, imagery and comprehensibility. The 24 proverbs were selected on the basis of rated imagery value in order to maximize the difference on that measure. Thus, half of the proverbs were concrete (mean imagery rating 5.97 on the 7-point scale) and half abstract (mean imagery rating=3.3). (The list of proverbs and relevant mean ratings appears in the appendix).

An interpretation for each proverb was selected by the experimenter from the 12 interpretations available from study 3. The selected interpretation was chosen to represent the dominant interpretation for the proverb by examining the clusters of "same" interpretations produced by independent judges in study 3 and selecting an interpretation from the largest cluster in each case. An attempt was made to ensure that no words from the proverb were repeated in

the words of the interpretation. However, with the abstract proverbs in particular, it was sometimes impossible to select a dominant interpretation in which no words of the proverb were repeated. For example, all of the interpretations in the dominant cluster for the proverb "Poverty is neither a crime nor a credit" contained the word "poverty" or a close synonym. Each interpretation selected could be considered a good, nodal interpretation for the proverb because it represented the dominant meaning that each proverb suggested, as judged by the independent raters in study 3.

Two lists were constructed such that proverbs were in random order with the list position for concrete and abstract varied systematically across the two lists. Two extra proverbs were included at the beginning and end of the lists in order to reduce primacy and recency effects on the cued recall task. A set of numbered index cards was prepared for each subject to use to write an interpretation for each proverb in the experimental task. One set of written instructions specified that subjects were to use imagery in order to generate their interpretations; another specified that they were to comprehend the meaning of the proverb before writing an interpretation. The instructions are given in the

appendix. In addition, strategy questionnaires were prepared which were designed to check for the effectiveness of the instructional manipulation. One question sheet listed all proverbs used in the experiment and asked subjects to indicate whether they remembered using an image to generate the interpretation. Another questionnaire asked subjects to indicate what other strategies were used in generating the interpretations.

Procedure

Subjects were tested in groups of 5 to 10. Upon entering the testing room, they were given written instructions that instructed them that they were going to listen to a set of proverbs and were asked to write interpretations of the proverbs. One set of instructions (IMAGERY) specified that they were to use mental images to generate an interpretation, and the other set (COMPREHENSION) simply told them to "understand" the proverb before writing an interpretation. When they had read and understood the instructions, the experimenter read the proverbs, two practice examples first, with one minute between each for subject to write an interpretation on numbered index card. Following this task, subjects put the interpretations to the side, and were given the imagery questionnaire. This list was removed

immediately upon completion and the general strategy questionnaire was completed by subjects.

After completing the questionnaires, subjects were given recall cues which were the experimenter-selected modal interpretations of the proverbs and were instructed to write the proverb that the interpretation brought to mind. They were given 12 minutes to complete this task.

Following the cued recall procedure outlined above, subjects were instructed to take their own interpretations which had been set aside, and sort them in the order indicated by numbers on back of the cards. (These numbers provided the experimenter with the means of identifying the proverb on the original acquisition list that had suggested that interpretation as described below). Subjects were then given a new sheet of paper (the first had been removed) and asked to write the proverb appropriate to each interpretation. The interpretations were to be turned up one at a time and subjects were asked to write the number on the back of the interpretation card beside the proverb they were recalling in order to permit correct scoring of recall for each proverb on the original acquisition list. For example, the number "6" on the back of the interpretation cards corresponded to the first proverb on the acquisition

list; the number "13" interpretation card corresponded to the third proverb on the acquisition list and so on.

Results and Discussion

Scoring of Recall

Recall was scored in two ways. First, verbatim recall was calculated by summing, for each subject, the number of verbatim recalled concrete and abstract proverbs out of a possible total of 12 in each case.

This stringent scoring was also supplemented by a scoring procedure which took into account gist recall. This supplementary procedure was carried out as follows. Subjects recall of the proverbs was given a maximum score of 6 if the exact wording of the proverb was recalled or if a close synonym replaced one or more of the content words. A score of 5 was credited for correct gist recall where some content or structural changes occurred but the figurative element was retained. (e.g. "Admiration is the daughter of ignorance" recalled as "Ignorance is the father of admiration"). A score of 4 was assigned for correct gist recall in which the figurative element was missing (e.g. "The wish is father to the thought"

recalled as "Wishing comes before thinking"). A score of 3 indicates incorrect or incomplete meaning recalled (e.g. "Admiration is the daughter of ignorance" recalled as "something about admiration"). Finally, scores of 2 and 1 were given to total recall failures and recall of an incorrect proverb respectively.

An analysis of variance was computed for both stringent and gist scored cued recall measures with INSTRUCTIONS as the between subjects variable and CONCRETENESS of proverb and CUE GENERATION as within subject variables. The stringent scoring is reported first.

The Generation Effect on Cued Recall

There was a main effect of source of generation of the recall cue with self-generated interpretations cuing recall significantly better than experimenter provided interpretations ($F=38.94, mse=2.71, df=1, 18, p<.0001$). However, this effect was modified by the theoretically important interaction with proverb concreteness ($F=57.80, mse=.93, p<.0001$).

Tukey tests on the means making up this interaction (see Table 10) showed that when proverbs were cued by experimenter provided interpretations,

Table 10

Mean Number of Proverbs Recalled When Cued by Experimenter-
Provided Interpretations and Self-Generated Interpretations

VERBATIM SCORES (Maximum possible 12 in each cell)

	<u>Experimenter-Provided Cue</u>	<u>Self-Generated Cue</u>
Proverb Imagery		
Concrete	5.05 (2.39)	9.05 (2.11)
Abstract	5.25 (2.47)	5.84 (2.81)

GIST SCORES (Maximum possible 6 in each case)

Concrete	2.80 (.81)	4.29 (.62)
Abstract	3.14 (.70)	3.59 (.73)

* Means are averaged over 20 subjects in each cell.

there was no difference in recall of concrete and abstract proverbs (critical difference = .86, $p < .05$). In contrast, when interpretation cues were self-generated, abstract proverbs were recalled at lower levels than concrete proverbs.

The results for cued recall with experimenter provided interpretations replicate the findings of Reichman and Coste (1980) which have demonstrated that concrete proverbs are recalled at levels equal to or lower than abstract proverbs under these cuing conditions. The reversal of the effect of proverb concreteness when the recall cues are self-generated support the theoretical analysis of figurative interpretation based on dual coding. This analysis suggested, in contrast to the Conceptual Base Hypothesis, that imaginal representations may be part of the meaning representation of figurative proverbs; as these results show, when recall cues are self-generated interpretations which presumably have been integrated by subjects with that imaginal component, the usual benefit of imagery-concreteness on memory is observed.

Finally, the smaller generation effect for abstract proverbs indicates that a self-generated interpretation of an abstract proverb has a relatively small advantage in cuing memory over a good,

interpretation produced by someone else. This supports the idea that a good interpretation of an abstract proverb may be more conventionally and literally related to the proverb than is the case for interpretations of concrete proverbs. The larger cue advantage for self-generated interpretations of concrete proverbs is especially interesting because exactly the opposite result would be expected from investigations which have shown that associations to concrete words are less variable both within individuals and across individuals than are associations to abstract words (Clark, 1978).

Similarly, studies in bilingual memory representations reveal that associative responses to translations of concrete words are more similar than are associations to abstract words and their translations (Kollers, 1963). If concrete literal language leads to more similarity in associative responding than does abstract language, then the present results clearly suggest that concrete figurative language is not interpreted in the same way as concrete literal language.

The results presented above have been based on the verbatim recall measure. When the composite measure of gist recall was used as the dependent variable, the pattern of results was essentially identical, (see

appendix to compare analysis of variance summary tables). The one difference in the comparison of results for the two measures was that when gist recall was allowed in the scoring, the Tukey test revealed that concrete proverbs were significantly more poorly recalled than abstract proverbs when the experimenter provided the interpretation recall cue. Since there was no difference under verbatim recall, this suggests that abstract proverbs tended to be less likely recalled by their exact words than concrete proverbs; the more lenient measure increased recall levels for abstract proverbs only. In any case, both strict and lenient scoring support the critical hypothesis that the generation effect should be larger for concrete proverbs.

The Effect of Instructions on Cued Recall

The analysis of variance showed that instructions to subjects did not influence cued recall overall or in interaction with any other factor ($F's < 1$ in all cases): This result shows that the previously demonstrated negative effect of imagery instructions on cued recall for proverbs does not extend to the case where subjects actually generate a verbal interpretation of a proverb before receiving experimenter-provided interpretations as recall cues.

Reichman and Coste inferred that a subject's recognition of an experimenter provided interpretations is a measure of the extent to which that interpretation is similar to the representation of proverb meaning. If this is the case, then the results obtained here suggest that subjects who use imagery to generate proverb interpretations have similar representations of proverb meanings as subjects who generate interpretations under instructions to abstractly comprehend proverbs.

The dual coding analysis of the figurative interpretation process led to the expectation that instructions should not influence the kind of representation afforded by concrete figurative proverbs because a figurative interpretation always requires both imaginal and abstract interpretation processes. The recall results support this expectation. However, the theory also suggested that abstract proverbs may be interpreted by a different process than concrete proverbs and that this difference could be revealed in differential effects of instructions on representations of the proverb meanings. This expectation was not supported; abstract proverbs were recalled equivalently regardless of whether they were interpreted under imagery instructions or under comprehension instructions.

One possible explanation for the failure of instructions to produce an effect on cued recall is that the instructions manipulation was not successful; that is, that subjects did not use images to encode the abstract proverbs even under instructions to do so. In order to evaluate this possibility, a separate analysis of variance was done with mean number of reported images as the dependent measure and with instructions and proverb concreteness as the between and within subjects factors respectively.

Instructions did influence the number of images reported for both concrete and abstract proverbs with more images reported under imagery instructions than under comprehension instructions. Further, a moderately significant interaction

($F=4.11, mse=3.50, p=.057$) showed that the instructions had a larger effect on reported images for abstract proverbs than for concrete proverbs. Therefore, the failure of instructions to influence cued recall for abstract proverbs was apparently not due to a general failure of the instructions to influence encoding strategies of the subjects.

A number of alternative explanations for failure of instructions to result in differences in cued recall for abstract proverbs can be devised. A plausible one is that experimenter-selected "good" interpretations

of abstract proverbs are good interpretations because they are closely related in a literal, associative manner to the words of the proverb. This strong literal relation between dominant interpretation and proverb could potentially override the weaker effect of encoding differences under different instructional sets.

Summary of Findings And Their Implications

Reichman and Coste (1980) have reported consistent negative effects of imagery instructions on cued recognition for the meanings expressed by both concrete and abstract proverbs. Failure to obtain instruction differences in this experiment can be taken to result from the manipulation change which required subjects to generate a verbal interpretation of each proverb before being given experimenter-provided interpretations as recall cues. According to the predictions derived from the model of figurative interpretation processes developed here; no difference in cued recall as a function of instructions was expected for concrete proverbs. It was expected that in generating a figurative interpretation of a concrete proverb, both imaginal and abstract interpretive processes would necessarily be engaged, and that the resulting mental representation would include both an imaginal and a verbal component.

It is important to note however, that the failure of instructions to influence cued recall for the concrete proverbs does not rule out an important implication of the conceptual base hypothesis that imagery is not involved in generating a figurative meaning. It is

possible that subjects ignore the images they generate to concrete proverbs and therefore imagery and comprehension instructions lead to equivalent performance. One conclusion with respect to the role of imagery is possible however; imaging to concrete proverbs does not appear to have any negative influence on interpretation; subjects in the imagery condition were not biased toward a literal level of meaning when the task was to interpret the proverbs. This is more consistent with the idea that imaging is a separate process in figurative interpretation, rather than with the idea that imagery is a conflicting process.

Support for the specific idea that concrete proverbs may be interpreted by integrating a non-conventional verbal interpretation with an imaginal representation is found in the interaction between proverb concreteness and source of interpretation cue: Recall of concrete proverbs was relatively poor when cued by experimenter-generated interpretations; a self-generated interpretation, however, resulted in higher levels of recall for concrete than abstract proverbs. The better recall for concrete proverbs under self-cuing conditions should not have occurred if the meanings of concrete and abstract proverbs are represented in memory in a

similar, abstract conceptual base. At the same time, the larger advantage for a self-generated cue for concrete proverbs shows that only when the imaginal representation suggested by the words of a proverb is integrated with the abstract verbal interpretation does the usually observed memory advantage of that imaginal representation appear. An experimenter-provided interpretation does not access the imaginal component because of the abstract and non-conventional relationship between figurative interpretations and the imaginal representations suggested by concrete language.

One plausible argument against this analysis of the results can be considered here. In the procedure used in Study 4, subjects attempted recall of the proverbs twice, first in response to the experimenter-provided cues, and second in response to their own cues. Thus, source of interpretation was entirely confounded with recall order. It could therefore be argued that interference effects as result of the first recall attempt may have operated differentially on abstract proverbs and therefore led to a greater relative failure for those proverbs the second time recall was attempted. In order to evaluate this possibility, a control condition for the experiment was run in which 10 subjects recalled the

proverbs in response to their own interpretations only. If the relative cue advantage for a self-generated interpretation for concrete proverbs was due to interference of the first recall attempt on recall of abstract proverbs, then self-generated interpretations in the "first-recall" control condition should induce higher levels of recall for abstract proverbs than that observed in the original experiment.

As shown in Table 11, there was no difference in recall levels for either concrete or abstract proverbs as a function of whether there was a previous recall attempt. Therefore, differential interference factors cannot explain the increased generation effect for concrete proverbs in the experiment.

Table 11

Mean Verbatim Recall for Concrete and Abstract Proverbs Cued
By Self-Generated Interpretations as a Function of Time of
Presentation of Recall Cue

<u>Time of Presentation</u>	<u>Proverb Imagery</u>	
	Concrete*	Abstract**
First	9.40 (2.59)	6.00 (2.40)
Second	9.05 (2.11)	5.85 (2.81)

* t for difference in presentation time = -.37, p = .72

**t for difference in presentation time = -.15, p = .88

Study 5: Replication of Study 4 Using Randomly
Selected Interpretations as Proverb Cues

The strong inference arising from the results of study 4 is that the greater advantage for a self-generated interpretation cue for concrete proverbs is due specifically to the integration of an imaginal base and an abstract-verbal interpretation of that base that occurs in figurative interpretation. According to this interpretation of the generation effect, the locus of the effect is, in the nature of the figurative interpretation process itself.

Concrete proverbs show a larger generation effect because in figuratively interpreting a proverb, a subject integrates an imaginal representation with the abstract interpretation of this representation. The integration is episodically controlled and unique to the subject and therefore an interpretation of another individual does not have the advantage of the integration of imaginal and abstract verbal processes.

However, another possible explanation for the result can be suggested. This is that when subjects generate their own interpretations of concrete proverbs, those interpretations are not as abstract and figurative as the "good" interpretations selected by the experimenter. Instead, subjects own interpretations literally repeat words and phrases of

the proverb that were completely figuratively interpreted in the experimenter-provided interpretation. For example, compare the two interpretations of the concrete proverb, "Dirt is dirtiest on the fairest spot".

Experimenter-provided: "Things that are opposite are noticed more".

Self-Generated: "When things are clean, dirt shows up on them more".

In the self-generated interpretation, the relation between proverb and interpretation is more literal than in the case of the experimenter-provided interpretation. The advantage for a self-generated interpretation of a concrete proverb would thus arise chiefly from the direct literal repetition and literal associative connections between self-generated interpretations and proverbs.

In the contrasting case of abstract proverbs, it would be expected that there would be a smaller difference between "good" interpretations and self-generated interpretations in their relationship to the proverb. According to the model presented here, the more abstract the proverb the less likely it would be figuratively interpretable; any appropriate interpretation would be expected to be literally related to the proverb. This would produce a smaller

1
difference in recall cue effectiveness for self-generated interpretations compared to experimenter-provided interpretations.

The argument is, then, that self-generated interpretations of concrete proverbs have the larger cue advantage because they contain more literal repetition of key words than the corresponding experimenter-generated interpretations.

Note that this potential explanation remains consistent with the theoretical position that abstract language, in contrast to concrete language, does not lead to figurative interpretations. That is, interpretations of abstract proverbs are always primarily literally related to the proverbs; only concrete proverbs can potentially be figuratively interpreted, but that potential may not always be realized in an individual's verbal interpretation. However, this argument does suggest a different locus of the generation effect observed in Study 4. This explanation says that the locus of the generation-effect may be in differences in the "quality" of random interpretations of individual subjects and those interpretations specifically chosen to be representative of the proverb meaning.

In order to evaluate the alternative explanations for the larger generation effect for concrete

proverbs, a replication study was designed. This experiment used the identical materials and procedure as in the previous experiment with the exception that instead of having experimenter-selected interpretations for cues in the first cuing task in the experiment, subjects simply exchanged interpretations with one another and then proceeded to recall the proverbs in response to the interpretations received from their partner. Following this task, as in the first experiment, subjects then received their own interpretations as memory cues for the original set of proverbs.

Since no selection of particularly abstract or "figurative" interpretations for concrete proverbs occurs in this experiment, a self-generated interpretation and "other generated" interpretation should be, on average, equally abstract in relation to the proverb. If the size of the generation effect observed in Study 4 is explained completely by the self-generated interpretations being literally related to the proverb, the generation effect for concrete proverbs should be no greater than the generation effect for abstract proverbs in the following experiment.

Method

The method is essentially identical to that of Study 4. Therefore, only a condensed method will be reported, with exceptions to Study 4 noted.

Subjects

A new set of 20 subjects was recruited from the Introductory Psychology subject pool at the University of Western Ontario.

Materials

The same set of 24 proverbs (12 concrete and 12 abstract) as were used in study 4 were used in this experiment.

Procedure

As in study 4, subjects were tested in groups of three to ten. The procedure was identical to that described in the method section of study 4, except that in the first cued recall task, each subject was told to exchange the interpretations they had generated in the first phase of the experiment with another member of the group, all of whom had received the same instructions (either imagery or comprehension) for generating the interpretations. Upon receiving another subject's set of interpretation cards, the subjects shuffled the cards so the order of recall would not be the same as the order in which the

proverbs were originally heard. The subjects then turned the cards up one at a time, and tried to write the proverb that was appropriate to that interpretation. Subjects recorded their recall attempts on a sheet of paper with numbered blanks, the numbers corresponding to the numbers on the back of the interpretation cards. Thus, if the first interpretation card had a "3" on the back, the subject wrote the appropriate proverb in the blank marked "3".

Following this task, the participants retrieved their own interpretations and re-sorted them according to the order given by pre-determined random numbers on the backs of the cards. Then, the participants were told to look at each interpretation in turn and to write the proverb that matched the interpretation on a sheet of paper provided. Thus, order of original acquisition, order of first recall and order of second recall were all different.

Results and Discussion

The Generation Effect

An important purpose of this experiment was to determine the extent to which the generation effect for concrete proverbs in Study 4 was due to the difference in abstractness of the modal interpretations and the self-generated interpretations.

As with Study 4, an analysis of variance was computed on both the verbatim measure of cued recall and on the scored gist recall. These analyses showed the expected main effect for generation of interpretation cue ($F=76.47, mse=.221, p<.0001$, gist recall; $F=76.47, mse=.31, p<.0001$, verbatim recall). As in Study 4, the analysis on the gist recall scores showed a significant interaction between proverb concreteness and source of the interpretation cue, with concrete proverbs showing an overall larger advantage for a self-generated interpretation than abstract proverbs ($F=6.69, mse=.078, p=.018$; the analysis of variance summary tables are presented in the appendix.) However, the size of the interaction was smaller than that observed in Study 4 and this two-way interaction failed to reach significance in the analysis on the more conservative measure of verbatim recall scores ($F=2.99, p=.1$). Further, an

important contrast to the results of study 4 emerged in both gist recall and verbatim recall. INSTRUCTIONS interacted both with the GENERATION factor alone, and with GENERATION and CONCRETENESS together ($F=5.65$, $mse=1.06$, $p=.02$, for the 3-way interaction, verbatim scores; see table 12 for means). In addition, inspection of the mean levels of recall revealed that in general, concrete proverbs were recalled more often than abstract for both other generated interpretations and self-generated interpretations and for both instructional sets. (See Figure 2).

The Effect of Instructions

In order to interpret the effect of instructions on cued recall it is important to keep in mind the difference between the "other" generated modal cues that were cues for the first recall task in Study 4 and the "other" generated cues used for the same task in this study. In Study 4, the "other" cues were interpretations that had been generated as part of another study under no particular instructional set; in the present study, the "other" interpretations were themselves generated by subjects under either imagery instructions in the

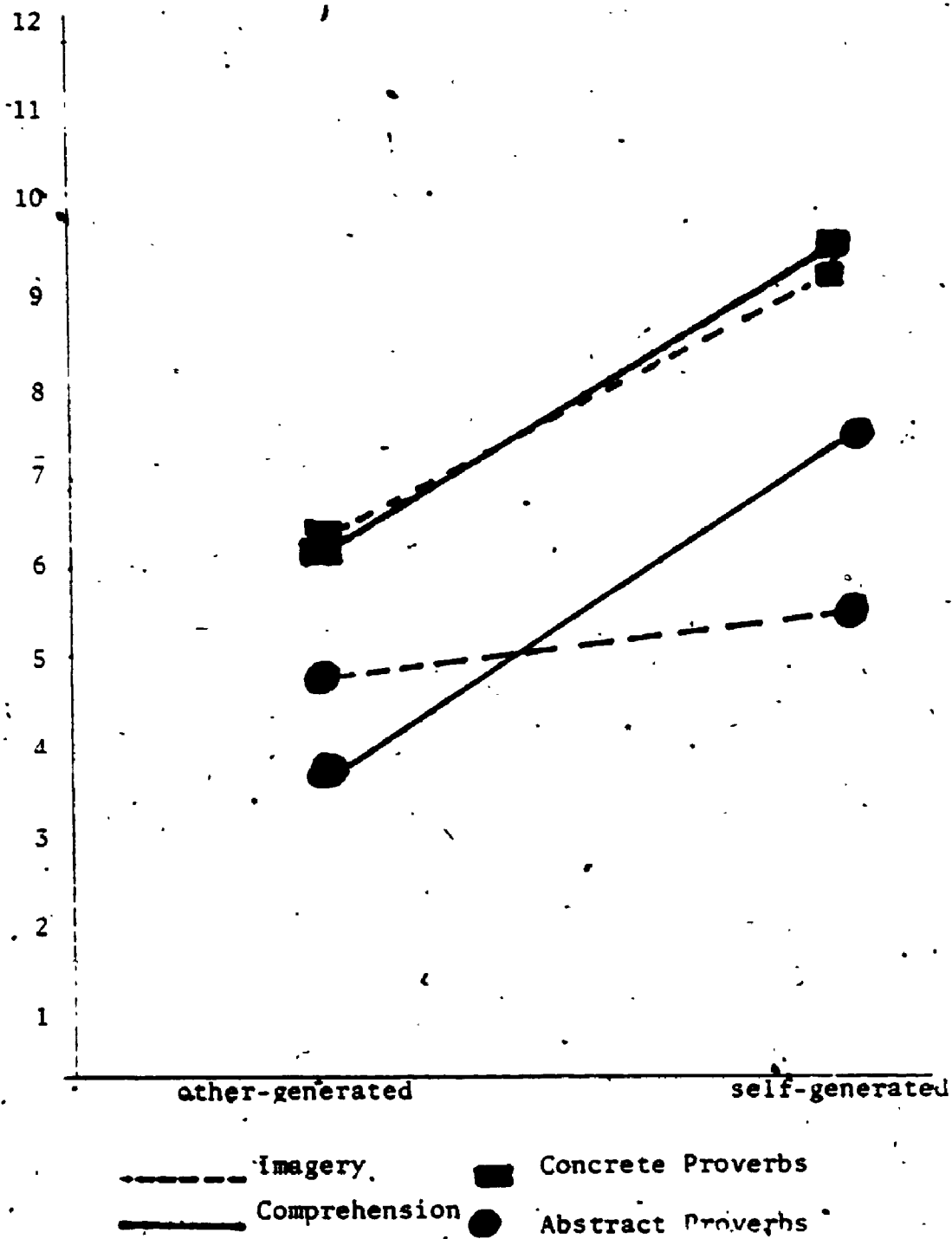


Figure 2: Mean Number of Proverbs Recalled Verbatim Cued By Other-Generated Interpretations and Self-Generated Interpretations Under Imagery and Comprehension Instructions

imagery condition, or abstract comprehension instructions in the comprehension condition. Instructions did not influence cued recall in Study 4; apparently the relation between the selected modal interpretations and the proverbs was controlled in such a way that the instructions under which subjects interpreted the proverbs did not influence the cue effectiveness of those modal interpretations. However, in the present experiment, the relation between "other" generated interpretation cue and a proverb could alter as a function of instructions. That is, people who interpret a proverb under instructions to use imagery may give a different sort of interpretation than people who interpret the same proverb under instructions to use an abstract comprehension process. Therefore, the difference in the two experiments with respect to the influence of instructions is most likely in the relation between the "other-generated" interpretations and the proverbs, rather than in encoding differences alone.

Tukey tests (critical difference = 2.66, $p < .05$) indicated that instructions had no effect on cued recall for concrete proverbs; concrete proverbs interpreted under imagery instructions were recalled as well as those proverbs interpreted under comprehension instructions regardless of whether the

interpretation cue was self generated or other-generated. The means are reported in table 12). The finding that instructions had no effect on cued recall of concrete proverbs was expected based on the dual-coding analysis of figurative interpretation. According to that analysis, both imaginal and abstract interpretive processes are necessarily integrated in generating a figurative interpretation.

However, imagery and comprehension instructions differed in their effect on cued recall for abstract proverbs. As can be seen in table 12 when interpretation recall cues were "other-generated" there was no significant difference in cued recall levels as a function of instructions although the difference favoured imagery instructions (mean number recalled 4.90 and 3.80 under imagery and comprehension instructions respectively). However, when self-generated interpretations were cues, comprehension instructions led to superior recall for the abstract proverbs. The cued recall results for abstract proverbs interpreted using imagery parallels the result in study 4 which showed that the generation effect was relatively small for abstract proverbs. In fact, as can be seen by comparing the appropriate cells in table 12 with table 10, the levels of cued recall for abstract proverbs observed in Study 4 are

Table 12

Guided Verbatim Recall for Concrete and Abstract Proverbs Interpreted
Under Two Instructional Sets: Self-Generated and Other-Generated
Interpretations Compared

<u>Instructions</u>		<u>Source of Interpretation</u>		<u>Generation Effect</u>
		<u>other</u>	<u>self</u>	
Imagery	Concrete	6.60(2.55)	9.30(2.71)	2.70
	Abstract	4.90(3.21)	5.70(4.00)	.80
Comprehend	Concrete	6.50(2.41)	9.90(1.85)	3.40
	Abstract	3.80(3.15)	7.50(3.06)	3.70

Critical Tukey Value for Comparison of Means @ $p=.05$: 2.66.

essentially equivalent to the levels of cued recall observed in this study for abstract proverbs interpreted under imagery instructions.

In contrast, however, comprehension instructions for abstract proverbs appear to have had the effect of producing relatively poor recall cues for other people, but relatively good cues for the interpreter. This is the same pattern observed for the figurative interpretations of concrete proverbs. It is possible that when subjects are asked to interpret an abstract proverb using an "abstract" comprehension strategy they might be led to generate an interpretation which is very far removed from the literal meaning of the words of the proverb. That is, instead of just rephrasing or paraphrasing the words of the proverb, they would try to devise a unique interpretation, perhaps one that was only personally relevant. Thus, the explanation for the size of the generation effect for abstract proverbs interpreted under abstract comprehension instructions would be similar to the explanation for the generation effect for concrete proverbs which are assumed to be figuratively interpreted. The difference between an abstract interpretation of an abstract proverb, and an abstract (i.e. figurative) interpretation of a concrete proverb would be in the closeness of integration between

verbal and non-verbal processes; in the case of concrete proverbs, the tighter integration would lead to an overall memory advantage.

In order to further understand the concrete-abstract differences in proverb memory under the different instructional sets, a separate analysis was conducted for the imagery and the comprehension groups. The results of the separate analysis revealed that under imagery instructions, there was no significant difference for cued recall of concrete and abstract proverbs when cues were other-generated ($t=1.31, p=.21$). The memory advantage for concrete proverbs emerged with self-generated interpretations, however ($t=2.36, p=.03$). This result is the same as that observed in Study 4 and confirms that under imagery instructions at least, the stronger generation effect for concrete proverbs occurs even when interpretation cues are randomly selected.

The separate analysis revealed that for subjects working under comprehension instructions concrete proverbs were recalled at higher levels than abstract both when the interpretations were "other-generated" ($t=2.15$) or self-generated ($t=2.12; p's=.05$ in both cases). These results confirm that earlier failures to find effects of proverb imagery in cued recall must have been due to the particular relation between

interpretation recall cues and the proverbs themselves.

Proverb Interpretation Quality and Recall Cue

Effectiveness

The question of how differences in quality of interpretations can lead to differences in the effectiveness of those interpretations as recall cues is important both theoretically and empirically for the present studies. The interesting problem with respect to quality of interpretations and their effectiveness as recall cues is that for concrete proverbs, in contrast to abstract proverbs, a "good" interpretation may not function well as a recall cue for another individual. This is because such interpretations should be figuratively related to concrete proverbs; they should not be highly related associatively and semantically to those proverbs. Thus, when "good" interpretations of proverbs are used as recall cues (as in Study 4) abstract proverbs will be relatively more likely to be accessed in response to those cues than concrete proverbs. When interpretation cues are not selected to be "good" or representative (as in Study 5) the interpretations of concrete proverbs may be more literally related to the proverbs, thus allowing a relatively higher level of access to the proverb itself, despite the fact that an

individual other than the subject generated the interpretation.

This reasoning relies on the assumption that semantic similarity between proverbs and interpretations distinguishes "good" interpretations of abstract proverbs from good interpretations of concrete proverbs.

I tested this inference by obtaining two measures of similarity in wording between the proverbs and the selected modal interpretations in study 4, and between the proverbs and a sampled group of 10 interpretations generated by the subjects in study 5. The 10 sampled interpretations for each proverb were selected from a total group of 20 subjects, so that comprehension and interpretation instructions were equally represented and so that interpretations for 6 concrete and 6 abstract proverbs were used from each of the 20 subjects.

Rated similarity in Wording Between Proverbs and Interpretations

The first measure of similarity in wording was intended as a simple confirmation of my subjective impression that the interpretation recall cues for concrete proverbs, despite being more "abstractly" related to their target proverbs than were interpretation cues for abstract proverbs, were not

themselves equivalently abstract for the two experiments. This confirmation was obtained by having an independent judge, unfamiliar with any of the experimental hypotheses, rate, on a 7-point scale, the similarity in wording between each interpretation and the proverbs. The results of these ratings (presented in the upper portion of table 13) showed that for both the modal interpretations used in Study 4 and the sampled interpretations used in Study 5, similarity in wording between proverb and interpretation was rated as higher for abstract proverbs than for concrete proverbs. This is consistent with the idea that interpretations of abstract proverbs are more literally related to the proverbs themselves, across different interpreters. However, the comparison of interest with respect to the different results obtained in Studies 4 and 5 is the relative magnitude of the difference in interpretation wording similarity for concrete and abstract proverbs. The lower similarity in wording between concrete proverbs and their interpretations relative to abstract proverbs appeared greater for the selected modal interpretations.

Wording Overlap Between Proverbs and their Interpretations

This pattern was confirmed using the second

Table 13

Similarity in Wording for Proverbs and Their InterpretationsAs a Function Of Proverb Imagery Level

<u>Proverb Imagery</u>	<u>Mean Similarity in Wording</u> (7-point scale)	
	<u>Modal Interpretations</u>	<u>Random Interpretations</u>
Concrete	1.41	2.46
Abstract	4.00	3.47

Mean Proportion of Proverbs Yielding Interpretations withNo Shared Wording with Proverb

<u>Proverb Imagery</u>	<u>Modal Interpretations</u>	<u>Random Interpretations</u>
Concrete	.75	.59
Abstract	.08	.29

measure of similarity in wording between proverbs and their interpretations. Each modal proverb interpretation and each of the 10 random sampled interpretations was examined for repetitions of words or close synonyms from the proverb itself. Then, for each proverb, all interpretations that had no words or close synonyms repeated from the proverb were summed. For the modal interpretations, the concrete/abstract difference in the number of proverbs yielding interpretations with no content words repeated either verbatim or as synonyms was very marked (75% for concrete, compared to 8% for abstract; see middle portion of table 13).

For the 10 representative sampled interpretations for each proverb, the concrete/abstract difference was smaller, as shown in table 13, but even here the concrete proverbs on average yielded significantly more interpretations that showed no word overlap with the proverb than did abstract proverbs ($t=3.33$, $p=.003$). This result is important because it shows that the effectiveness of a proverb interpretation as a recall cue cannot be simply a matter of the absolute amount of word repetition; if this were the case the abstract proverbs should have been recalled better than concrete proverbs in Study 5 where there were no experimenter imposed selection restrictions on the

interpretation recall cues. It remains a problem, therefore to explain why other-generated interpretations of abstract proverbs functioned poorly as recall cues in Study 5.

The difference in results between Studies 4 and 5 for "other-generated" interpretation cued recall of proverbs may be related to a second factor--differences in the quality of interpretation recall cues of concrete and abstract proverbs in the two experiments. Recall that the present proposal is that a good interpretation of an abstract proverb is literally related to that proverb, and a good interpretation of a concrete proverb is figuratively related to the proverb. It should be the case then, that the modal interpretations, which showed a wider spread in the wording similarity for interpretations of concrete and abstract proverbs should be rated as better interpretations than should the random interpretations. In particular, it is important to show that the size of the generation effect in Study 4 was not produced by a bias for selecting "poor", semantically unrelated interpretations of concrete proverbs, but rather was an intrinsic function of the interaction between proverb concreteness and verbal relatedness of good interpretations.

Two independent judges, both university graduates

with experience in evaluating language-related materials, were given the set of modal interpretations for the proverbs and the set of 10 sampled interpretations for each proverb and asked to rate, on a 7-point scale the quality of each interpretation, according to their subjective opinion. Table 14 summarizes these results. The overall pattern confirms that for both judges and for both concrete and abstract proverbs, the modal interpretations were rated as better than the average of the sampled interpretations. Pearson correlations between the ratings of the two judges (also given in Table 14) were acceptable except in the case of the modal interpretations of abstract proverbs which showed a non-significant negative correlation for the goodness ratings of the two judges. It is important to note that this apparent "unevenness" in perceived quality of the modal interpretations of abstract proverbs could not have produced the results in experiment 4 where they were used as recall cues, since the interpretations functioned quite well as recall cues. Because of the lack of agreement in this one case, however, I did not average the judges ratings together; rather, I compared for each of the 12 concrete and 12 abstract proverbs, the goodness rating given by each judge to the modal interpretation used

Table 14

Mean Ratings of Goodness of Interpretation for Random and Modal Interpretations Used in Studies 4 and 5

	<u>Modal Interpretations</u>				
<u>Concrete Proverbs</u>	Judge 1	Judge 2	Pearson r	Significance	n
S.D.	5.75 (1.21)	6.16 (1.99)	.66	.01	12
<u>Abstract Proverbs</u>					
S.D.	5.50 (1.31)	5.41 (2.23)	.38	.10	12
	<u>Random Interpretations</u>				
<u>Concrete Proverbs</u>	3.29	3.27	.51	.001	119
S.D.	(2.02)	(2.41)			
<u>Abstract Proverbs</u>	3.14	3.10	.40	.001	116
S.D.	(2.08)	(2.38)			

in Study 4 with the averaged goodness rating given to the sampled interpretations used in Study 5. Table 15 presents this data and shows that in all but 5 cases the goodness rating for both judges was higher for the modal interpretations than for mean rating of the sampled interpretations. For each of the 5 cases which did not show this pattern (indicated on Table 15) the rating of only 1 judge varied from the pattern.

The results of these ratings strongly suggest that good interpretations of concrete proverbs bear a different relation to the proverb than do good interpretations of abstract proverbs. A selected good interpretation of a concrete proverb is rated as less semantically related to the proverb than a good interpretation of an abstract proverb. Study 4 revealed poorer cued recall for concrete proverbs cued by "other-generated" interpretations compared to cued recall of abstract proverbs. The pattern was reversed in this study because the random interpretations of the concrete proverbs were more literally related to those proverbs, leading to enhanced recognition of the relation between the interpretation and the proverb.

These results suggest that the size of the generation effect observed in Study 4 was contributed to by the fact that self-generated interpretations of

TABLE 15

Rated Goodness of Interpretation for Modal and Sampled

Proverb Interpretations

Concrete Proverbs

Random Interpretations*

Modal Interpretations

Proverb	Judge 1	Judge 2	Judge 1	Judge 2
1	2.40(1.71)	2.70(2.11)	4	7
2	3.10(2.18)	2.40(2.32)	4	3
6	4.00(2.00)	2.89(2.32)	4	1
8	4.40(2.50)	3.90(2.73)	6	7
10	2.60(1.43)	3.30(2.54)	6	7
11	3.30(1.57)	4.50(2.68)	6	7
12	4.00(2.00)	4.33(2.55)	7	7
14	3.30(2.26)	4.00(2.11)	5	7
17	3.30(2.45)	2.80(2.35)	7	7
18	3.30(2.11)	3.70(2.58)	7	7
22	2.60(1.78)	1.90(1.52)	7	7
23	3.40(2.27)	3.10(2.77)	6	7

Abstract Proverbs

3	1.90(1.77)	2.40(2.50)	6	4
4	2.80(1.75)	2.50(2.12)	6	1
5	3.60(2.01)	3.60(2.80)	7	7
7	2.60(1.90)	2.70(2.41)	2	7
9	2.33(2.06)	2.89(2.37)	7	1
13	3.80(1.69)	2.70(2.06)	5	6
15	2.10(2.33)	1.30(.67)	6	7
16	3.90(1.79)	2.50(2.01)	6	6
19	5.20(1.55)	5.10(1.91)	5	6
20	2.90(2.08)	4.20(2.53)	5	7
21	3.22(2.28)	3.67(2.74)	6	7
24	3.25(2.55)	3.88(2.64)	5	6

*Random Interpretations are mean ratings based on a sample of 10 ; standard deviations in brackets

concrete proverbs may not always be expressed as abstractly as selected "good" interpretations of those same proverbs. The literal repetition of content words apparently aided concrete proverb recall more than abstract proverb recall. Nevertheless, despite differences in the apparent abstractness of experimenter-generated interpretations and randomly selected interpretations, the advantage for a self-generated interpretation was still somewhat larger overall for the concrete proverbs in Study 5, showing that differences in quality of self-generated and experimenter generated interpretations could not be the only explanation for the generation effect observed in Study 4.

Summary and Implications of Results of Studies 4 and 5

The pattern of results in experiments 4 and 5 can be summarized under 3 general headings. These are 1) the generation effect for interpretations of concrete and abstract proverbs; 2) the effect of instructions on the cue effectiveness of interpretations for concrete and abstract proverbs, and 3) the relation between the quality of proverb interpretations and how closely those interpretations correspond to the words of the proverbs. Each of these issues will be discussed in turn.

1) The generation effect

Concrete proverbs generally show a greater advantage for a self-generated recall cue than do abstract proverbs. This difference between a self-generated interpretation and an interpretation generated by someone else for concrete proverbs is larger when good interpretations are compared against the self-generated interpretations, but occurs also when interpretations are not selected to be "good". This finding is important for two reasons. First, it suggests that the "conceptual base" hypothesis, which suggests that imagery is not part of the representation of proverb meanings, may need to be modified. In contrast to previous results supporting the conceptual base hypothesis, concreteness effects

were observed in cued recall when subjects own interpretations were used as recall cues. This positive effect for interpretations of concrete proverbs occurs despite the fact that interpretation cues for abstract proverbs are more semantically related to those proverbs than are interpretations of concrete proverbs.

Second, the larger generation effect for concrete proverbs supports the idea that that interpretations of concrete proverbs are more figurative than abstract proverbs. The finding is consistent with the idea that figurative interpretations differ from literal interpretations because they require episodic integration between words of the interpretation and the representation of the proverb. Self-generated figurative interpretations make better recall cues because they have been integrated by the subject with the representational base for the proverb. In contrast, when a literal semantic relation between a proverb and its interpretation exists, as occurs for abstract proverbs, a much smaller advantage for a self-generated interpretation is noted.

2) The effect of instructions on generation of proverb interpretations

Imagery and comprehension instructions do not

influence interpretation cued recall performance for concrete proverbs. This is consistent with the theory of figurative interpretation proposed here which states that in order to figuratively interpret a proverb, (the implicit requirement of the task set for the subjects in these experiments) both imaginal and abstract comprehension processes must be involved. Instructions to use one or other of those processes will not eliminate the other process required by the task.

In contrast, the instructions under which the proverbs were interpreted influenced the cue effectiveness of interpretations of abstract proverbs. Interpretations that were generated under imagery instructions served as better recall cues for another individual than interpretations that were generated under abstract comprehension instructions. In contrast, self-generated interpretations made under comprehension instructions were better cues than those made under imagery instructions. The finding of no significant generation effect for abstract proverbs under imagery instructions was the same as that observed when good, modal interpretations were used as memory cues, suggesting that a "good" interpretation of an abstract proverb may be similar to one that is generated under imagery instructions. The relatively

large generation effect for abstract proverbs interpreted under comprehension instructions suggests that when a subject tries to "abstractly" interpret an abstract proverb, the result is an interpretation that is less semantically related to the proverb than an interpretation generated under imagery instructions. Whether such an interpretation would be considered "figurative" would require further investigation. However, the general pattern of instructional differences supports the idea that concrete and abstract proverbs are interpreted by a different process, and that normally subjects do not "abstractly" interpret abstract proverbs.

3) The relation between quality of interpretation and similarity of wording between proverbs and their interpretations

In Study 4, when subjects were given interpretations generated by someone else to use as memory cues for the proverbs, the interpretations of abstract proverbs were more effective cues than were interpretations of the concrete proverbs. In Study 5, the reverse pattern occurred. Investigation of the reason for this difference led to the finding that good interpretations of concrete proverbs (used in Study 4) are less semantically related to the proverbs than are random interpretations (used in Study 5). In

contrast; good interpretations of abstract proverbs are more semantically related to the proverbs than are randomly selected interpretations. This finding supports the idea that concrete and abstract proverbs are not equally figurative in the kinds of interpretations they suggest and suggests that a good interpretation of a concrete proverb is generated in a different manner than a good interpretation of an abstract proverb.

General Discussion

The initial goal of the research presented in this thesis was to critically evaluate the claim proposed by Reichman and Coste (1980) that a dual coding approach to language representation cannot explain figurative interpretation. That claim was based on findings that were interpreted as showing that the memory representations for the meanings of proverbs are abstract and imagery-free. My goal in the thesis was to show that in fact a dual coding analysis of figurative representation provides a better explanation for the memory findings than does the conceptual base hypothesis put forth by Honeck et al. (1980) and Reichman and Coste (1980).

The first step was to show that, as language increases in abstractness, it decreases in the potential for a figurative interpretation; that is, an interpretation which is not directly expressed by the words of a sentence. Study 1 showed that proverbs that were rated as high in imagery are independently rated as more figurative in the relation between the meaning expressed by the words of the proverb and its "intended" meaning. The conceptual base hypothesis does not suggest a distinction between concrete and abstract language in terms of figurativeness whereas a

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dual coding analysis of language representation does suggest this distinction. According to dual coding, representations of abstract words are primarily linguistic in nature and their meanings are dependent on the highly conventionalized and structured relations defined by the verbal system. In contrast, concrete words have, in addition to linguistic representation, associated non-verbal representations which would permit the enhanced processing flexibility required by non-conventional, figurative interpretations.

The second step in showing that imagery may play a role in figurative interpretation was to examine the relation between ease of imagery and ease of comprehension and interpretation of proverbs. Study 2 showed that increasing imagery is associated with increasing ease of proverb comprehension and interpretation. The conceptual base hypothesis suggested incorrectly that imagery should not be associated with ease of understanding and interpreting proverbs because comprehension rests on generation of an abstract, imagery-free conceptual base. On the other hand, a dual coding analysis suggested an interesting prediction for concreteness effects on the relationship between ease of comprehension and ease of interpretation. The prediction was, that ease of

comprehension and ease of interpretation should be more closely associated for abstract proverbs, which are both comprehended and interpreted in the same verbal system. In contrast, concrete proverbs could be "comprehended" in the non-verbal system, but would require interpretation in the verbal system.

Therefore, interpretation and comprehension would be less closely related for these proverbs. This prediction was supported in Study 2.

The third study presented additional evidence for concrete/abstract differences associated with differences in interpretation processes for proverbs. Interpretations of concrete proverbs were shown to be less semantically related to the proverbs than were interpretations of abstract proverbs. This finding was taken to support the idea that concrete proverbs are more figurative than abstract proverbs. Therefore, previous findings that memory for concrete proverbs is less effectively cued by interpretations of those proverbs than is memory for abstract proverbs can be explained by the less direct verbal relationship, in the case of concrete proverbs and their interpretations. In addition, Study 3 showed that concrete proverbs can lead to a somewhat larger number of interpretations than abstract proverbs, providing a further source of decreased cue

effectiveness for interpretations of concrete proverbs.

Finally, Studies 4 and 5 showed that when subjects are given their own interpretations of proverbs to cue memory for the proverbs, interpretations of concrete proverbs are more effective memory cues than are interpretations of abstract proverbs. This contrasts with results of earlier studies reported by Reichman and Coste (1980), and with results from study 4 which show that when an experimenter provides the interpretation cues, memory for concrete proverbs is poorer than memory for abstract proverbs. The finding that self-generated interpretations for concrete proverbs make effective memory cues was taken to show that when a subject has integrated an abstract, figurative interpretation with the concrete representation of the proverb, the memory advantage for the imaginal representation can be detected.

Two further findings from studies 4 and 5 show that concrete and abstract proverbs are interpreted by a different process. First, the advantage for a self-generated interpretation as a memory cue was generally larger for concrete than for abstract proverbs. This is explained by the idea that the relation between a self-generated interpretation and a concrete proverb is more controlled by episodic

factors that are unique to individual interpreters; in contrast, the relation between interpretations and abstract proverbs is controlled by semantic memory factors that would tend to be relatively more similar across different interpreters.

Second, good interpretations (as opposed to poor interpretations) of concrete and abstract proverbs show a different relation to the proverbs. A good interpretation of an abstract proverb has a very close semantic relation to the proverb itself; in contrast a good interpretation of a concrete proverb has a distant semantic relation to the proverb. It can be inferred, then, that the process of generating a good interpretation of an abstract proverb must differ from the process of generating a good interpretation of a concrete proverb.

Taken together, the findings show that a number of the important results supporting the conceptual base hypothesis can be explained by the different verbal relationship that exists between concrete proverbs and their interpretations and abstract proverbs and their interpretations. The dual coding idea that two different cognitive systems are involved in figurative interpretation provides a better explanation of the data than does the conceptual base hypothesis.

The Dual Coding Model of Figurative Interpretation

According to the theory of figurative interpretation proposed here, a figurative interpretation may be defined as an abstract verbal interpretation of a concrete referent. Application of dual coding principles of language representation to this definition suggests how a model of the figurative interpretation process might be constructed.

According to such a model, a figurative interpretation starts out with an imaginal, non-verbal base, which is then interpreted by the verbal system. The inference that the source of a figurative interpretation is in non-verbal information associated with language is derived from the finding that abstract, low imagery sentences show a decreased potential for a figurative interpretation. Further, results of the studies presented in the thesis show that interpretations of high imagery proverbs are less related, in a verbal associative sense, to those proverbs, than are interpretations of abstract proverbs. This result identifies a figurative interpretation as one that is not highly associatively related to the words of the interpreted sentence.

Dual coding theory provides a cognitive account of why abstract language cannot be figuratively interpreted. Abstract language is mentally

represented primarily within the verbal-linguistic system ; according to Paivio, "abstract terms depend relatively more [than concrete words] on verbal associative connections for their meaning" (1986,p.123). Meanings of abstract words and presumably larger units such as phrases and sentences are associatively derived, according to the theory. Interpretations of abstract proverbs are therefore closely semantically related to the abstract words of the proverbs.

In contrast, concrete words have associated with them information that is not part of the linguistic representation, but which is part of sensory experience with the referents of those concrete words. Representations of concrete words therefore allow more flexibility in the way they are verbally described-any aspect of the sensory, imaginal information can provide a basis for a figurative (i.e. non-literal) interpretation.

Dual-coding theory does not state that non-verbal representations are primarily visual in nature, (Paivio,1986) ; rather, the relative emphasis on visual imagery arises because of the apparent dominance of the visual system in sensory processing for most people and the resulting importance of visual information in cognitive processing. According to

Paivio (1986), the non-verbal system,

"must include representations of the sensory properties of things, relations among them and their behavioral "affordances";...a thing can be known by more than one modality - by appearance, haptic feel, sound, smell and taste" (p. 58).

Accordingly, concrete words could have associated with them, in addition to visual images of their referents, motor, auditory, haptic and other internal sensory information, any of which are not primarily part of the linguistic representation of the word and could thus form the basis of a figurative interpretation.

According to this proposal, then, the basis of the concrete-abstract difference in the potential for figurative interpretation is explicitly in the non-verbal information associated with concrete words.

However, the research in this thesis does not provide direct evidence that the association between figurativeness and imageability is due to imagery and not to some other feature associated with concreteness of language. It is known that concrete and abstract language differs on a number of variables that could be relevant to processes involved in figurative language. For example, concrete words are categorized more consistently than abstract words (Kintsch, 1974) which could serve a function in metaphorical interpretation. Some theories of metaphor (e.g.

Tourangeau and Sternberg, 1981; McCormac, 1987) stress the importance of category information in metaphorical interpretation in that metaphor seems to involve the use of words to apply to categories to which they don't normally belong. Perhaps abstract words have less figurative potential because they lack definite category information and cannot therefore be used in a "cross-category" fashion. Alternatively, abstract words may themselves be considered category labels, and thus cannot be applied to refer to alternate categories. The extent to which accessibility of category information, rather than availability of non-verbal information, is the crucial variable in figurative representation is probably an empirical question. However, the question always remains about the fundamental basis for a distinction between concrete and abstract words on any cognitive dimension.

In addition to being more readily categorizable than abstract words, concrete words elicit a greater number of associations than abstract words (Paivio, 1968), show more stable associative patterns than abstract words (Clark, 1978), are more easily defined (O'Neill, 1972) and are communicated more readily than abstract words (Begg, Upfold and Wilton, 1978). Clark and Paivio (unpublished), have

summarized these and a number of other concrete-abstract differences in language by stating that concrete language differs from abstract language in three general ways; accessibility of perceptual information, distinctiveness of meaning, and consistency of meaning. These last two factors are described by the authors as semantic coherence; meanings of concrete words are more coherent both because they are distinct from each other and more consistent across individuals than are abstract words. It could be argued that any of these factors could be important in figurative language use. For example, a possible argument would be that a "figurative" meaning of an abstract term cannot be constructed because meanings of abstract words are not sufficiently coherent to allow those terms to be used in a novel, non-conventional sense as is demanded by a figurative use.

Importantly, Clark and Paivio argue that the differences between concrete and abstract words arise because of the fundamental difference in observability of the referents of concrete and abstract language. The dual coding claim is that it is necessary to postulate representational differences for concrete and abstract words in order to explain the whole pattern of concrete-abstract differences in language;

however, it would be consistent with the theory that some differences between concrete and abstract words could be explained by differences in verbal processes, such as those associative differences noted above.

The issue with respect to figurative meaning is the extent to which purely verbal processes can account for the relation between figurativeness and concreteness of language. Clearly, verbal processes are involved in generating a verbal interpretation of a figurative meaning. The problem for dual coding, or any other theory of figurative interpretation, is in specifying how an abstract verbal interpretation is generated from a concrete linguistic unit, and what the role of the concreteness of the interpreted unit might be.

While the issue requires further research, at present there are theoretical reasons for preferring the imagery account for the figurative potential of concrete words. The theoretical preference is compelled by the distinction between literal and figurative interpretations. The results obtained in the experiments presented here lead to the conclusion that a literal interpretation is more closely related to the interpreted proverb in a verbal, associative sense than is a figurative interpretation. It can be concluded, therefore, that the generation of the

figurative interpretation seems to be less governed by "conventional" (i.e. close) semantic relations than the literal interpretation. In order to specify where such an interpretation comes from, it seems useful to assert that concrete language expresses information that is not directly available from a conventional literal interpretation of the sentence. If that "non-literal" information is mentally represented in exactly the same way as the literally associated information, it is difficult to identify the basis for a distinction between a literal and figurative interpretation of a word or sentence. On the other hand, if we accept the dual coding position that non-verbal representations are associated with concrete language, it is possible to claim that it is the non-verbal information that serves as the basis for the "abstract", figurative interpretation, i.e., an interpretation that is not associatively related in the verbal system to the word or sentence.

The following examples from the proverb interpretation task used in the research here illustrates how imaginal processes can be involved in constructing a figurative meaning. One high imagery proverb is:

A bird that lives in water is never wet.

An occasional response to this proverb is that "it

doesn't make sense--if a bird lives in water it would always be wet!" One could speculate that a person who makes this response is probably relying on verbal processes to interpret the proverb; for example, noting the contradiction between "water" and "never wet". If however, people are encouraged to image a bird that lives in water--and asked, with respect to that image, if the bird looks wet--the response is typically "no!". At this point, most people remember that ducks, geese, and other water birds are specially adapted to live in water without getting wet. Use of imagery would thus allow a "correct" interpretation of the proverb--that a person can adapt to circumstances that others would find unbearable.

A second example illustrates how failure to use imagery to generate a figurative interpretation can lead to an incorrect interpretation. The proverb "Punishment is lame, but it comes" is often interpreted to mean "Punishment is bad, or doesn't work, but it does occur". A better interpretation seems to be "Punishment may take a long time to arrive, but it eventually will." In the poor interpretation, subjects seem to be interpreting the figurative element "lame", in a verbal associative, perhaps idiomatic, sense as in "a lame excuse". To generate the correct interpretation, it seems helpful

to image a lame individual , hobbling slowly along,
but eventually arriving at a destination. The example
is particularly revealing because the proverb is rated
as low in imagery, yet the figurative element appears
to need an imaginal process for interpretation.

Predictions from the Model for Individual Differences
In Figurative Interpretation Ability.

The dual coding model of figurative interpretation, in stating that both imaginal and verbal processes are involved in a way that is distinct from interpretation of literal language makes interesting predictions for the role of individual differences in figurative interpretation. Imagery ability, for example, should not necessarily predict performance in figurative interpretation since imagery is only one aspect of the process and must be combined with some as yet unspecified verbal process which would allow an abstract interpretation of the non-verbal representation. In this regard, Katz has reported some recent work which showed that reliance on imaginal representation did not predict subjects' choices in a metaphor construction task, whereas analogical ability was associated with the way subjects completed sentence frames to make metaphors. Tests for analogical ability may measure a more complex behavior (c.f. Sternberg, 1977) than the test for reliance on imagery, and imagery may itself be a component in analogical ability; in this case, then, Katz's result would be predicted by the model of figurative interpretation presented here.

Another potential good candidate for a relevant

individual difference variable that could, on the basis of the model, be expected to contribute to differences in figurative interpretation skills would be "referential" ability (Bucci, 1984). Bucci defines referential ability in terms of the dual coding distinction between non-verbal representations and verbal representations. An individual of high referential ability is one who is able to quickly link a verbal label with a non-verbal representation. Referential ability is measured by the speed with which individuals name colours. If figurative interpretation involves the linking of verbal and non-verbal information, people who are high in referential ability may be particularly successful at generating figurative interpretations. In support of this idea, Bucci (1984) found that people who have high referential ability were more likely than those with low referential ability to use metaphors to describe sensory experiences such as naming relatively less codable colours.

Conclusion

In conclusion, the dual coding model of language representation suggests an interesting program of research for investigations of comprehension of figurative language. Particularly relevant issues include a more precise understanding of the concept of

"abstraction" both as it applies to figurative language interpretation and to language interpretation in a more general sense. With respect to figurative language, the concept of abstraction has been identified here within the framework of dual coding theory as a process that occurs when a verbal label is given to some aspect of experience that is non-verbally represented. Whether this concept could be used to explore a wider range of interpretive behaviors, and especially to differentiate between "comprehension" and "interpretation", bears further investigation.

The relative contributions of conventionalized semantic memory processes common to all speakers of the language, and episodic processes unique to individual interpreters, may, upon further investigation, be shown to be differentially important in interpreting different kinds of language. The concept of the size of advantage for a self-generated interpretation (the generation effect observed in Studies 4 and 5) may be fruitfully applied to the distinction between episodic contributions and semantic contributions to interpretation of language. For example, it could be expected that with concrete literal language, the generation effect would be smaller than with abstract language, the opposite

effect that is found with the comparison between concrete figurative language and abstract language.

Finally, the educational implications of the studies reported here could be fruitfully explored. One inference from the results of these studies is that concrete proverbs "concretize" abstract meanings or ideas. The concrete proverb "Birds who live in water are never wet" is a concrete "model" for a general aspect of human experience—that people who are challenged by difficult circumstances, come to tolerate them. In contrast, abstract proverbs appear to be more like literal paraphrases of abstract ideas. For example, the abstract proverb "A friend to everyone is a friend to no one" is more literally related to its apparent intended meaning about the requirements of true friendship, without that meaning being completely expressed in the proverb.

The concretization of abstract ideas may have both a positive and negative effect on learning. The benefit of concretization appears to be increased ease of comprehension and interpretation; subjects find the figurative meanings expressed by concrete proverbs as relatively more comprehensible and easy to interpret than the meanings expressed in abstract proverbs.

The disadvantage of concretization of abstract ideas, however, appears to be that an interpretation of

the concrete "model" can be quite variable and dependent on individual episodic processes for the explicit link between that model and the abstract meaning it illustrates. If the goal of the using concrete models as explanatory devices is enhanced memory for the abstract ideas the model "explains", then educators may need to explicitly control the episodic processes involved in model interpretation to exploit the advantages of the concrete representation. For example, a concrete examples from everyday experience are often used in a classroom setting to illustrate abstract theoretical ideas. Unless the relation between example and theory is itself explicitly verbalized by the teacher, students may fail to grasp the intended relation, and interpret the example "incorrectly".

The results of the studies presented here suggest one further aspect of abstract interpretation processes that could be explored for their educational implications, as well as for their theoretical importance. When an abstract meaning is expressed concretely as in a concrete proverb, the interpretive process appears to require abstraction from the specific representation suggested by the words of the proverb to the abstract underlying meaning. However, when abstract ideas are expressed in an abstract

manner, as in the case of abstract proverbs, there is some evidence to suggest that concretization, the opposite process from that observed for concrete proverb interpretation, is a useful strategy for generating an effective interpretation. This inference is drawn from the finding that people who interpret abstract proverbs under imagery instructions produce interpretations that are better memory cues for someone else than do people who interpret those proverbs under comprehension instructions. Concretization of abstractly expressed ideas as an interpretive strategy needs to be explored more fully, with respect to how this process may differ from the abstraction process involved in interpreting concretely expressed ideas. In suggesting representational differences for concrete and abstract language, dual coding theory provides a framework for doing so.

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APPENDIX 1: LISTS OF PROVERBS USED IN STUDY 1

Note: Numerical values are;
Rated Literalness 1, Rated Literalness 2, Rated
Imagery, Rated Comprehensibility
List 1

1. Do not drive a second nail until the first is clinched.
1.66 4.00 3.80 4.50
2. What can be decided only once must long be pondered over.
4.58 4.91 1.40 4.80
3. Quick and well done do not agree.
3.58 3.50 1.40 4.20
4. The larval stage of the housefly is the maggot found in garbage and decaying matter.
3.83 4.16 6.40 6.50
5. Punishment is lame but it comes.
2.75 1.91 3.00 3.30
6. Soldiers in peace are like chimneys in summer.
2.58 3.75 5.00 4.00
7. Who never climbed high never had a great fall.
3.50 4.50 4.30 5.80
8. Geese are larger than ducks but smaller and less graceful than swans.
4.25 4.83 6.30 6.80
9. A promise delayed is justice deferred.
2.75 3.91 2.50 3.50
10. Different sores must have different salves.
2.91 4.83 4.20 4.80
11. Much of the energy consumed by man comes directly from the sun.
4.83 4.91 5.70 5.10
12. Six feet of earth makes us all equal.
1.08 3.40 4.70 5.10
13. Frost is present in the surface soil in winter.
4.81 5.00 5.10 6.30
14. A man's manners are the mirror in which he shows his portrait.
1.83 2.25 5.10 5.30
15. He that begins many things finishes few.
4.41 4.66 1.90 6.60
16. The burden is light on the shoulders of another.
3.48 3.91 2.70 5.80
17. If you have a horse of your own, you may borrow another's.
2.41 3.25 3.20 4.20
18. Land connections between Asia and China must have existed then.
3.83 4.33 4.50 5.90

19. Experience is the father of wisdom and memory the mother.

2.25 1.41 1.90 4.50

20. The finest clothes are soonest out of fashion.

3.58 4.33 4.80 5.70

21. A man in a passion rides a horse who runs away with him.

1.33 2.66 4.20 4.20

22. Forget other people's faults by remembering your own.

4.33 4.16 1.50 6.40

23. Children's toys provide for the rehearsal of adult activities.

4.58 4.66 5.50 6.20

24. Confession of a fault makes half amends.

3.41 3.91 2.40 5.70

25. Solitude is often the best company.

4.33 3.80 3.30 6.30

26. The mind is the man.

2.66 2.16 2.30 5.60

27. All that is said in the kitchen should not be heard in the hall.

2.16 3.66 3.30 4.00

28. The carver makes his own knife from a piece of scrap metal.

2.00 4.83 5.00 5.00

29. Compliments cost nothing, yet many people pay dearly for them.

3.08 3.50 1.80 5.20

30. At length, the fox is brought to the furrier.

2.25 4.41 4.70 5.00

31. Each member of a community has his own place and function.

4.58 4.75 4.10 6.20

32. Cynics are those who never see the good qualities of others and never fail to see the bad ones.

4.66 3.91 2.50 6.20

33. Self-praise is no recommendation.

3.66 4.08 1.50 5.40

34. Butterflies and moths have colonised most of the world's land surfaces.

3.75 4.58 5.00 6.20

35. Rich men feel misfortunes that fly over poor men's heads.

2.58 2.08 3.20 5.30

36. If you cut down the forest you'll catch the wolf.

1.66 3.16 4.80 5.00

37. Contentment comes through happiness, not happiness through contentment.

4.66 4.25 1.60 5.60

38. One gets sick of cake, but never of bread.

1.83 4.41 4.90 5.40

- 39. A married man turns his staff into a stake.
1.41 1.44 3.80 3.40
- 40. Most arsenic compounds are poisonous to most forms of life.
4.91 5.00 3.20 5.30
- 41. Suicide is rare among the aborigines.
4.50 4.83 4.20 5.60
- 42. Good words cost no more than bad ones.
2.75 2.58 2.00 5.50
- 43. It is good to have two strings to one's bow.
1.50 3.60 4.40 3.90
- 44. Precious things are not found in heaps.
3.41 4.66 3.40 5.70
- 46. No one is worse for knowing the worst of himself.
3.25 4.50 1.50 4.60
- 47. The bee gives honey from its mouth but stings from its tail.
2.50 4.58 5.40 5.50
- 48. Bread is a nutritious food.
4.83 5.00 5.70 7.00
- 49. The English language as spoken in Canada is generally American in character.
4.83 4.66 2.90 5.10
- 50. A lot of cheap fish may be bought for a penny, but one does not eat as much as one throws away.
2.25 3.83 5.40 4.80
- 51. Praise a fair day at night.
2.33 3.91 2.20 3.40
- 52. Procrastination is the thief of time.
3.08 2.33 3.30 6.30
- 53. It is much easier to recognize error than to find truth.
3.66 4.00 1.60 6.20
- 54. He that waits for dead men's shoes must long go barefoot.
1.33 2.75 3.30 4.40
- 55. The albatross feeds largely on squid.
4.25 4.58 5.40 6.50
- 56. Fraud squats under a good bargain.
2.00 2.08 1.90 2.50
- 57. When wine sinks, words swim.
1.33 2.41 3.50 5.60
- 58. Many would be cowards if they had sufficient courage.
2.16 2.19 2.50 3.30
- 59. An old ox makes a straight furrow.
1.83 4.58 4.40 4.91
- 60. The Inuit need eight caribou skins for a man's winter costume.
4.41 4.83 5.80 6.50
- 61. Glory paid to ashes comes too late.
1.33 3.33 3.30 5.50
- 62. The brain is really two brains operating

simultaneously.

3.83 4.58 5.50 6.90

63. He cries "wine" and sells vinegar.

1.25 4.25 3.40 4.80

64. Lack of care is more dangerous than lack of knowledge.

4.25 4.16 1.80 5.80

65. We all have sufficient strength to bear the misfortunes of others.

4.25 3.33 1.80 5.80

66. Every man is the architect of his own fortune.

2.75 3.91 3.80 5.60

67. To appreciate ballet is to appreciate both animal grace and the grace of the intellect.

4.50 4.33 5.30 5.80

68. The sure way to be cheated is to think ourselves more clever than the others:

3.91 4.41 1.90 5.70

69. He that is warm thinks all are so.

3.00 4.00 2.10 4.70

70. Moderate riches will carry you; if you have more you must carry them.

2.00 2.41 1.80 5.00

71. When a person gets involved with drugs, no one can help him unless he wants to help himself.

5.00 4.91 5.30 7.00

72. Every leader surrounds himself with advisors who will assure him that he is always right.

5.00 4.66 5.90 6.10

73. He that is not handsome at 20, strong at 30, rich at 40, and wise at 50 will never be handsome, strong, rich or wise.

4.25 2.91 2.90 4.80

74. The wish is father to the thought.

1.75 2.25 1.70 2.60

75. Great weights hang on small wires.

1.25 3.16 5.00 4.50

76. As good broth comes out of a wooden ladle as out of a silver spoon.

2.00 4.63 5.70 4.70

77. Every teacher ought to remind himself daily that his students are vulnerable people.

5.00 5.00 4.20 6.40

78. Dry shoes won't catch fish.

1.33 2.83 3.70 3.60

79. Great winds blow upon high hills.

1.66 5.00 5.80 5.70

80. A straight stick is crooked in the water.

1.58 3.16 6.30 6.20

List 2

- 1. The dust raised by the sheep does not choke the wolf.
2.58 3.66 5.60 5.10
- 2. Good wares make quick markets.
3.91 4.58 1.50 2.80
- 3. The new love drives out the old love.
4.45 4.63 2.40 6.10
- 4. The larval stage of the housefly is the maggot found in garbage or decaying matter.
4.08 4.75 6.00 5.40
- 5. Great and good are seldom the same man.
2.83 4.25 2.00 5.40
- 6. He tells me the way but does not know it himself.
3.54 4.72 1.60 5.90
- 7. One swallow does not make a summer.
1.91 1.91 2.90 5.00
- 8. Many birds live in the desert.
4.41 3.50 5.60 6.20
- 9. Men's ears are less reliable than their eyes.
4.27 4.18 4.10 6.00
- 10. Remove an old tree and you'll kill it.
3.58 4.42 1.30 5.80
- 11. The oldest Chinese writing is found in the Shang Dynasty.
4.83 4.41 2.60 5.90
- 12. Necessity and opportunity may make a coward brave.
3.58 4.42 1.30 5.80
- 13. The most common honeybee has been domesticated for honey.
3.91 4.33 5.00 6.60
- 14. Men are not to be measured in inches.
1.66 3.91 2.80 5.30
- 15. You cannot see in another person more than you have in yourself.
2.90 2.63 1.90 4.60
- 16. New brooms sweep clean.
2.58 3.75 4.90 5.90
- 17. The fairest flowers fade soonest.
2.00 3.00 5.50 5.40
- 18. The earliest bridges were logs thrown across streams.
4.91 4.25 6.60 6.70
- 19. Necessity knows no law.
2.75 4.00 1.20 4.20
- 20. Quick wits are generally conceited.
3.72 3.54 1.70 3.60
- 21. Flatterers do not haunt cottages.
1.25 2.50 1.70 1.70
- 22. War destroys many for the benefit of a few.
4.72 4.63 5.50 6.60

23. The United States has often been called a melting pot.
3.00 4.09 3.10 5.60
24. A joke never wins over an enemy, but often loses a friend.
3.72 4.09 1.70 4.70
25. What costs little is little esteemed.
3.54 4.18 1.10 3.80
26. As the twig is bent, so grows the tree.
1.91 3.83 4.60 4.50
27. No part of the ocean is completely still.
3.83 3.91 6.00 6.70
28. Poor men seek meat for their stomach, rich men seek stomach for their meat.
1.41 3.50 2.90 4.00
29. The miser is ever in want.
3.70 3.90 2.30 5.20
30. The earth has a strong magnetic field.
4.91 4.58 3.00 6.70
31. Skill is stronger than strength.
4.00 3.25 2.10 5.60
32. Better a little fire to warm you than a large one that burns.
2.50 4.08 4.70 6.20
33. More die by food than by famine.
2.09 3.09 3.20 4.70
34. Geese are larger than ducks but smaller and less graceful than swans.
5.00 4.41 6.20 5.50
35. Patience is a flower that does not grow in every garden.
2.66 3.25 3.60 5.80
36. A mewling cat is never a mouser.
2.66 3.25 4.20 4.20
37. Frost is present in the surface soil in winter.
4.75 5.00 6.10 6.50
38. Death happens only once, yet we feel it every moment of our lives.
3.45 3.81 3.80 5.80
39. Fruit does not ripen well in the shade.
4.08 4.75 5.30 6.90
40. Envy and idleness married together, begot curiosity.
2.58 2.83 1.20 3.20
41. The brain is really two brains working simultaneously.
4.75 4.33 5.30 6.40
42. Hard stones are hollowed out by soft water.
2.41 3.08 3.40 3.90
43. A life of leisure and a life of laziness are two different things.
4.59 4.16 4.00 5.90

- 44. Birds that live in water are never wet.
1.50 2.75 3.20 3.00
- 45. As love thinks no evil, so envy speaks no good.
3.25-3.50 1.00 3.80
- 46. Better reap two days too early than one day too late.
3.00 3.83 2.70 4.60
- 47. The carver makes his own knife from a piece of scrap metal.
3.75 4.08 5.70 6.20
- 48. Deeds are fruits; words are leaves.
1.58 2.16 3.30 3.50
- 49. If the lad goes to the well against his will, either the can will break, or the water will spill.
1.91 2.91 4.80 4.70
- 50. The word "Mountie" is distinctively Canadian.
4.90 4.72 5.60 6.80
- 51. Nature, Time and Patience are the three great physicians.
3.66 4.25 2.30 5.20
- 52. Take gifts with a sigh; most men give to be paid.
1.81 3.33 2.60 5.60
- 53. Small wounds, if many, may be mortal.
2.41 3.50 3.90 4.80
- 54. When money speaks, truth keeps silent.
2.08 3.58 3.40 5.50
- 55. To appreciate ballet is to appreciate both animal grace and the grace of the intellect.
4.50 3.75 4.30 4.70
- 56. An old eagle is better than a young sparrow.
2.08 3.16 5.70 5.20
- 57. A bold attempt is half success.
3.27 3.41 2.20 5.00
- 58. We confess small faults in order to insinuate that we have no large ones.
5.00 4.90 2.60 5.60
- 59. Who will not taste sour does not deserve sweet.
2.08 2.83 1.80 5.00
- 60. Good clothes open all doors.
2.50 2.91 4.10 5.30
- 61. Each member of a community has his own place and function.
5.00 4.91 3.40 6.30
- 62. Trust is the mother of deceit.
2.16 2.50 2.10 4.30
- 63. A dwarf sees further than a giant when he has the giant's shoulders to sit on.
2.25 2.75 6.20 6.10
- 64. Our own actions are our security, not others judgements.
3.45 3.90 2.60 4.90
- 65. Every leader surrounds himself with advisors who

- will assure him that he is always right.
4.50 4.91 5.20 7.00
66. A blunt wedge succeeds where a sharp axe may fail.
1.50 3.00 5.65 4.80
67. A bad workman blames his tools.
3.25 4.25 5.50 6.70
68. The stick is the surest peace-maker.
2.08 3.16 4.20 4.60
69. Skill and confidence are an unconquered army.
2.58 3.50 2.70 5.10
70. Admonish your friends in private; praise them in public.
4.54 4.54 3.90 5.80
71. Children's toys provide for the rehearsal of adult activities.
4.66 5.00 4.10 6.00
72. Early wed; early dead.
2.54 1.75 3.20 5.30
73. An untried friend is like an uncracked nut.
2.41 3.00 3.90 5.30
74. A head with a good tongue in it is worth double the price.
1.91 2.75 3.70 4.80
75. Most arsenic compounds are poisonous to all forms of life.
5.00 5.00 3.90 6.80
76. Time is the rider that breaks youth.
1.66 3.16 2.80
77. Opportunity makes the thief.
3.08 3.83 3.30 5.70
78. Happy the man who expects nothing, for he shall never be disappointed.
4.54 4.08 3.20 6.40
79. Bread is a nutritious food.
4.66 4.75 6.60 6.90
80. The Albatross feeds on squid.
4.66 4.63 5.90 5.90

List 3

1. A blow with a reed may make a noise but it will not hurt.
3.08 3.08 3.11 4.00
2. Fate leads the willing, but drives the stubborn.
2.66 3.33 2.00 4.00
3. The carver makes his own knife from a piece of scrap metal.
4.41 4.08 5.33 6.56
4. Our pleasures are mostly imagined but our griefs are real.
4.00 4.00 1.88 5.11
5. A generous confession disarms slander.
2.50 2.75 2.44 2.33
6. Frost is present in the surface soil in winter.
4.91 4.16 5.66 7.00
7. If you lie upon roses when young, you'll lie upon thorns when old.
1.66 2.83 4.93 6.33
8. He is not the best carpenter who makes the most chips.
2.97 3.75 4.22 5.11
9. A fox should not serve on the jury at the trial of a goose.
2.08 3.75 5.88 4.44
10. The dog that fetches will carry.
3.41 3.00 5.44 4.44
11. The larval stage of the housefly is the maggot found in garbage or decaying matter.
4.91 4.41 5.33 6.55
12. To a shattered ship every wind is foul.
3.33 3.58 4.88 5.55
13. The golden age was never the present age.
3.50 3.33 1.88 2.33
14. The belly robs the back.
1.66 2.08 3.22 2.33
15. He that always complains is never pitied.
4.41 4.25 2.11 5.55
16. Geese are larger than ducks but smaller and less graceful than swans.
4.83 4.83 5.44 6.44
17. Consideration is the parent of wisdom.
2.25 3.08 1.77 5.11
18. Whether the pitcher strikes the stone or the stone the pitcher, woe to the pitcher.
1.91 2.33 4.55 3.66
19. He that makes faintly begs a denial.
2.00 3.75 3.00 3.88
20. The word "Mamie" is distinctly Canadian.
4.91 3.75 5.44 7.00
21. Do not neglect your own field and plow your neighbour's.

- 2.16 3.50 5.22 6.33
 22. Error, though blind herself, sometimes gives birth to children who can see.
 1.41 2.33 3.66 4.22
 23. Do as most people do, and others will speak well of you.
 3.75 3.58 2.55 6.2
 24. The Inuit need eight caribou skins for a man's full winter costume.
 4.83 4.33 6.00 7.00
 25. Don't take a musket to kill a butterfly.
 2.58 3.83 5.77 5.75
 26. Without equality there can be no friendship.
 4.08 3.66 2.22 6.00
 27. He that lays a trap for others falls into it himself.
 2.66 3.08 5.22 6.55
 28. He that sits with his back to a draught, sits with his face to a coffin.
 1.50 2.50 5.55 4.11
 29. Bread is a nutritious food.
 4.91 4.91 4.88 7.00
 30. Favours unused are favours abused.
 2.50 3.00 1.66 5.77
 31. Responsibility must be shouldered; you cannot carry it under your arm.
 1.91 3.16 4.11 4.11
 32. At a great bargain, make a pause.
 2.83 3.50 3.11 5.33
 33. Most arsenic compounds are poisonous to all forms of life.
 4.83 4.41 3.44 6.66
 34. The highest price a man can pay for a thing is to ask for it.
 .00 .00 1.88 3.77
 35. Adventures are to the adventurous.
 3.50 2.41 2.33 4.88
 36. The Albatross feeds largely on Squid.
 4.75 3.91 6.00 6.66
 37. Crows bewail the dead sheep, then eat them.
 3.50 3.58 6.77 6.00
 38. Everybody's friend should be nobody's confidant.
 3.00 3.16 2.11 5.33
 39. A wager is a fool's argument.
 2.58 2.50 1.66 2.66
 40. There is many a good tune played on an old fiddle.
 3.47 3.68 5.66 6.88
 41. Censure is the tax a man pays to the public for being eminent.
 2.66 3.25 1.77 2.55
 42. Comfort is tedious when it lasts too long.
 3.58 3.25 2.77 6.00

43. The brain is really two brains operating simultaneously.
4.25 3.75 5.55 6.33
44. Great talkers fire too fast to take good aim.
1.91 2.41 3.66 6.11
45. Every shoe does not fit every foot.
3.25 4.25 5.44 7.00
46. Dogs begin in jest and end in earnest.
1.25 2.16 2.33 2.11
47. Lost time can never be regained.
4.00 4.25 2.44 7.00
48. Truths and roses have thorns about them.
2.25 3.08 5.33 6.22
49. To appreciate ballet is to appreciate both animal grace and the grace of the intellect.
4.58 3.83 6.80 5.88
50. A little pot is soon hot.
3.16 3.75 5.88 7.00
51. Conversation teaches more than meditation.
3.08 3.16 3.00 5.00
52. Dirt is dirtiest on the fairest spot.
2.41 2.41 5.88 6.22
53. If you give quickly you give twice.
1.75 2.25 1.77 4.22
54. When a person gets involved with drugs, no one can help him unless he wants to help himself.
4.91 4.75 4.44 7.00
55. Age is all head; youth is all heart.
2.41 3.00 2.22 5.33
56. The tongue is small but it dominates the body.
3.16 3.44 4.88 5.66
57. The more light a torch gives the shorter it lasts.
3.33 3.00 5.44 5.88
58. A wild goose never laid a tame egg.
2.22 3.30 4.33 5.11
59. Every teacher ought to remind himself that his students are vulnerable people.
4.41 4.26 3.00 6.11
60. You may know the whole sack by a handful.
2.75 3.16 3.33 4.22
61. An enemy mayb chance to give good counsel.
2.58 3.08 3.00 4.00
62. When the cause is lost, words are useless.
2.83 3.11 2.11 5.66
63. Great trees keep down the little ones.
2.75 4.00 5.66 6.33
64. Be a friend to yourself and others will be so too.
4.41 4.00 3.55 6.77
65. There are many rivers and creeks in Tasmania.
4.91 4.33 5.55 6.88
66. Blushes are the luminous escapes of thought.

- 2.33 2.58 5.77 5.77
 67. Sport is sweetest when there are no spectators.
 2.58 2.91 4.66 4.55
 68. At first habits are cobwebs; at last they are chains.
 2.08 2.50 4.44 4.44
 69. The tears of others are only water.
 2.33 2.33 5.88 5.77
 70. A full cup must be carried carefully.
 4.58 4.50 6.33 6.55
 71. Butterflies and moths have colonised most of the earth's surface.
 4.50 4.25 6.00 5.88
 72. The English language as spoken in Canada is mostly American in character.
 4.50 4.50 1.33 4.88
 73. The cow gives good milk but she kicks over the pail.
 2.33 3.91 6.33 6.11
 74. Every ruler surrounds himself with advisors who will assure him that he is always right.
 3.75 2.91 5.22 5.88
 75. He that died six months ago is as dead as Adam.
 3.75 2.91 2.77 4.77
 76. Little is done where many command.
 3.66 4.00 2.55 6.55
 77. Land connections between Canada and Asia must have existed at one time.
 4.58 4.25 3.88 6.00
 78. Many people take advice like they do medicine; to fling it aside once the doctor's back is turned.
 4.41 4.25 3.88 6.00
 79. Heaven often smites in mercy though the blow be severe.
 1.83 1.91 2.44 2.77
 80. Each member of a community has his own place and function.
 4.50 4.50 2.33 6.66

List 4

- 1. Green wood makes a hot fire.
3.16 4.25 4.77 5.00
- 2. Flattery brings friends; truth, enemies.
4.58 4.50 1.77 5.11
- 3. Good words cool more than cool water.
2.08 2.25 2.77 3.55
- 4. Many birds live in the desert.
2.58 4.50 2.55 6.11
- 5. The good is the enemy of the best.
3.16 3.41 1.88 3.44
- 6. Novelty always appears handsome.
3.66 2.41 3.11 4.22
- 7. Cooks are not taught in their own kitchen.
2.75 4.75 3.77 5.66
- 8. Early American portraitists were house painters or sign painters who were asked to make rough likenesses.
3.91 4.58 4.00 3.66
- 9. When two persons do the same thing, it is not the same thing.
4.00 3.91 2.33 4.77
- 10. Mettle is dangerous in a blind horse.
2.08 2.66 3.22 1.88
- 11. The oldest Chinese writing is found in the Shang Dynasty.
3.91 4.75 4.77 5.88
- 12. Virtues are often vices disguised.
4.08 3.25 1.44 3.33
- 13. The most common honeybee has been domesticated for honey.
4.41 4.53 5.33 6.55
- 14. Truth may be blamed but never shamed.
3.50 3.00 1.88 3.88
- 15. Benefits bestowed on the undeserving are no kindness.
4.00 3.66 1.88 3.33
- 16. No man is a hero to his valet.
3.33 2.83 2.22 3.11
- 17. A closed mouth catches no flies.
1.25 3.58 5.22 6.77
- 18. The earliest of bridges were logs thrown across streams.
3.91 4.91 6.66 7.00
- 19. Night is the mother of thought.
1.75 1.66 3.77 4.66
- 20. The courteous learns his courtesy from the discourteous.
1.00 3.66 3.77 4.33
- 21. A trouble shared is a trouble halved.
1.00 3.33 3.22 4.66
- 22. Blessings are only valued when they are gone.
3.66 3.00 2.11 6.11

23. The United States has often been called a melting pot.

3.08 3.08 5.44 6.11

24. Better buy than borrow.

3.91 3.50 2.22 6.00

25. A man that breaks his word bids others to be false to him.

4.08 4.16 1.66 4.00

26. Envy shoots at others and wounds herself.

1.66 1.58 3.66 3.88

27. Don't have your cloak to make when it begins to rain.

1.75 4.08 4.77 4.88

28. No part of the ocean is completely still.

2.50 4.58 6.66 6.55

29. A friend to everybody is a friend to nobody.

3.91 2.58 2.88 5.77

30. Don't lean on a reed.

2.00 3.75 5.11 5.22

31. The earth has a strong magnetic field.

4.25 4.91 6.11 6.77

32. Nightingales sing their own song best.

1.83 4.33 5.44 6.33

33. It is better to give a shilling than lend half a crown.

3.41 3.33 2.66 6.33

34. Coal was the first fossil fuel to be exploited on a large scale.

4.25 4.25 3.66 6.77

35. A man's gift makes room for him.

2.08 1.66 2.22 2.88

36. Ask much to have little.

2.58 2.91 1.88 5.33

37. A big head can have a big ache.

2.41 3.50 4.77 5.44

38. Don't take a musket to kill a butterfly.

1.50 4.50 4.66 6.11

39. Give your tongue more holidays than your head.

3.00 2.00 2.00 4.77 6.33

40. Every teacher ought to remind himself daily that his pupils are vulnerable people.

4.58 4.83 4.11 5.77

41. Love finds its beginning in the eyes.

4.41 2.91 5.66 6.33

42. When a person gets involved with drugs, no one can help him unless he wants them to.

5.58 4.83 3.66 6.77

43. Birth is much; but breeding is more.

3.33 3.75 3.44 3.77

44. He who has property has relations.

2.00 3.08 2.55 4.33

45. God gives the milk, but not the pail.

- 1.50 3.16 4.44 4.22
- 46. Calamity is a mighty leveler.
- 2.25 2.33 2.33 3.00
- 47. If you miss the first buttonhole, you will not be able to button your coat.
- 3.16 4.50 6.11 6.11
- 48. Human society is anywhere from a few million years to 50,000 years old.
- 4.66 4.91 3.11 5.88
- 49. The larval stage of the housefly is the maggot found in garbage or decaying matter.
- 3.58 4.91 .00 .00
- 50. You might light another candle with your own without loss.
- 2.25 4.08 4.33 4.11
- 51. Poetry is truth in its Sunday clothes.
- 2.16 2.08 2.44 3.55
- 52. Riches well got and well used are a great blessing.
- 4.25 3.83 2.33 4.66
- 53. Courtesy on one side can never last long.
- 3.66 3.83 2.22 5.11
- 54. Even caviar tastes bad to one who is forced to eat it.
- 2.41 4.75 5.88 5.66
- 55. There are many rivers and creeks in Tasmania.
- 4.33 4.91 6.00 6.88
- 56. Money is the best bait to fish for men with.
- 2.33 3.25 4.66 5.44
- 57. Great wealth and contentment seldom live together.
- 3.33 2.08 3.22 5.88
- 58. A little sympathy goes a long way.
- 4.16 3.66 3.00 6.00
- 59. They killed the horse but they got the hare.
- 1.25 2.08 5.11 2.88
- 60. The polar ice caps hold just over two percent of the earth's water.
- 5.00 4.58 6.33 6.77
- 61. Hunger is the best sauce.
- 1.58 1.41 3.88 4.33
- 62. People use arithmetic so often in everyday life that they hardly ever think about it.
- 4.08 4.75 2.66 5.55
- 63. At the end of the game, the king as well as the pawn goes into the bag.
- 2.25 4.25 4.66 5.88
- 64. We always like those who admire us, but we don't always like those who we admire.
- 3.41 4.50 3.77 5.88
- 65. Everybody's business is nobody's business.
- 1.83 2.75 2.00 4.22
- 66. An empty sack cannot stand upright.

- 1.58 4.08 5.88 6.56
 67. The far northern sky is dominated by the constellation of Ursula Major.
 4.25 5.25 5.33 6.33
 68. A growing youth has a wolf in his belly.
 5.32 4.44 5.33 4.44
 69. Poverty is the mother of health.
 1.75 1.83 3.66 3.88
 70. "Anytime" means no time.
 3.00 3.33 2.22 4.55
 71. As the light increases, we see ourselves to be worse than we thought.
 1.91 3.25 4.22 4.66
 72. An atom of material is the smallest amount of material there is.
 4.58 4.83 4.66 6.55
 73. The fox who has lost his tail will persuade others out of theirs.
 2.18 1.45 5.55 4.77
 74. Tons of antibiotics are produced every year.
 4.41 4.66 4.44 6.66
 75. A buyer needs 100 eyes; a seller needs only one.
 2.41 2.00 4.44 5.66
 76. Children are certain cares but uncertain comforts.
 2.83 2.91 2.55 3.77
 77. When the ass bears too light a load, he wants to lie down.
 1.83 3.25 3.22 4.55
 78. Each member of a community has his own place and function.
 4.91 4.58 2.55 5.88
 79. Search not a new wound lest you cause a new one.
 1.75 2.33 4.44 4.33
 80. Poverty is not a crime nor a credit. 4.50 3.25 3.00 3.33

Appendix 2: Proverbs used in Study 2 (Numbers refer to mean imagery rating, mean comprehensibility rating, mean interpretability rating respectively)

1. Do not drive a second nail until the first is clinched.
5.08 5.33 5.33
2. Quick and well done do not agree.
3.33 5.50 5.66
3. Punishment is lame but it comes.
3.33 3.91 4.16
4. Different sores must have different salves.
4.50 4.00 4.09
5. Six feet of earth makes us all equal.
5.08 5.16 5.19
6. A man's manners are the mirror in which he shows his portrait.
4.58 5.25 5.50
7. Experience is the father of wisdom, and memory the mother.
4.50 5.50 5.50
8. The finest clothes are soonest out of fashion.
5.66 5.08 5.41
9. That which will not be butter must be made into cheese.
5.58 5.11 4.25
10. Eagles fly alone.
6.66 5.33 4.25
11. He that has no children brings them up well.
4.33 4.91 4.63
12. Nothing costs so much as that which is given us.
3.91 5.58 5.66
13. He that speaks ill of the mare would buy her.
4.58 4.91 4.25
14. Don't let your tongue run away with your brains.
5.83 5.41 6.08
15. The dog in his kennel barks at his fleas but the dog who hunts does not feel them.
5.83 5.58 5.18
16. Only the wearer knows where the shoe pinches.
6.08 5.91 5.75
17. Laws catch flies but let hornets go free.
4.75 5.66 5.25
18. If you marry money you sell your freedom.
5.41 6.33 5.58
19. He that makes himself a sheep is eaten by the wolves.
5.75 5.50 5.91
20. You can't put an old head on young shoulders.
5.58 5.58 5.41
21. The monkey takes the chestnuts out of the fire with the dog's paws.

- 4.45 2.09 3.33
 22. Admiration is the daughter of ignorance.
 2.24 3.72 3.83
 23. When the ass bears too light a load, he wants to lie down.
 5.58 5.41 5.50
 24. Search not a wound too deep lest you cause a new one.
 3.91 4.41 4.66
 25. Poverty is neither a crime nor a credit.
 3.41 5.33 4.83
 26. Children are certain cares but uncertain comforts.
 4.25 4.50 4.50
 27. A buyer needs 100 eyes; a seller needs only one.
 5.50 6.83 5.09
 28. Green wood makes a hot fire.
 5.66 4.50 2.91
 29. Flattery brings friends; truth enemies.
 4.91 6.50 5.63
 30. Cooks are not taught in their own kitchen.
 5.58 5.08 4.75
 31. Novelty always appears handsome.
 2.91 3.91 4.58
 32. The good is the enemy of the best.
 2.91 3.41 3.66
 33. No man is a hero to his valet.
 3.91 4.08 4.08
 34. A trouble shared is a trouble halved.
 4.75 5.83 6.16
 35. Don't have your cloak to make when it begins to rain.
 4.25 4.33 5.00
 36. Envy shoots at others and wounds herself.
 4.83 5.25 5.33
 37. A friend to everyone is a friend to no one.
 4.83 5.50 4.83
 38. Dirt is dirtiest on the fairest spot.
 5.50 5.33 5.50
 39. If you give quickly you give twice.
 3.50 3.83 3.91
 40. Age is all head; youth is all heart.
 4.16 5.66 6.08
 41. The tongue is small but it dominates the body.
 6.00 6.33 6.27
 42. The more light a torch gives the longer it lasts.
 6.33 5.91 4.50
 43. He that will not go over the stile must be thrust through the gate.
 4.66 5.25 3.75
 44. Cover yourself with honey and flies will seek you out.
 6.66 6.16 5.63

- 2-
45. Truth lies at the bottom of a well.
4.50 5.33 4.91
46. A guest and a fish stink after three days.
4.66 6.16 6.00
47. While the grass grows the horse starves.
4.66 3.75 3.50
48. One thing acquired with pain is better than fifty
acquired with ease.
3.66 5.83 5.66
49. Hope is a good breakfast but a bad supper.
3.58 4.41 4.33
50. Don't draw your bow until your arrow is fixed.
6.16 5.58 5.33
51. Hunger makes hard beans soft.
5.08 6.16 6.00
52. If your enemy flees, build him a bridge of gold.
4.58 4.75 4.58
53. When the pot boils over, it cools itself.
5.91 5.00 5.33
54. He that lies down with dogs gets up with fleas.
5.33 5.85 5.58
55. The sea refuses no river.
5.41 4.91 4.66
56. A hired horse is never tired.
4.25 3.66 3.66
57. Rich men feel misfortunes that fly over poor men's
heads.
4.00 4.58 4.66
58. An old ox makes a straight furrow.
5.33 4.25 4.75
59. The bee gives honey from its mouth but stings from
its tail.
6.16 3.66 5.08
60. When wine sinks, words swim.
4.58 5.66 5.66
61. Procrastination is the thief of time.
4.25 6.50 6.00
62. Dry shoes won't catch fish.
5.58 4.66 5.58
63. The wish is father to the thought.
3.50 4.50 4.50
64. A man in a passion rides a horse who runs away
with him.
6.08 4.66 4.58

Proverbs and Experimenter Provided Interpretations
Used In Study 4 (C:Concrete; A:Abstract)

C 1. Green wood makes a hot fire.

The young of the world can make a big impact.

C 2. Eagles fly alone.

A successful person, one at the top, usually runs the show by himself.

A 3. Nothing costs so much as that which is given us.

A gift binds the recipient to the giver- after the act of giving, certain social graces are expected.

A 4. The wish is father to the thought.

Things that we think about are usually things that we want.

A 5. One thing acquired with pain is worth fifty acquired with ease.

You appreciate something more the harder it was to get.

C 6. Dirt is dirtiest on the fairest spot.

Things that are opposite are noticed more.

A 7. Hope is a good breakfast but a bad supper.

If you're still hoping for something at the end of the day, you've wasted the day.

C 8. Only the wearer knows where the shoe pinches.

You must experience things to know what the problems with them are.

A 9. If you give quickly, you give twice.

It means more if you do something good right when it is needed.

C 10. When the pot boils over it cools itself.

Releasing your emotions reduces them.

C 11. The bee gives honey from its mouth and stings from its tail.

People are often two-sided; saying nice things, then later spiting you.

C 12. Dry shoes won't catch fish.

You can't get anything done or changed unless you are willing to get involved.

A 13. Novelty always appears handsome.

New things always seem more appealing.

C 14. Cover yourself with honey and flies will seek you out.

If you are rich or have something others want, then thieves or untrue friends may come your way.

A 15. The good is the enemy of the best.

You should not be satisfied with doing something good if you know you can do better.

A 16. Admiration is the daughter of ignorance.

Ignorance, or naivete, usually blinds a person to another's faults and allows them to idolize that person.

C 17. Cooks are not taught in their own kitchen.

Learning requires one to explore the rest of the world.

C 18. He that lies down with dogs gets up with fleas.

If you associate with scum, some of it will rub off on you.

A 19. Quick and well done do not agree.

If a job was accomplished quickly, more than likely it was not done correctly.

A 20. Poverty is neither a crime nor a credit.

Poverty is not something evil or worthy. It is just something that happens in life with no credit given to those that are poor.

A 21. Punishment is lame but it comes.

Someone may not be punished right away for something, but eventually they will be.

C 22. The more light a torch gives the shorter it lasts.

Fame and glory are short-lived; like a passing fad.

C 23. That which will not be butter must be made into cheese.

Those people not suited for one position must try for something else.

A 24. No man is a hero to his valet.

People who work for great men are close to them and see their flaws more easily; therefore they would no longer be a hero to them.

Appendix 4
Proverb Interpretation Instructions: Studies
4 and 5.

In this experiment you will be writing interpretations of proverbs. Twenty four proverbs will be read to you with 1 minute between each proverb to allow you to write, on the card provided, what you think the proverb means. If you can't think of a whole sentence to describe the meaning of each proverb then try for a phrase or a rough idea. Occassionally, you may not be able to come up with a meaning of any sort; in this case, leave the card blank and wait for the next proverb. Our goal, though is to try to get from you a clear statement of what the proverb means to you personally.

COMPREHENSION GROUP

The manner in which you come up with a meaning is important for the experiment. We want you to try to comprehend the intended meaning of the proverb before you actually write a verbal staement of the meaning. For example consider the proverb:
 Don't have your cloak to make when it begins to rain.

You might think the proverb is saying something about being prepared (having a raincoat) for disasters (rain) before they happen. Try to get an abstract sense of what the proverb is saying before writing that interpretation down. We want to see what effect this technique will have on the interpretation of proverbs.

IMAGERY GROUP

We want you to specifically use your ability to create images to suggest the meanings to you. For example consider the proverb
 Don't have your cloak to make when it begins to rain.

You could use imagery to suggest an interpretation by imagining a person looking out a window at a downpour and then running to a sewing machine with a bolt of cloth in hand. You would create this image before actually writing your verbal interpretation of what the proverb means. We want to see what effect this imagining technique will have on the interpretation of the proverbs.

Analysis of Variance Summary Table for Scored Cued Recall:

Study 4

GIST RECALL

<u>Factor</u>	<u>MS</u>	<u>F</u>	<u>Sig. Level</u>	
Instructions	.40	.25	.61	mse= 1.57
Concreteness	.64	1.47	.68	mse= .18
Instructions X Conc.	.03	.18	.67	mse= .18
Generation	18.6	65.18	.0001	mse= .27
Instructions X Generat.	.12	.45	.50	mse= .27
Concreteness X Generat.	5.33	46.56	.0001	mse= .11
Instr. X Conc. X Gen.	.04	.36	.55	mse= .11

VERBATIM RECALL

Instructions	9.80	1.56	.48	mse=19.47
Concreteness	45.00	27.27	.0006	mse= 1.65
Ins X Con	1.80	1.09	.31	mse=1.63
Generation	105.80	38.94	.0001	mse=2.71
Ins X Generat	1.80	.66	.42	mse=2.71
Con X Gen	57.80	61.56	.0001	mse= .93
Ins X Con X Gen	.80	.85	.36	mse= .93

Analysis of Variance Summary Table for Scored Cued Recall

Study 5

GIST RECALL

<u>Factor</u>	<u>MS</u>	<u>F</u>	<u>Sig. Level</u>	
Instructions	.008	.003	.95	mse= 2.33
Concreteness	8.66	27.59	.0001	mse=.31
Instructions X Conc.	.003	.009	.92	mse=.31
Generation	16.95	76.47	.0001	mse=.31
Instructions X Generat.	1.60	7.23	.01	mse=.22
Concreteness X Generat.	.52	6.69	.018	mse=.078
Instr. X Conc. X Gen.	.80	10.14	.005	mse=.078

VERBATIM RECALL

Instructions	1.80	.06	.79	mse=26.25
Concreteness	135.20	31.50	.0001	mse=4.29
Ins X Con	.05	.01	.91	mse=4.29
Generation	140.45	50.71	.0001	mse=2.76
Ins x Gen	16.20	5.84	.02	mse=2.76
Con x Gen	3.20	2.99	.10	mse=1.06
Ins X Con X Gen	6.05	5.65	.02	mse=1.06