MEMORY FOR FIGURATIVE TEXTS IN ADULT WOMEN

by

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ABSTRACT

Previous theroretical and experimental work has suggested that older adults may develop and use an adaptive style of processing that emphasizes metaphoric and moralistic aspects of language materials. This style of processing may be associated with maintenance of performance in processing complex language materials. In the present study, 30 young (M age = 26 years) and 30 older women (M age = 66 years) performed three classes of tasks: (a) reading and recall of three stories (viz., fables, metaphoric stories and a non-figurative story), (b) interpretation of metaphors and fables, and (c) tasks hypothesized to be related to figurative interpretation. The younger women were found to recall a higher proportion of propositions from all three types of stories even though no age differences were found for the figurative interpretation tasks. These findings suggest that contrary to predictions, the older women were not able to use their figurative text interpretation abilities to compensate for age-related memory losses. The latter explanation was supported by the lack of a strong correlation between interpretation ability and recall performance. No clear pattern of relationships between the hypothesized component tasks of figurative interpretation emerged in the correlational data. Further

analyses were done using subsamples of high scorers on key variables. With some of these subsamples, the differences in recall performance between the age groups were not significant for the fables. These findings lend partial support to the notion that at least some older women may show higher recall performances with figurative than with literal materials.

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I: Memory for Figurative Texts in Adult Women

The inherent advantages of written discourse as recall stimuli, as well as the development of prose analysis systems in the early 1970s, have encouraged the use of texts in cognitive aging research (Hultsch & Dixon, 1984; Zelinski & Gilewski, 1988). Written discourse offers methodological advantages over word lists for cognitive aging research in that recall of such materials is more likely to reflect everyday activities and to increase motivation in subjects (Zelinski & Gilewski, 1988). Discourse is characterized by cohesion and logical organization, and is thus distinguishable from random lists of words and sentences (Harker, Hartley & Walsh, 1982; Meyer, 1983). While research using word lists had usually supported stereotypical beliefs of cognitive decline in later adulthood, results of work with prose materials have been much more complex (Hultsch & Dixon, 1984).

Many attempts have been made to provide theoretical models that incorporate the findings obtained in text recall research. One model was provided by Dixon and Backman (in press) who proposed that typical age differences are attenuated when older adults possess skills that permit them to compensate for diminished cognitive capacities. Compensation is hypothesized to occur when individuals are able to use (a) previously acquired pertinent knowledge, (b) long experience with the language, or (c) a qualitatively different style of processing written materials that leads

to a more thematic or narrative comprehension. Through the use of such acquired or latent skills, the older adults would be able to maintain high performance levels.

Other authors (e.g., Adams, Labouvie-Vief, Hobart & Dorosz, 1987; Denney, 1974b; Labouvie-Vief & Schell, 1982; Mergler & Goldstein, 1983) have also proposed that there is an age-related difference in processing styles. This model differs greatly from Dixon and Backman's (in press) compensation model since it does not view maintenance in performance with age as being due to attenuation of age related losses, but rather to a major shift in cognitive style. Labouvie-Vief and her colleagues have been the major proponents of a very bold model of cognitive aging that subscribes to the existence of continued cognitive progression throughout late adulthood. They proposed that aging is accompanied by a new style of processing that emphasizes metaphoric and moralistic aspects of the materials. Thus, this processing style is hypothesized to permit integration of new information in a manner more conducive to inter-generational transfer of values and knowledge.

One of the characteristics of this proposed new cognitive style is a more gist-like memory for text. In other words, less importance is accorded to the details than to the main ideas of the text. Some studies have found age-related losses in memory for lower level information

(details) of texts, with no age differences in memory for high level (gist) information (e.g., Byrd, 1985; Spilich, 1983). This finding is not robust, however, and other factors are now considered to be involved, such as verbal ability, text structure, and education (Hultsch & Dixon, 1984; Meyer & Rice, in press).

A second important assumption of this model, and the one of specific interest in the present research, is that older adults have increased abilities in the interpretation and comprehension of fabular and metaphoric types of texts. Accordingly, Boswell (1979) found that older adults provided more poetic or synthetic interpretations of metaphoric phrases, although Kramer and Woodruff (1984) found only that their two adult age groups did not differ on Boswell's metaphor interpretion task.

Cognitive research on the ability to use and understand figurative language expressions such as metaphors has often been of poor methodological quality, mostly due to the lack of adequate and useful definitions of metaphors (Ortony, Reynolds, & Arter, 1978). This literature does point out, however, that figurative language, and especially metaphoric language, is used surprisingly often in casual speech and in educational texts. Therefore, it becomes important to study for both pedagogical (Reynolds & Schwartz, 1983) and theoretical (Marschark & Hunt, 1985) purposes how individuals identify and understand unsignaled figurative

expressions so easily (at least a good proportion of the time). Another question of interest is why people are so willing to violate Grice's (1975) rules of language by creating a contradiction between what they say and what they mean (Searle, 1979).

Despite its weaknesses, the figurative language literature has been able to identify some componential factors of figurative language abilities (e.g., metaphor production, analogical thinking, categorization performance) and links between the comprehension and the memory of figurative expressions have been illustrated for at least some types of text. Thus the study of figurative language where comprehension is presumably more difficult may provide useful insights into the relationship between comprehension and recall skills.

Labouvie-Vief and her colleagues have done a series of studies using figurative language materials to provide support for their model of cognitive aging. In some of this work (e.g., Adams et al., 1987) no adult age differences were observed for recall of fables. Other researchers, however, have found age differences in memory for metaphoric sentences (Light & Albertson, 1987) and memory for metaphoric texts and sentences (Dixon & Backman, in press). Major reviews of text memory research (e.g., Hultsch & Dixon, 1984; Meyer, 1983) have concluded that a multivariate approach taking into account the interactions between

subject, material, and task variables is necessary to understand the attenuation of age differences in text recall.

The present research seeks to resolve the significant contradictions that exist between the findings of Adams et al. (1987) and of Dixon and Backman (in press). This will be done by attempting to identify whether subject or stimulus material variables differentiate performance on text memory in older women. A second objective of this research is to test the hypothesis that metaphors act as succinct summary statements that can be used to organize a text when it is recalled. The possiblity of morals serving the same function in fables is also investigated. A third goal of this study is to provide exploratory data on the relationships between figurative language interpretation skills and hypothesized component tasks of this skill in adult women.

In the following sections, two approaches to qualitative age differences in processing styles will be reviewed. The first model has focused on environmental factors as the basis for findings of age differences in cross-sectional work. Labouvie-Vief's model, on the other hand, has proposed a more universal or stage-like process. The principal goal of this review is to develop some of the assumptions the latter model makes for memory of text, and especially, memory of figurative texts. The subsequent

sections will cover the literature on figurative language, and focus on studies looking at memory for metaphors and metaphoric texts.

II: Literature Review

Qualitative Age Differences

Denney has carried out a considerable amount of work using classification tasks and the Twenty Questions task (e.g., Denney, 1974a, 1974b; Denney & Denney, 1982). She found that older adults usually use non-optimal strategies, as do young children. Optimal strategies involve grouping items according to similarity (e.g., pen and pencil) rather than complementarity (e.g., pen and paper) because they permit the rejection of a large number of items with each question on the Twenty Questions Task.

Denney (1982) cautioned, however, against concluding that older adults' intellectual capacities have regressed to the level of children. There are two reasons for this caution. First, the measures used in these tasks have been, for the most part, quite simple. Denney (1982) suggested that attention needs to be paid to the types of errors made by different age groups to discover whether older adults and young children really do use the same non-optimal strategies. Second, all of this work is cross-sectional and the possibility of the group differences being due to cohort rather than age differences cannot be excluded (Denney, 1982).

In her earlier work, Denney (1974b) suggested that the differences found between age groups was due to differences in environment rather than in capacity. She proposed that

the change from categorization based on complementarity to the more sophisticated categorization based on similarity was related to the entry of the child into the formal education system. After retirement, older adults would switch back to the more natural classification style based on complementarity. These hypotheses are partly based on previous studies (Denney, 1974a, 1979) showing that older adults could use more efficient strategies after watching the experimenter use these strategies (modeling); this suggests that the subjects possessed the ability but did not use it spontaneously.

One weakness of this work is that it was based on tasks with little ecological validity. Although the abilities used in the Twenty-Questions tasks have been related to problem-solving (Denney, 1982), this task may not have been sufficiently concrete to motivate the elderly subjects. Denney (1982) reviewed a series of studies she has done where this hypothesis was tested by manipulating such noncognitive factors in performance as motivation. These manipulations did not affect performance, although the author suggested that the interventions themselves might not have been successful (Denney, 1982).

Kramer and Woodruff (1984) also studied age effects in the categorization task, but with very different materials. They had young and older adults provide examples of wisdom and acquired experience. Stories based on these themes were

subsequently written by the experimenters. Subjects were then asked to write down the themes of these stories and these data were used to measure categorization styles in the two age groups. Results showed that the older subjects had less conceptual differentiation (i.e., formed fewer categories), yet a subgroup of the older adults, the highly educated women, produced categories with more items. Unfortunately, the qualitative similarity of the categories created by the two age groups was not analyzed, so it is not known what criteria the different groups used to classify the items. The authors suggested, however, that the highly social nature of the stimulus materials might have provided a bias in favor of females.

In summary, one approach to the study of qualitative adult age differences has used Piagetian type tasks with older adults, and most of this work showed age differences, with older adults performing worse than young. Hypotheses explaining these findings have been based on external or environmental variables, and more specifically on cohort effects, including and especially educational differences between the groups.

A second approach to the study of qualitative age differences in adulthood has been proposed by Labouvie-Vief and her colleagues. Labouvie-Vief (1977) reviewed the cognitive aging literature and concluded that, traditionally, cognitive aging has been seen as a general

process of decline, even though in some models subject, tasks, or criterion effects compensate for age-related losses. She criticized these types of models, however, for using young adults' performances as a yardstick against which older individuals' results were found wanting (Adams et al., 1987). Recently, Labouvie-Vief (1986) provided a review of cognitive aging data within a model of continued developmental reorganization. This model was proposed as a heuristic device promoting potentially illuminating reinterpretations of findings (Labouvie-Vief & Schell, 1982). The most important reinterpretation concerns the way age differences are perceived. Labouvie-Vief stated that the only valid conclusion to be made from the cognitive literature is the presence of age differences. Conclusions that these data are evidence for age related decline are a theory-driven interpretation of the facts.

As an alternative interpretation, Labouvie-Vief suggested that apparent declines be seen as evidence of trade-offs that appear when functioning is reorganized. In the same way that the concrete operational child can no longer function as a preoperational child, the mature adult can no longer return to previous levels of functioning (Labouvie-Vief & Schell, 1982). Therefore, if we use the cognitive performance of young adults as a standard, declines will be found that are, in reality, adaptive developmental changes that result in qualitatively different

modes of thought. Labouvie-Vief (1980) stated, "adaptation by its very nature is a trade-off process: Specialized adaptation to one context implies a failure to be adapted to another" (p. 23).

According to Labouvie-Vief and Schell (1982), gist memory for prose passages is one example of such changes and should produce no age differences between young and old adults in recall of the main ideas of the text. The adoption of a gist strategy by the older adults can be hypothesized to be adaptive, since it is known that the gist of a text can be maintained in memory for longer periods of time (Labouvie-Vief & Schell, 1982). This hypothesis has been tested in a series of studies (e.g., G. Cohen, 1979; Dixon, Hultsch, Simon, & von Eye, 1984; Meyer & Rice, 1981; Spilich, 1983) but inconsistent results were found. Both Meyer and Rice (in press) and Hultsch and Dixon (1984) reviewed this literature and concluded that verbal ability was one of the key variables involved in these inconsistent findings. Meyer and Rice proposed that low verbal older adults were less sensitive to text structure, and for this reason did not focus on the main ideas of a text as opposed to details. Hultsch and Dixon, on the other hand, concluded that age differences in recall of main ideas were found in low verbal and low education populations, and age differences in recall of text details were found in high verbal and high education older populations. Hultsch and

Dixon added that it may be in the latter population that age differences are due to different processing styles and strategies rather than age related losses.

Labouvie-Vief and her colleagues have not only proposed that older adults have qualitatively different strategies of recall, but that they also have different goals when processing information. The young adults would be attempting, in the main, to acquire and store information, whereas the old adults would have a greater need to understand information, to integrate it with previously acquired real-world knowledge and to store this information in a manner most efficient for the task of inter-generational transmission (Adams et al., 1987). Thus, this model proposed that older adults are more interested in the psychological and affective aspects of language since the goal of development is achieving a balance in the dialectic of logos and mythos (Labouvie-Vief, in press). Furthermore, these different goals have been hypothesized to result in an increased readiness to look for the figurative or symbolic meaning in texts and to store the information acquired from texts in metaphoric or moralistic forms that are presumably highly adaptive to inter-generational transmission (Adams et al., 1987).

From Labouvie-Vief's (1986) perspective, then, there are many reasons to predict that elderly individuals would be better at processing fabular materials. First, the

developmental differences in processing goals would lead them to a better understanding of materials where inter-generational transfer is valuable for socio-cultural stability. Second, a processing style that integrates mythos and logos thinking would render them more comfortable and efficient with such abstract, paradoxical and narrative styles of text. The empirical work based on Labouvie-Vief's model will be presented after an overview of the figurative language literature.

Figurative Language

Metaphors have often been defined in English literature textbooks as implied similes (e.g., Davis, Broughton & Wood, 1977). However, metaphors have traditionally been considered as the most fundamental or basic form of figurative language (Hawkes, 1972) with such figures of speech as similes, synecdoche and metonymy seen as partial metaphors (Thomas, 1969). The extreme abundance of metaphors in speech and writing is readily observable in any conversation, and L. J. Cohen and Margalit (1972) pointed out the usefulness for developmental psychology of considering the learning of speech as the imposition of restrictions on children's metaphorical productions rather than the addition of metaphors to literal speech.

Aristotle, in Poetics II, delegated metaphors to the simply ornamental, and this perceived censure of figurative language for use in serious thought was strongly maintained

up to the twentieth century (L. J. Cohen, 1978). Indeed, it was only in the beginning of this century that terms for the different parts of the metaphor were supplied by the rhetorician I. A. Richards (1936). He defined the metaphor has having a topic, a vehicle, a ground and a tension. Thus, in the Shakespearian metaphor "All the world's a stage," the topic is world and the vehicle is stage. The ground is the implied similarities between the two concepts, while the tension is the differences between them that render their comparison difficult, illuminating or simply surprising.

Black (1962) described the two radically different positions taken towards the role of metaphors in language. He called these two approaches the substitution view of metaphor and the interaction view of metaphor. These appelletions correspond quite closely to other dichotomies, such as the Classical versus Romantic views used in literature (Hawkes, 1972), and the non-facilitative view versus the general enhancement view (Reynolds & Schwartz, 1983; Miller, 1976) used in developmental psychology. The substitution view had as its basic tenet that metaphors can be replaced by equivalent literal expressions (Black, 1962). Black pointed out that if this is so, metaphors would be used in two situations only: (a) when a gap in the vocabulary must be remedied, and (b) when stylistic considerations are in order. Miller (1976) presented a

harsher view of the non-facilitative position, by stating that metaphors are used when speakers or writers are unable to be precise or explicit. Figurative language is then seen as a violation of linguistic rules, and not essential to communication (Baldwin, Luce, & Readence, 1982).

The interaction view of metaphors adopted by Richards (1936), Black (1962) and an increasing number of thinkers in the latter part of the twentieth century (Leone, 1982) proposed that metaphors cannot be replaced by equivalent literal statements. They are assumed to have a pedagogical function since they can be used to introduce new relationships and to bridge gaps in knowledge when introducing radically new information (Marschark & Nall, 1985; Petrie, 1979). Furthermore, metaphors are seen as exemplifying elegance and efficiency in language by permitting ideas otherwise impossible to explain to be expressed in a compact yet vivid form (Reynolds & Schwartz, 1983).

According to Black (1962), even if it were possible to list all the similarities between the topic and the vehicle, the relative weight of the different similarities that comes across in a good metaphor would be lost. Furthermore, the interpretation of metaphors necessitates not only the knowledge of dictionary definitions of the terms involved, but also a quantity of world knowledge, or what he called the "system of associated commonplaces" that relates to

these terms. For this reason, metaphors can be culture specific (Black, 1962). Likewise, since the effectiveness of metaphors does not depend on simple dictionary definitions, but on associations and analogies based on world knowledge, some have claimed that almost any combination of terms can be made meaningful as a metaphor (e.g., Deese, 1974).

Metaphors are produced by associations of identity (Frye, 1963). Thomas (1969) proposed that the realization that linguistic expressions need not be literally true corresponds to humanity's movement away from the primitive, with intellectual sophistication permitting the understanding that some things can only be understood through literal contradictions. In general, the disparities between the topic and the vehicle are as important as the similarities in making the metaphor meaningful (Richards, 1936). By thus illustrating the dialectic between two objects that are the same, yet different, metaphors can provide a richer, more meaningful depiction of reality (Frye, 1963).

In fables, the whole narrative is an extended metaphor for "a truth" or "truths" contained therein. For this reason, fables are usually described as extended metaphors, although they rarely contain metaphoric phrases or words. The fable is paradoxical in that it is concrete yet abstract, specific yet general. Fables do not state, they

show, and this very ambiguity leads to insight and reflection rather than to direct comprehension (Blackham, 1985). Fables often have animals and inanimate objects as actors, and in this way manage to entertain as they teach (Newbigging, 1896). The style of the fable is simple and direct (Daly, 1961), and it deals with common-sense in daily life activities (Newbigging, 1896).

The origin of fables is not known, although so simple and pragmatic an oratory tool has probably always been used by the possessors of language (Keidel, 1896). It is known that in the past, they were meant for adults, but are now mostly assumed to be for the benefit of children (Newbigging, 1896). They often begin or end with a pithy saying, or proverb, that is meant to summarize the moral of the fable. These proverbs are said to have been tacked on to the written form of fables that had been transmitted orally through the centuries, and Newbigging related that there has been disagreement about the usefulness of the proverbs. Some have said that a good fable should successfully illustrate its lesson without the help of a proverb, and that at least some fables contain many meanings that are ignored by too simplistic proverbs (Newbigging, 1896).

Empirical Studies in Figurative Language Ability

Comprehension of figurative materials.

Ortony, Reynolds, & Arter (1978) provided an empirically useful

definition of metaphors by stating that "the expression should be contextually anomalous and the metaphorical tension must in principle be eliminable" (p. 939). The advantages of this last definition are twofold. First, it identifies as metaphoric normal sentences that are figurative only because of the context in which they appear. Second, the criterion of eliminable tension ensures that syntactically correct nonsense is distinguishable from metaphors.

Pollio and Smith (1980) defined figurative competence as "the ability of an individual to understand and use figurative language as well as his or her ability to paraphrase and/or explain it" (p.368). Traditionally, however, studies have included only one or two measures of one of these dimensions, presumably assuming that all measures tapping into figurative competence were closely interrelated. Pickens and Pollio (1979) verified this premise with the use of both correlational and factor analyses techniques. They used a multiple choice test of metaphor comprehension, another of metaphor preference, a composition test and a completion task for unfinished similes. They found that novel and frozen metaphor use are correlated positively across tasks, and negatively within tasks. Frozen metaphors are metaphoric expressions that become idiomatic through common use (e.g., the foot of the bed). Novel metaphors are the spontaneous expression of

literally false but meaningful statements.

The factor analyses done by Pickens and Pollio (1979) also illustrated the multidimensionality of figurative language abilities. Three factors were extracted: (a) a novel figurative factor, (b) a comprehension factor, and (c) a frozen metaphor factor. Pickens and Pollio concluded that both measures of production and of comprehension were necessary to obtain a reasonable view of figurative language competence. Of the tasks they used, the only one sensitive to both of these aspects was composition. Pollio and Smith (1980), in an attempt to relate problem solving abilities to figurative language abilities, also used a factor analysis technique to study the latter. Many of the measures they used were similar to the ones used in the Pickens and Pollio (1979) work and both studies concluded that figurative language ability is a multidimensional construct.

Pickens and Pollio (1979), proposed that explaining a metaphor and understanding or using it necessitates different abilities. The former task requires "an ability to transform pre-existing information about a given topic-vehicle combination into a single coherent interpretation" (p. 311) while using or understanding a metaphor means being immediately aware of the relationship between the topic and the vehicle. The task of explanation therefore requires the use of more metalinguistic abilities.

This notion has been supported by the developmental

literature, where contradictory evidence has been found regarding figurative ability in children. Some researchers have found figurative language abilities in very young children, while others, using more complex tasks as criteria, concluded that metaphoric ability was only evident at later ages (Ortony, Reynolds, & Arter, 1978; Pollio & Smith, 1980). The critical factor seems to be the amount of contextual information given to the child (Verbrugge, 1986). When asked to explain, or even to paraphrase a metaphor, metalinguistic skills are needed, and it has been suggested that these tasks underestimate the figurative competence of children (Verbrugge, 1986; Vosniadou & Ortony, 1986). On the other hand, as Gardner and Winner (1978) pointed out, it is also possible that metaphoric production ability in children is being over-estimated if they use apparent metaphors because they are not aware of the limited meanings of certain words.

Windmueller, Massey, Blank, Gardner and Winner (1986) have looked at the importance of context through the use of allegorical stories. Allegories are extended metaphors presented in narrative form, and differ from fables in that they lack a moralistic aspect. Windmueller et al. presented a target story to children between the ages of 6 and 12 years, and asked them to choose a figurative equivalent. In one condition, the choices were two metaphors, and in another they were two allegories. No difference was found

in the number of right choices between the metaphors and the allegories. When the children were asked to justify their choice, however, their performance was better with the allegories. Allegories, by being in a story format or by providing a richer context, were easier for the children to understand (Windmueller et al., 1986). This suggested that the richer context permitted the children to compensate for deficiencies in metalinguistic skills.

Gentner (1988) has shown that the type of metaphor is also important in understanding the development of metaphoric ability. She divided metaphors into four categories: (a) attributional metaphors, in which common attributes are conveyed (e.g., "A snake is like a hose"), (b) relational metaphors, where the common relational structure between the topic and the vehicle are transferred through analogy (e.g., "A roof is like a hat"), (c) double metaphors, which combine elements of attributional and relational metaphors (e.g., "Grass is like hair"), and (d) complex metaphors.

Gentner (1988) studied three age groups of children (between the ages of 5 and 10 years old) and one group of young adults. She asked her subjects to interpret attributional, relational and double metaphors, and to judge their aptness. Productions were rated on two separate five-point scales for attributionality and relationality. Results showed an age-related increase in the relationality,

but not the attributionality of the metaphor interpretations. Furthermore, adults rated the relational metaphors as more apt, and their aptness ratings correlated with the relationality of their productions. Gentner (1988) described a second experiment where the same developmental increase in relationability was found when children were given a multiple choice task to control for metalinguistic difficulties. Age differences were not found on the attribution type metaphors, thus suggesting that the developmental changes are not due only to verbal ability. She proposed that the paradox between children's productions and laboratory performances are due to the fact that many studies have included both attributional and relational type metaphors. In sum, Gentner proposed that the development of metaphoric competence differs according to the type of metaphor studied, and that the best hypothesis to explain the differences in relational interpretation is of an acquisition of domain related knowledge, leading to a novice-expert shift.

Attempts to distinguish different types of metaphors have also been made in the Piagetian literature. A series of developmental studies have attempted to relate metaphorical ability to Piagetian stages, or competence on types of metaphors with particular stages. For example, Billow (1975) concluded that figurative ability existed in quite young children and that concrete operations were

sufficient but not necessary for comprehending similarity metaphors. He also hypothesized a relationship between formal operations and the comprehension of proportional metaphors but this hypothesis was not confirmed. Ortony, Reynolds, & Arter (1978) strongly disagreed with Billow's methods, stating that the types of stimulus materials used differed on many dimensions, and that metacognitive skills were confounded with language skills. These authors declare that the only conclusion possible from Billow's results was that cognitive and linguistic abilities are correlated with age.

Cometa and Eson (1978), in somewhat more methodologically sound work, concluded that metaphor comprehension develops in two succeeding stages: first, the concrete operations children are able to paraphrase the metaphor and, second, they can explain it when they develop intersectional classification ability during the end of concrete operations. This ability involves recognizing that subgroups of distinct classes have similarities (Cometa & Eson, 1978). In sum, although no consensus exists as to the particulars, the relationship between classification abilities and metaphoric language seems to be empirically supported.

A link between classification ability and figurative language has been proposed by other than Piagetian approaches. Malgady and Johnson (1980) summarized results

from correlational studies, and stated that the similarity between topic and vehicle plays a part in the comprehension of the metaphor, and this similarity can be predicted from the number of semantic features shared by the concepts. Carrol (1986) added that comprehension of a metaphor involves retrieving the representations of the topic and the vehicle from the semantic lexicon and finding the resemblances between them. Thus, understanding a metaphor becomes, in part, a task of rearranging elements from two classes into a novel set based on newly found resemblances.

The salience imbalance hypothesis proposed by Readance, Baldwin and their colleagues also involves the knowledge and manipulation of the attributes of the two terms of the metaphor. They proposed that in a metaphor, a salient feature of the vehicle is attributed to the topic (Readence, Baldwin, Martin, & O'Brien, 1984). According to this theory, for a metaphor to work, the topic and the vehicle must have non-trivial, matching attributes that are of unequal salience, and this inequality must be directional in that the matching attribute is of low saliency for the topic, and of high saliency for the vehicle.

This hypothesis has been tested in a series of studies. Baldwin, Luce and Readence (1982) asked fifth-graders to interpret a series of metaphors, and then to list the attributes of the vehicles previously interpreted. Several days later, the subjects were shown a list of attributes of

the vehicles from the metaphors they had misinterpreted, and then asked to interpret them again. Their results showed that a significantly larger number of metaphors were interpreted correctly when the critical attribute was listed than when it was not, and the children were typically able to interpret metaphors when they had been shown the attribute list. Readence, Baldwin, Martin and O'Brien (1984) provided a more critical test of the hypothesis. They asked their sixth-grade and adult subjects to list the attributes of the metaphors they would subsequently interpret, and also to rank these attributes in order of importance. They found the same pattern of results in both age groups. Metaphorical interpretation was correlated with a low salience in topic/high salience in vehicle imbalance. They concluded that this imbalance was an enhancing though not necessary condition for correct metaphor interpretation.

Readence, Baldwin and Rickelman (1983), pointed out the importance in successful metaphor interpretation of not only knowing the meaning of a word, but knowing it "well enough," thus echoing Black's (1962) notion of a system of associated commonplaces. This link between verbal fluency and performance in metaphor interpretation tasks was investigated by Whyte (1983). She compared adults with reading ages of 8 or less with normal adult readers in a metaphor interpretation task. Winner, Rosenstiel and Gardner's (1976) categories of metaphor interpretation were

used for scoring. These categories are: (a) magical, (b) metonymic, (c) primitive metaphoric, (d) genuine metaphoric, (e) inappropriate metaphoric and (f) incomplete metaphoric interpretation. The groups in Whyte's study did not differ in regards to number of misinterpreted metaphors, although the fluent readers were found to use a more abstract/ psychological language than the non-fluent readers, who used more concrete/sensory referents. Furthermore, correlational analyses showed that non-verbal IQ was significantly related to the level of interpretation of the metaphors, and this correlation was higher for the poor readers. On the other hand, the correlation between the vocabulary test and metaphor interpretation and explication scores was significant for the fluent readers only.

As Whyte proposed, this suggests different patterns of functioning in the two groups. The poor reader group, which had significantly lower scores on the vocabulary test, seemed to be able to use other than verbal abilities to understand metaphors, although their lack of verbal skills was evident when a more sensitive measure of interpretive ability was done. With the Winner et al. (1976) scale, any explanation that showed a minimum of understanding of the metaphor was classified as "genuine metaphoric" and this did not permit a differenciation of the levels of metaphoric understanding. Although the Winner et al. scale is quite useful for scoring children's productions, its application

with adults is obviously limited, and Boswell's (1979) scoring scheme is preferable for classifying adults' interpretations.

In sum, the task of explaining a metaphor necessitates metalinguistic skills, as well as knowledge of the multiple meanings of the words in the metaphor, including both direct and indirect allusions that their use might imply. The literature has shown that with an adult group, the task of explaining metaphors does yield different levels of performance. However, very sensitive measures are necessary to distinguish between levels of performance.

Memory for metaphoric materials. Although relatively little research has been done on memory for metaphors, general agreement exists as to the wholistic or conceptual nature of the information that is stored (Marschark & Hunt, 1985). Verbrugge and McCarrell's (1977) much cited study showed this by finding that grounds were as effective recall cues as the topic or the vehicle of a metaphor. The authors hypothized that imagery was the process by which the two semantic domains (topic and vehicle) were integrated and the metaphor understood. The importance of imagery was supported by the findings of Marschark and Hunt (1985). They had their subjects rate metaphors on a series of scales such as familiarity and degree of metaphoricity. In all cases, (a) the number of alternative interpretations available and, (b) the rated imageability of the metaphors

were the best predictors of recall. Marschark and Hunt (1985) then compared free and cued recall to investigate the consistent finding that the number of interpretations available for a metaphor is a good predictor for recall and concluded that metaphors with many interpretations lead to many encodings. The imageability effect is not surprising, since traditionally imagery has been positively related to sentence memory.

One limitation present in most of the figurative language work is that the metaphors are studied in isolation. Few studies have investigated memory for metaphors in an extended context. Pearson, Raphael, TePaske and Hyser (1981) studied memory for metaphors in contexts with children. They used short expository texts containing either a series of metaphors or their literal equivalents. Only in some conditions was recall for metaphoric sentences found to be better for literal targets than for metaphorical ones. The authors concluded that this relationship was determined by the familiarity that the children had with the topic of the stories. Their methodology renders these conclusions questionable, however. Although claiming to have manipulated familiarity, they did no pretesting of their material and decided rather arbitrarily that, for example, children in the third grade knew more about water pollution than they did about deep-sea vessels. When familiarity, grade, and verbal ability were manipulated,

Pearson et al. (1981) did not obtain significant results for free recall because of floor effects. In the cued recall task, however, the metaphor versus literal effect was significant, but only for the unfamiliar passage. As noted above, the authors concluded that in unfamiliar contexts, metaphors assume more salience and provide a bridge between old and new knowledge.

Reynolds and Schwartz (1983) used short stories in which the concluding sentence was either metaphoric or literal. They asked their subjects to rate the stories and then gave them a surprise cued recall task. They found that the metaphoric target sentences were better remembered than were the literal ones. One particularly interesting finding in this study was that the presence of a metaphoric concluding sentence improved recall of the preceding text. Pearson et al. (1981), however, did not find that memory for the context was affected by metaphors and, comparing their results to those of Reynolds and Schwartz, they suggested that the different roles played by the metaphors might explain these inconsistencies. Reynolds and Schwartz used metaphors that summarized their paragraph while in the Pearson et al. material, the metaphors were used in details of the passages.

Waggoner, Messe and Palermo (1985) also looked at children's recall of metaphors presented in short stories. They compared recall for target sentences that were either

metaphors or their literal equivalents, and also manipulated the position of the target sentences within the stories. They found that recall increased with age, but no difference was found between recall of the metaphoric or the literal equivalents. The position of the metaphor did effect recall, with metaphors in the outcome part of the story being better remembered than those in the beginning of the story. Waggoner et al. also looked at recall of the three sentences following the metaphor or literal equivalent, and found that target sentence type did not effect recall of these sentences. Following the free recall task, these authors asked their subjects to interpret the metaphors. They found that performance increased with age, and the probability of correctly interpreting the metaphor was greater if the metaphor had been remembered in the free recall task.

In conclusion, studies using materials where the metaphors appear in discourse suggest interesting topics for future research. The role played by the metaphor in the the recall of text is of particular interest. If metaphors that act as succinct summaries of a text are better remembered than literal statements that serve the same function, then the usefulness of metaphors in to-be-remembered texts is evident. A further question is whether this summarizing quality or simply the position of the metaphor is the critical factor in explaining these conflicting findings,

since these variables have not been isolated in the above mentioned studies. The research reviewed above has been done solely with children and young adults. The following section shall cover work done with figurative materials with older adults.

Aging and Processing of Figurative Materials

Two lines of research in the processing of figurative materials have focused on older adults. First, a series of studies have been done based on Boswell's (1979) investigation of metaphor interpretation skills in adulthood. Second, memory for figurative materials has been investigated.

The hypothesis of increased ability to process figurative language has been supported in studies by Boswell (1979) and by Dixon and Backman (in press) but by neither Kramer and Woodruff (1984) nor Szuchman and Erber (1988). Boswell used graduate students in English to rate the interpretations of metaphors given by young and elderly subjects. The judges rated the metaphor interpretations on a five point scale ranging from poetic/synthesizing to literal/analytic and an average score was established for each subject. Results showed that older subjects gave significantly more synthesized explanations than did the young group. In the young group there was no difference between the sexes, although in the older adult group, women were found to produce significantly more synthesizing

interpretations than the men. Furthermore, the two age groups were found to be similar on vocabulary scores, although this score was correlated with metaphor interpretation performance for the younger group only. The author suggested that for mature adults only a minimum of verbal ability is necessary for synthesis to be present, while for younger subjects, the task is simply a verbal one. It was concluded that metaphoric comprehension abilities continue to develop across the life-span.

As implied above, Kramer and Woodruff (1984), did not support Boswell (1979)'s results. They used the same metaphors, the same instructions and similar scoring techniques as Boswell, yet did not find significant differences between their two age groups. The authors suggested that this lack of replication is due to the age of Boswell's younger subjects. Boswell's young group consisted of 17 to 19 year olds ($\underline{M}$ = 18), while Kramer and Woodruff's young group contained 19 to 34 year olds ($\underline{M}$ = 27.5). The latter authors suggested that Boswell's data indicated a shift in metaphoric style at the transition to adulthood rather than life-long changes in this ability. This conclusion can be questioned in view of Dixon and Backman's (in press) results however. They also used Boswell's materials and scoring scheme but replicated Boswell's finding of old adults performing better than young adults on the metaphoric interpretation task with a young group whose

mean age was 25.6 years.

Szuchman and Erber (1988) also studied metaphor interpretation, and obtained results similar to those of Kramer and Woodruff (1984). Szuchman and Erber found no age differences between the performance of young and old adults when professional raters used a scale similar to the one developed by Boswell (1977). The variable of particular interest in this study was the effect of the age and training of the raters on judged performance. When non-professional raters judged the metaphor interpretations using a goodness scale, young raters judged the young subjects as superior at interpretation, but older raters produced no age differences.

In their work on memory for figurative materials, Labouvie-Vief and her colleagues have used both metaphoric sentences and fables. Labouvie-Vief, Campbell, Weaverdyck and Tanenhaus (1980) presented metaphoric sentences in a surprise cued recall task, where they compared the effectiveness of metaphoric and literal cues. Paraphrases of the sentences were used as metaphoric cues, and the metaphor topics were used as literal cues. The topic, the vehicle and the prepositional phrase were scored separately as being recalled either in literal or in paraphrased form. Significantly more of the literal responses were produced by the topic cues than by the metaphoric cues, and more of the partial literal responses were produced by metaphoric cues

than by literal cues. The number of paraphrased responses was not significantly different between the two cue types. Furthermore, Labouvie-Vief et al. (1980) found that while the young had more literal recall responses than the older group, the latter had higher scores in the paraphrase conditions than the young. When total recall was obtained by summing across all three categories of responses, "total recall is nearly the same" (Labouvie-Vief et al., 1980, p. 8). The authors interpreted these results as suggesting that older adults recalled metaphors in a gist or meaning preserving fashion rather than in a verbatim form as did the young adults.

Light and Albertson (1987) also looked at memory for metaphoric materials, and found very different results. They used a cued recall paradigm and replicated the Verbrugge and McCarrell (1977) study with two age groups. In the first condition the cue was the appropriate ground for the metaphor read, in the second an irrelevant ground, and in the third the topic of the metaphoric sentence. The main effect of age was significant, with the younger adults superior to older subjects in proportion of sentences recalled. Significant age differences were also found with the topic cues, and the latter were found to be more effective than grounds. A particularly interesting finding was the significant interaction of age by cue type, showing that older adults improved their recall more than did young

with topic cues relative to ground cues. Although they produced appararently contradictory results, these two studes are very difficult to compare directly because of the different scoring techniques used. Labouvie-Vief et al. (1980) did not specify the proportion of full sentences recalled, while Light and Albertson (1987) did not report how partially recalled sentences were scored.

Dixon and Backman (in press) also used metaphoric materials to address the question of a processing style shift in later adulthood. Their study had the advantage of using texts that contained metaphors in context, rather than metaphoric sentences. Specifically, they wished to test the hypothesis that metaphor interpretation skills would compensate for decreased abilities in some of the components of prose reading and recall. The absence of age-related decline for recall of metaphoric texts when the older adults evidenced deficits would have supported the compensation model. Hypotheses about performance on component skills of reading and remembering were supported. Young adults performed better than old adults on all of these measures except for metaphoric sentence interpretation, where the older adults showed better performances. However, compensation was not found since the young performed better than the old adults on free recall of the metaphoric texts as well as on the non-figurative texts.

Some work on figurative text memory has also been done

using fables rather than metaphoric materials, with the expectation that these types of narrative texts faciliate the emergence of processing style differences (Adams, 1986). Labouvie-Vief, Schell and Weaverdyck (1981) used a fable as stimulus, and divided the propositions of the story into either gist or detail level. They found that when the task was to provide a summary, the responses given by the two age groups were qualitatively very different. The young group's summaries were based on the text's hierarchy, while one third of the older adults provided a moral of the story, thus showing a qualitatively different style of recall (Labouvie-Vief et al., 1981). They remembered metaphoric or moral meanings of the fables and these were clearly related to the original texts, although such summaries were difficult to analyze quantitatively. When asked to recall the fable, however, both age groups gave answers based on the propositional content of the stimuli. Older individuals remembered fewer details than the young for the summary condition, but not for the free recall and recognition tests. Similar results were found for gist recall, although for this variable, the summary condition only approached significant age group differences.

Further work with fabular materials was done in Adams' (1986) dissertation. She studied two adolescent age groups, a middle-aged group and a group of older adults. Unfortunately, she did not include a group of young adults

and this makes comparisons of her results with other studies more difficult. Adams asked her subjects to recall and summarize a Sufi tale and an essay with a similar theme. Responses were divided into categories, and each of these was analyzed separately. Two types of text base categories were identified, the action-event and the subjective. The action-event category included information from the story's line of action, while the subjective text-base involves affective and motivational information from the story. She hypothesized that these two levels of the text would be processed differently by the age groups.

For the fable recall, Adams (1986) found that the number of text based action-event propositions recalled was stable across the age groups, but that there was an increase in the number of transformed subjective information recalled, with the only significant pairwise comparison being between the 13-15 age group and the 39-55 group. This rise was accompanied by a decrease in the text-based subjective information recalled, with the 16-19 year olds having significantly more text base subjective information than the 60 years and above group. Adams concluded that this pattern of results suggested a shift from a text-based, or simple reproduction mode of recall to a more interpretive style.

Performance on the essay text showed an increase in the amount of untransformed text base with a peak at the 16-19

year old group followed by a decrease. This was accompanied by an increase in transformations in later adolescence in transformations, with a stable level in the subsequent groups. Thus, there seemed to be an age-related increase in the use of transformation in recalling texts. The author suggested, however, that the older adolescent group and the two adult groups were using this type of recall for different reasons. The use of transformations was also associated with text type, but only for women. In both types of text, recall was strongly related to vocabulary ability and to gender, with women producing more text base propositions on both the fable and the essay recall, and producing more transformations on the fable recall.

Labouvie-Vief and her colleagues have suggested that certain qualitative style differences would not be captured by text-based recall measures such as those present in the models of Kintsch (1974) and Meyer (1975). One of the objectives of Adams' (1986) dissertation was to develop a scoring procedure that would capture both literal and interpretive response styles. Certain problems existed with this procedure, however. First, the categories of recall statements were different for the fable story than for the essay story, with the consequence that recall performance on the two texts could not be directly compared. Second, many of the categories had to be rejected because of empty cells. For the quantitative analyses, Adams et al. (1987) used a

procedure that could be applied both with the fable and the non-fable studied in this experiment. The three categories of recall statements are (a) text-based listings, (b) additions, and (c) integrations. A fourth category, interpretations, yielded empty cells and was not considered in the quantitative analyses. Although the way in which the protocols are divided up into "idea units" differs greatly from the proposition text base used by methods based on Kintsch's (1974) model, the three categories used for scoring seem to correspond very closely to the categories used in the latter model. In the Kintsch procedure, additions are described as elaborations, and integrations as macrostatements. Furthermore, in the Labouvie-Vief, Schell and Weaverdyck (1981) study cited by Adams et al. (1987) as an example of this need for more qualitative scoring, the major weakness of the quantitative scoring scheme used was in scoring the summary condition, where many older subjects developed the inherent metaphor of the fable.

Adams et al. (1987) studied recall with fables and non-fables with different criterion tasks. The material was presented simultaneously in written and audio forms and subjects were told to listen carefully as they read because they would be questioned about the story. After a short filler task, subjects were asked to write down the total recall, the summary, the gist or the gist plus moral. In the analysis, each subject's protocol was divided into idea

units which were assigned to categories. In the quantitative analysis, there were no significant age differences in recall of fable, but for the non-fable, the older group gave fewer text-based listings, and fewer additions. In other words, for the non-fables, the young adults recalled more details about the text than did the elderly. The older group had more integrations, although this only approached statistical significance. Both groups produced interpretations in the gist and the gist + moral conditions for the fable and the non-fable, but with the latter, older adults produced them spontaneously in the summary task too.

The Adams et al. (1987) study had both quantitative and qualitative analyses. In the qualitative analyses the standardized scores for each category of proposition used in the quantitative scoring were submitted to a clustering program to identify different styles of responding. These results yielded four response patterns corresponding to the four categories of idea units that were most represented in each pattern. In the main, these analyses did not support Labouvie-Vief et al. (1981). Fables were found to invoke more text-base styles of recall than did non-fables and more of the young than the old subjects used an interpretive style in their recall.

Adams et al. (1987) proposed a series of post-hoc explanations for these contradictory results that are based

mostly on specific fable effects. They suggested that the stereotypicality of the fable used might have provided a better structure for this type of recall than did the non-fable. However, they did not explain in which dimensions these fables differed, and how the stereotypicality of a fable could be defined. The authors also suggested that the presentation of a fable acted as a cue for the young to process the information in a more interpretive way and that this cue was especially effective in the Adams et al. (1987) study because of the theme of the fable. The authors added that the number of interpretive statements is not necessarily an indication of a qualitatively superior interpretation of the fables, and possibly the smaller number of such statements in the protocols of older subject indicated a greater integration of information and a more succinct style.

Although the qualitative data analyses yielded ambiguous results, it is important to note that in the Adams et al. (1987) study, as well as in the Labouvie-Vief et al. (1981) and the Adams (1986) studies, the number of text-based idea units is not significantly different between the age groups. These findings are surprising for many reasons. Zelinski and Gilewski (1988) used the data from a large number of text recall studies and concluded that in general, older adults showed decline in recall of prose. Furthermore, even when figurative texts (metaphoric stories)

have been used, age differences in favor of the young were found (Dixon & Backman, in press).

Objectives and Hypotheses

The above review has illustrated the contradictions in the studies of figurative language processing in older adults. Studies looking at both the interpretation of metaphors by older adults, and the recall of figurative texts by this population have yielded contradictory results. These two questions will be addressed in the present research.

The first part of this study compares performance of young and older adult women on recall of fables, metaphoric stories and a non-figurative narrative. Only women were tested, because the literature suggests the existence of gender differences. The discrepencies between the recall findings obtained by Labouvie-Vief and her colleagues on the one hand, and Dixon and Backman on the other, have many possible explanations. First, it is possible that the samples tested were not comparable on some meaningful variables such as verbal ability, familiarity with the materials, or reading practice. Another possible reason for contradictions in the literature is that the scoring schemes used in different laboratories do not permit comparison. Even if, as suggested previously, the protocol units in the Adams (1986) and the Adams et al. (1987) studies were divided into categories similar to the ones used by Dixon &

Backman (in press), the idea units themselves might not correspond to the propositions in the latter's scoring scheme. The most commonly used prose analysis systems in cognitive aging research are those developed by Kintsch (1974) and Meyer (1975). Although quite different in focus, the two systems have produced highly correlated results (Meyer & Rice, in press) and are considered to be equally effective (Zilewski & Gilewski, 1988). In the present study, the Kintsch (1974) scoring system will be used, since it is fast and effective with the high levels of recall performance obtained with short texts and immediate recall. Furthermore, the Kintsch scoring system was chosen over Adams somewhat intuitive approach because the former is (a) more objective, (b) can be applied in the same manner to all types of texts, and, (c) allows the comparison of findings between laboratories.

The model of progressive development in later adulthood described by Labouvie-Vief predicts that older adults have a greater facility in processing metaphors and the fable morals. This hypothesis would be supported in the present study if the older women are able to use well understood metaphors and morals to help them organize the information contained in texts and recall these texts as well as younger women. On the non-figurative text, however, young women are expected to perform better than the older group.

The second part of this study will focus on figurative

text interpretation. Boswell's (1979) metaphor interpretation task will be used and performance is expected to be significantly related to the metaphoric text recall measure. Based on previous work done with this task (Boswell, 1979; Dixon & Backman, in press; Kramer & Woodruff, 1984), older women are expected to perform as well or better than young women. A measure hypothesized to be similar to metaphor interpretation for fables has been developed by the experimenter. In this task, participants will be asked to find the moral of short fables. Since older adults are hypothesized to process information in a metaphoric or moralistic form (Adams et al., 1987), older women are expected to perform as well or better than young women on this task. Performance on this measure is expected to be significantly correlated with performance on the recall of fables.

The third part of this study will be of an exploratory nature. Two measures hypothesized to be components of figurative text interpretation will be used. A feature listing task, where participants are presented with two words and asked to write ways in which these words are similar and different, is expected to be related to metaphor interpretation. Similarly, a definition of abstract concepts task is proposed to be related to the task of identifying the morals of fables. Both of these measures will be compared with vocabulary scores as possible

explanations for expected superior performance of older women at interpreting materials.

The feature listing task is based on a measure used by Malgady and Johnson (1980). As noted in the literature review, these authors found that the number of common attributes between the topic and the vehicle predicted the difficulty of interpretation of the metaphor. While this work did not focus on individual differences in performance, it does suggest a link between the listing of attributes of the topic and vehicle and performance on the interpretation tasks. Spilich (1985) reviewed work on access to the lexicon and concludes that there are regular age differences on tasks that require searching the conceptual contents of long-term memory. Performance on the feature listing task is therefore expected to show age differences, with younger women producing lists that have have a higher proportion of attributes that allude to the metaphoric or symbolic meanings of the words. This is expected because older women's hypothesized abilities for processing metaphoric materials are not expected to be sufficiently tapped by this word production task for performance levels to be maintained, since listing the attributes of the words is conceived as only a part of the task of understanding and explaining a metaphor.

A measure hypothesized to be similar to feature listing will be used for fabular materials. Subjects will be asked

to provide definitions of abstract concepts that provide the basis for the morals of fables. Botwinick and Storandt (1974) found that young adults provided qualitatively better definitions for the WAIS vocabulary words than did older adults, even though quantitative results were similar. Based on such findings, it is hypothesized that older women will not perform as well on this task as young women.

In conclusion, although parts of the study are exploratory in nature, certain predictions have been made about the relationships between the tasks. It is expected that the patterns of relationships between the tasks will not be the same for the two age groups studied. The old are expected to be as good or better as the young women at interpreting figurative materials. However, metaphor interpretation skill is not expected to be strongly predicted by either the vocabulary measure or feature listing performance for the older women. Similarly, fable interpretation skill is not expected to be strongly predicted by either the vocabulary measure or the abstract word definition task. For the younger women, on the other hand, vocabulary and feature listing scores are expected to be strongly predictive of metaphor interpretation performance, and vocabulary and word meaning scores are expected to be strongly predictive of fable interpretation performance. This pattern of results would support Boswell's (1979) hypothesis that for the young, metaphor

interpretation is simply a verbal task, while for the old, only a minimum of verbal ability is necessary for more poetic or synthesizing interpretations to be produced. This pattern of results would also suggest that although the two age groups show similar levels of performance when they interpret figurative materials, these performances are the result of qualitatively different processes.

III: Methods

Participants

Thirty-one young women ranging in age from 19 to 34 years, and thirty-two older women between the ages of 59 and 79 participated in this study. Because of the exploratory nature of parts of this study, and the suggestions in the literature of possible gender differences, only women were tested. All participants were paid a ten dollar honorarium. Participants were recruited through posters at the University of Victoria, the Lansdowne Campus of Camosun College, and at various seniors' activity centres in the city of Victoria. Participants were also invited to participate in this and other similar studies through an advertisement in the local newspaper. One young and two older women were excluded from further consideration because of missing data due to misunderstood instructions. This resulted in 30 young (M = 26.46 years) and 30 older (M = 65.63 years) participants.

Ninety percent of the older individuals and 83% of the younger reported their health to be good or very good. None of the older, and only one of the younger participants reported their health as poor. All but three older and one younger individuals reported English as their first language.

As can be seen in Table 1, the two age groups differed significantly on years of education and vocabulary, but not

on hours of reading per week. The older sample had a mean of 12.73 years of education, and the younger sample had a mean of 15.16, $t(55.09) = 4.06$, $p < .001$. The vocabulary test consisted of 54 multiple choice items from the Kit of Factor Reference Cognitive Tests (Ekstrom, French, Harman, & Derman, 1976). The first 18 words were from the vocabulary test II-V2 (part 1), words 19 to 36 were from the Advanced Vocabulary test I-V4 (part 2) and words 37 to 54 were from the Advanced Vocabulary test II-V5 (part 2). On the vocabulary test, the older sample had a significantly higher percentage of correct answers ($M = 80.26$) than did the young ($M = 69.10$), $t(57.81) = -3.74$, $p < .001$. (Percentages of items correct were used because one younger and one older individual responded only to the first two sections of the vocabulary test [items 1 to 36]). The older group reported a mean of 21.6 hours of reading per week, and the young a mean of 19.7 hours of reading, $t(51) = -0.66$, $p > .05$.

Insert Table 1 about here

Procedure

Testing was done in groups of one to five women on the university campus and lasted approximately two hours. The participants were given a short break about half way through the testing session. The testing sessions began with the presentation of a short questionnaire about participants'

age, educational background, health, and reading habits.

Testing materials were divided into three sets. The first set consisted of the metaphoric materials and these were presented in the following order: (a) the feature listing task, (b) reading and recall of the story titled "The Call," (c) the metaphor interpretation task, and (d) reading and recall of the story titled "The Teacher." The second set consisted of the fable materials and these were presented in the following order: (a) the word meaning task, (b) reading and recall of the story titled "The Stream," (c) the fable interpretation task, and (d) reading and recall of the story titled "The Wolf." The third set contained the control materials, and consisted of the vocabulary test followed by recall of the story titled "Camping."

The order of presentation of the tasks within these sets did not change, and was established to avoid presenting two consecutive story recall tasks. The order of the recall stories within the sets was decided arbitrarily as the alphabetical ordering of the titles of these stories. The three sets of tasks were counterbalanced with a latin square design so that each order was presented to five individuals of each age group.

Materials

Text recall. Three types of text were used: two metaphoric stories, two fables and one control story. These stories are presented in Appendix A. The metaphoric story

"The Call" was adapted slightly from the story used in Dixon and Backman (in press). The first sentence of this story was the metaphor "The call was a winged car." This metaphor was elaborated in the remainder of the story. The story consisted of 111 words, 8 sentences, and 57 propositions according to the Kintsch (1974) and the Turner and Green (1978) text recall scoring method. The second metaphoric story was called "The teacher" and began with the metaphor "The old teacher is an encyclopedia." This metaphor was taken from Marschark and Hunt (1985) and the accompanying story, which was an elaboration of this metaphor, was written by the experimenter. This story had 122 words, 10 sentences and 64 propositions. For both metaphoric stories, recall of the metaphor was scored as a separate variable from number of propositions.

The first fable story was called "The Stream and the Desert" and contained 10 sentences, 141 words and 63 propositions. This is a condensed version of a story related by Shah (1972) in his collection of Sufi tales. The longer version of the story was used by Adams (1986). The second fable was called "The Wolf and the Crane" and contained 10 sentences, 129 words and 57 propositions. This is a shortened version of the Aesop fable used by Rumelhart (1977), and was used by Labouvie-Vief, Schell, and Weaverdyck (1981).

The control or non-figurative story was titled

"Camping" and is adapted from a series of stories written expressly for use in text recall studies (Dixon, Hultsch, & Hertzog, 1987). It contained 8 sentences, 121 words and 66 propositions. For all five stories, the title of the story was presented, but not scored. All of these stories were rated as having a grade 7 readability level on the Fry (1975) Readability Scale.

In all of the text recall tasks, participants were instructed to carefully read the story for three minutes, and then when told to do so, to turn the page and write down everything they could remember from the story on the lined page provided. They were told not to worry about remembering the story word for word. The participants were given as much time as they needed to write down their recall. Once they had finished their recall, they were asked to answer a short questionnaire about the story they had just read. These questions asked (a) whether they had read the story before, (b) how familiar they had been with the story on a five point scale ranging from not at all familiar to very familiar, and (c) how relevant they felt the story was to a person their own age, also on a five point scale, this time ranging from not at all relevant to very relevant.

Each proposition from the participants' protocols was compared to a text-based proposition list based on the method developed by Kintsch (1974) and Turner and Green (1978). A gist criterion was used. Propositions that were

neither verbatim recalls nor paraphrases, and thus could not be scored as text-based, were assigned to one of the following categories: (a) elaborations, (b) macrostatements, or (c) errors. Elaborations are statements that are consistent with the story, but which are not explicitly contained in it. Macrostatements are statements that summarize more than one proposition, and errors are statements that directly contradict a proposition.

The two metaphors from the metaphoric stories were scored as being either correct or incorrect. Gist recall of the metaphors, as well as intrusions of the word "like" in the sentence were scored as correct, since this last case was judged to indicate comprehension of the metaphor. Other cases, including no recall of the metaphor, were scored as incorrect.

Figurative text interpretation. For the metaphor interpretation task, participants were presented with a six-page booklet. The first two pages contained the instructions used by Boswell (1979) and presented in Boswell (1977). These instructions are reproduced here in Appendix B. The instructions were read aloud by the experimenter and participants were given an opportunity to ask questions if they did not fully understand these instructions. The following four pages contained a metaphor printed at the top of the page. The words "My interpretation of this metaphor is" were printed at the top of a lined page on which the

participants wrote their answers. The four metaphors were taken from Boswell (1979) and were the following: (a) Slavery is the world's frost, (b) My soul is an enchanted boat, (c) Nature is a strong wave, and (d) A nation is a warm ocean.

Participants responses were typed onto separate cards and spelling and simple syntax errors were corrected before these responses were given to two raters. These raters were two graduate students in the English department at the University of Victoria and were paid for their work. One rater was a male master's student in his mid-twenties and the other a female doctoral candidate in her early thirties. These raters read the instructions used by Boswell (1979) and presented in Boswell (1977). The instructions explain that the responses should be sorted into five categories acccording to how poetic versus literal they are. These instructions are reproduced in Appendix C. After they had read the instructions, the raters discussed examples produced by the experimenter and examples from the participants responses to establish criteria for their ratings. The two judges agreed or differed by 1 point on 88.7% of the decisions, and differed by 2 points or less on 97.9% of the decisions. For the full sample, inter-rater reliabities of the ratings for metaphors a to d were respectively, $\underline{r}$ = .68, $\underline{r}$ = .71, $\underline{r}$ = .73, $\underline{r}$ = .68. Complete inter-rater reliabilities are provided in Table 2.

Insert Table 2 about here

The fable interpretation task was also presented in booklet form. The first page contained the instructions, which were read aloud by the experimenter. Participants were asked to read four stories and to write down what they thought was the moral of each story. Morals were defined as a practical lesson implied by the story. Participants were told to use as much time as they needed for this task, and were free to reread the story if they so wished.

Each story was followed by an empty, lined page with the following sentence at the top. "I think the moral of the story about (title of the story) is." This page was then followed by a questionnaire parallel to the one used for the story recall task, in which participants rated their previous experience with the story and the perceived relevance of the story to a person of their age.

The four fables used were the following: (a) The Crow and the Pitcher (91 words), adapted from Bewick's (1886) collection of Aesop fables, (b) The Man and the Monkey (105 words), adapted from Shah's (1972) collection of Sufi tales, (c) The Mouse and the Ocean (143 words), a shortened version of a children's fable written by Lobel (1980) and used in Adams et al. (1987), and (d) The Two Pots (103 words), also adapted from Bewick's fables. All of these stories were

rated as having a grade 7 readability level on the Fry (1975) Readability Scale.

The fable interpretation data were scored in a similar fashion to the metaphor interpretation data. The participants' answers were typed onto cards, with spelling and simple syntax errors corrected, and these cards were given to two raters to divide into 5 categories. The two raters were the same as in the metaphor interpretation task. The instructions were written by the experimenter, but based on Boswell's (1977) instructions to raters for metaphor interpretation. Raters were instructed to judge the answers on a five-point scale ranging from a literal understanding of the story to a complete understanding of the metaphoric value of the fable. These instructions are printed in full in Appendix D. The two raters were given examples written by the experimenter as well as samples from the subjects' responses for practice and discussion of categorization criteria. The two raters agreed or differed by 1 point on 98.73% of the decisions, and disagreed by 2 points or less on 99.58 of the decisions. Inter-rater reliability for these ratings are listed in Table 2. For the full sample, correlation of rater 1 and rater 2 for fables a to d, respectively, were: $\underline{r}$ = .70, $\underline{r}$ = .77, $\underline{r}$ = .64, $\underline{r}$ = .67.

Feature listing. This task was loosely based on the one used in Malgady and Johnson (1980). Participants were presented with four legal size pages. The instructions were

printed on the first page, and presented at the top of the following three pages were, in order, the word pairs: (a) Rivers and Ribbons, (b) Lions and Kings, and (c) Rainbows and Butterflies. In the instructions, participants were asked to write down as many ways as they could that the two things were similar on the left side of the page and different on the right side. An example was provided in the instructions, and participants were given three minutes for each word pair.

For scoring purposes, all of the items written by the participants were typed as complete sentences, and similar and different items were intermixed. These lists of items were presented to two raters after they had read the instructions in Appendix E. These instructions were written by the experimenter. The raters were two women, aged 21 and 22 and both had some training in psychology. The raters were instructed to rate each item as either descriptive or symbolic. Items were to be rated as symbolic if they alluded to subjective attributions about the stimuli. Raters practiced and discussed their rating strategies on examples provided by the experimenter. The two raters agreed on 91.06% of the items, and disagreements were decided by the experimenter.

Word meanings. On this task, participants were asked to give the meaning of three words chosen to represent common themes of fables. In the order of presentation,

these words were: (a) courage, (b) ingratitude, and (c) wisdom. The three words were presented on separate pages, with the sentence "I think (stimuli) is" printed below, followed by a lined page on which the participants wrote their answers.

These answers were typed onto cards, with spelling and syntax errors corrected, and these cards were given to the same two raters that scored the feature listing materials. These raters were asked to rate the answers as being either symbolic or descriptive according to the instructions reproduced in Appendix F. In summary, answers were rated as descriptive if they were limited to simple, literal definitions. For example, with the word courage, any allusion to non-physical danger would place this answer into the symbolic category. The raters agreed on 87.22% of the decisions, and disagreements were decided by the experimenter. For the full sample, correlations between raters 1 and 2 are the following: courage, r = .67, ingratitude, r = .68, and wisdom, r = .77. Inter-rater reliabilities for these ratings are listed in Table 1.

IV: Results

Text Recall

The first part of this study compared results of young and older women on recall of metaphoric story 1 ("The Call"), metaphoric story 2 ("The Teacher"), fable story 1 ("The Stream"), fable story 2 ("The Wolf") and the control story ("Camping"). A 2 (age) x 5 (story) ANOVA with repeated measures on the second factor was performed on the percentage of propositions recalled and yielded a significant age effect, $F(1, 58) = 17.17$, $p < .001$, and a significant story effect, $F(4, 232) = 91.08$, $p < .001$, but the age by story effect was not significant, $F(4, 232) = .82$, $p > .05$. The age effect was a result of the younger women ($M = 58.87$) remembering a higher percentage of propositions than the older group ($M = 45.49$) on the five stories. Therefore, hypotheses about performance on recall of figurative stories were not supported. Follow-up t-tests showed that a significant age effect was present on all five stories: for "The Call," $t(58) = 4.26$, $p < .001$, for "The Teacher," $t(58) = 4.77$, $p < .001$, for "The Stream," $t(58) = 3.37$, $p < .01$, for "The Wolf," $t(51.30) = 2.78$, $p < .01$, and for "Camping," $t(58) = 2.94$, $p < .01$. The age group means are presented in Table 3.

Insert Table 3 about here

The story effect was a result of the different performance levels in the recall of the five stories. Pairwise t-tests were done as a follow-up analysis to the story effect and showed that only the comparison of performance of "The Teacher" with "The Stream," $t(59) = 1.70$, $p > .05$, and of "The Wolf" with "Camping," $t(59) = .99$, $p > .05$ did not differ significantly. All other pairwise comparisons were significant at the $p < .001$ level, except for "The Call" with "The Stream," $t(59) = -2.60$, $p < .05$. The entire group means for each story, in descending order were: "The Wolf" ($M = 64.56$), "Camping" ($M = 62.92$), "The Teacher" ($M = 47.74$), "The Stream" ($M = 45.02$), and "The Call" ($M = 40.66$). Figure 1 shows the recall performances of the two age groups for the five stories.

Insert Figure 1 about here

Number of errors in recall protocols ranged from $M = .050$ in the second metaphor story to $M = .467$ in the control story for all 60 subjects. No tests were done on this variable because of the low incidence rates. Number of elaborations and number of macrostatements in recall were compared between the age groups with 2 (age) x 5 (story) ANOVAs with repeated measures on the last factor. For number of elaborations, the age effect was significant, $F(1,58) = 21.67$, $p < .001$, as was the story effect, $F(4,232)$

= 101.61, $p < .001$, but the Age x Story interaction was not, $F(4, 232) = 1.56$, $p > .05$. The age effect was the result of older women producing more elaborations ($M = 3.78$) than younger women ($M = 2.08$). Follow-up tests showed that in their protocols for "The Call," the older group wrote an average of 4.67 elaborations, and the younger group wrote only an average of 3.10, $t(58) = -2.99$, $p < .01$. The same pattern is found in "The Teacher," in which the older women ($M = 4.53$) had more elaborations than the young ($M = 2.83$), $t(58) = -3.50$, $p < .01$, in "The Wolf," where the older women ($M = 1.03$) had more elaborations than the young ($M = .533$), $t(58) = -2.67$, $p < .05$, and in "Camping," where the older group (M 1.67) also used more elaborations than the young ($M = 1.33$), $t(58) = -2.10$, $p < .05$. In "The Stream," the number of elaborations used by the older women ($M = 7.03$) did not differ significantly from the number used by the younger women ($M = 5.90$) $t(58) = -1.66$, $p > .05$.

Pairwise t-tests were performed as a follow-up to the significant story effect. The lack of Age x Story interaction did not justify doing this analysis separately for the two age groups. In descending order of number of elaborations, the means for the entire group were the following: "The Stream" ($M = 6.46$), "The Call" ($M = 3.88$), "The Teacher" ($M = 3.68$), "Camping" ($M = 1.40$), and "The Wolf" ($M = .78$). Each pairwise comparison was significant at the $p < .001$ except for "The Call" versus "The Teacher"

which did not differ significantly $t(59) = .61$, $p > .05$.

Similar results to those obtained with elaborations were found with macrostatements. The 2 (age) x 5 (story) ANOVA yielded a significant age effect, $F(1,58) = 7.76$, $p < .01$, and a significant story effect, $F(4,232) = 179.57$, $p < .001$, but the Age x Story effect did not reach statistical significance, $F(4,232) = 2.18$, $p > .05$. The age effect was the result of older women using slightly more macrostatements ($M = 2.96$) than younger women ($M = 2.35$). Follow-up tests showed that the age differences were significant for only "The Call," where the older women wrote an average of .93 macrostatements, and the young .47, $t(58) = -2.46$, $p < .05$, and for "The Wolf," where the older group ($M = 6.97$) also had more macrostatements than the young ($M = 5.53$), $t(58) = -2.54$, $p < .05$. On the other three stories, the age differences were not significant.

The finding of a significant story effect for number of macrostatements was followed-up with a series of pairwise t-tests done on the entire sample, since the lack of a significant Age x Story interaction did not justify separating the groups for this analysis. In descending order of mean number of macrostatements, the means for the stories were: "The Wolf" ($M = 6.25$), "Camping" ($M = 4.56$), "The Stream" ($M = 1.05$), "The Teacher" ($M = .70$), and "The Call" ($M = .70$). The first three stories in this list differed from each other on number of macrostatements

produced at the $p < .001$ level. "The Stream" and "The Teacher" had similar amounts of macrostatements, $t(59) = -2.01$, $p < .05$.

It was hypothesized that the older women in this study would be able to use the presence of a well understood metaphor in the metaphoric stories to cue their recall and thus remember more of these stories. A chi-square test indicated that there were no significant age difference in the number of individuals recalling the metaphor correctly in the story "The Call" (X (1, $N = 60$) = 2.954, $p > .05$, but there was a significant age difference in "The Teacher" (X (1, $N = 60$) = 7.546, $p < .01$, where a significantly larger number of young women recalled the metaphor. For each story, t-tests were done to compare the older women who had remembered the metaphor with the ones that had not remembered it on percentage of propositions recalled. This analysis was only performed with the older group since only 5 younger women did not remember the metaphor in "The Call," and 2 did not remember the metaphor in "The Teacher."

In the older group, the 18 women who remembered the metaphor in "The Call" recalled an average of 36.66% of the propositions from the rest of the story, while the 12 women who did not recall the metaphor had an average recall performance of 26.51%, $t(28) = 2.04$, $p > .05$. With "The Teacher" group, 18 of the women recalled the metaphor (M = 43.99% of propositions recalled) and 12 women did not recall

the metaphor (M = 36.69% of propositions recalled), $t(28) = 2.28$, $p < .05$. Thus, the hypothesis that older women are able to better recall metaphors, and can subsequently use these metaphors to organize and cue recall of the accompanying text is supported only in one of the two metaphorical stories ("The Teacher").

Covariance Analyses. Because of the significant differences in years of education and vocabulary performance between the two age groups, both these variables were used as covariates in the analysis of proportion of propositions recalled. When vocabulary performance was used as a covariate, the age factor remained significant, $F(1,57) = 28.21$, $p < .001$ in favor of young women. Follow-up t-tests showed that the age difference remained significant at the .01 level for all five stories, "The Call," $F(1,57) = 23.72$; "The Teacher," $F(1,57) = 23.15$; "The Stream," $F(1,57) = 23.46$; "The Wolf," $F(1,57) = 15.83$; and "Camping," $F(1,57) = 15.16$.

Similar results were found with years of education as a covariate. The test of the age factor was $F(1,57) = 11.57$, $p < .01$, and all stories except for "Camping" had significant age differences: "The Call," $F(1,57) = 13.35$, $p < .01$; "The Teacher," $F(1,57) = 16.06$, $p < .001$; "The Stream," $F(1,57) = 7.98$, $p < .01$; "The Wolf," $F(1,57) = 6.57$, $p < .05$; and "Camping," $F(1,57) = 4.45$, $p < .05$. Therefore, neither vocabulary ability nor years of education seemed to be

critical in explaining the age differences in recall performance.

Figurative Interpretation Ability

Ability to interpret figurative materials was measured for metaphors and for fables. Each subject received a metaphoric interpretation score which consisted of the mean of performance on four trials, where the performance on a trial was the mean of the two ratings. A similar score was obtained for the fable interpretation task, and for the word meaning task. For the feature listing task, the number of answers judged to be symbolic were divided by the number of answers for that item. The percentage of symbolic answers was averaged across three trials. These four measures of figurative ability were analyzed in a multivariate analysis of variance, and showed that the age effect was not significant for these variables, Wilks' $F(4,52) = .973$, $p > .05$. For the metaphor interpretation task, the older women received an average rating on a 5-point scale of 2.92 and the younger of 3.23, and for the fable interpretation task, the older women received an average rating on a 5-point scale of 3.59 and the younger group of 3.65. In the feature listing task, 28.99 percent of the items listed by the older women were rated as symbolic rather than literal and 30.54 percent of the younger women's items were categorized as symbolic. Finally, in the word meaning task, the older adults had an average score of 1.52 and the young of 1.58 on

a 2-point scale.

Thus, hypotheses about age effects on these tasks were only partly supported. The older women performed as well as the young on metaphor and fable interpretation, but predictions of age differences in performance on the feature listing and the word meaning tasks were not supported.

Correlational Analyses

Relationships between performance on the different tasks were investigated with Pearson product moment correlations. Overall, hypotheses about a strong relationship between the figurative ability measures and recall performance were not supported. For "The Call," metaphor interpretation and recall were significantly related for the young women (r = .51, p < .01) but not for the old (r = -.06, p > .05). The correlations between interpretation and recall of "The Teacher" were very low for both the young women (r = .16, p > .05) and the older women (r = .16, p > .05). The fable stories ("The Stream" and "The Wolf" yielded generally negative correlations between recall and interpretation performances. In "The Stream," the correlations were negative for both the older (r = -.25, p > .05) and the younger group (r = -.11, p > .05), while in "The Wolf," the correlations were negative for the young (r = -.21, p > .05) but not the old (r = .01, p > .05).

The correlations between recall performance and vocabulary scores were also calculated. When the age groups

were considered separately, the correlations were positive, but seldom significantly so. The only significant correlations were found with (a) "The Stream," where both age groups had $r = .42$, $p < .01$, (b) in "The Wolf" for the older women ($r = .49$, $p < .01$) and (c) in "Camping" for the younger women ($r = .37$, $p < .05$). The correlations between the recall measures and figurative interpretation and vocabulary are listed in Table 4.

Insert Table 4 about here

In summary, the relationship between vocabulary scores and recall performance is somewhat stronger and at least more consistent than the one between interpretation and recall. However, this is true only when the correlations are calculated separately for the two age groups. When the entire sample is considered, the r values are very small and range only from .00 to .17. Finally, because of the inconsistent correlations between figurative interpretation scores and recall performance, it is difficult to make conclusions about whether the fable interpretation task is similar or not to the metaphor interpretation task based on these somewhat inconsistent correlations. In fact, the relationship between interpretation and recall differs greatly even between the two metaphoric stories.

Predictions about different patterns of relationships

between the hypothesized component tasks for the two age groups were, for the most part, not supported. The correlations between metaphor interpretation performance and (a) feature listing, and (b) vocabulary were expected to be lower for the older women than the younger. This pattern was found for vocabulary, where the young had a correlation of $r = .53$, ($p < .01$) and for the old $r = .19$, ($p > .05$) with the difference between these two correlations being significant at the .05 level. For the feature listing task, this pattern was found also, but surprisingly, only for total items listed and not for proportion of symbolic items listed. Even with the former variable, however, both groups had very high correlations (for the young, $r = .52$, $p < .01$, and for the old, $r = .47$, $p < .01$) and it is difficult to interpret the difference between these correlations to be meaningful. The proportion of symbolic items listed in the feature listing task did not support the hypothesis since for the young women the variable did not correlate with metaphor interpretation ($r = .01$, $p > .05$) and it did for the older women ($r = .32$, $p < .05$). The difference between these correlations was significant at the .05 level, but in the direction opposite to that predicted.

Similar to the predictions for the metaphoric materials, it was predicted that correlations between fable interpretation performance and (a) scores on the word meaning task, and (b) vocabulary, would be lower for the

older women than the young. This pattern was found for neither vocabulary, where both groups had a correlation of r = -.06, (p > .05) nor word meanings where the older women had a slightly stronger correlation with interpretation (r = .53, p < .01) than the younger women (r = .41, p < .05). In summary, it had been predicted that for the older women, figurative interpretation performance would not be predicted by performance on hypothesized component tasks of this ability but that this would be true for the younger women. The present results do not strongly support these predictions. The correlations are listed in Table 5.

Insert Table 5 about here

Because of the exploratory nature of the feature listing and word meaning tasks, correlations between them and vocabulary performance were calculated. Interestingly, both total number of items and proportion of symbolic items in the feature listing tasks were negatively correlated with vocabulary for the older women. This correlation was significant for total number of items (r = -.38, p < .05) but not for proportion of symbolic items (r = -.21, p > .05). For the younger women, the correlation was significantly positive for total number of items (r = .41, p < .05) and the difference between the correlation of the two age groups on this variable was significant at the .01

level. For the younger women, the proportion of symbolic items produced in the feature listing task was not correlated with vocabulary performance (r = .05, p > .05). Finally, for the fable materials, the correlation between word meanings and vocabulary were very low for both the young women (r = .13, p > .05) and the older group (r = .16, p > .05). These correlations are presented in Table 5.

Subsamples

The hypothesis that older women would be able to use their figurative interpretation skills to recall figurative stories as well as young adults was not supported by these data. It is possible, however, that the predicted outcomes are present within specific subsamples of the older population. Hultsch and Dixon (1984), as well as Dixon and Backman (in press), proposed that qualitative age differences may not be a universal process, and may be found only in populations with high verbal ability and high education levels. Based on these suggestions, further analyses of recall performance and of figurative interpretation scores were done with specific subsamples of both age groups. The first set of subsamples was obtained by choosing the top five scorers for both age groups, thus resulting in a sample size of 10 individuals, and testing for age differences between these two groups.

For the first group of analyses, performance on the vocabulary test was used as a criterion for choosing the top

five performers in both age groups. A 2 (age) x 5 (story) ANOVA was performed on the recall variables, with repeated measures on the second factor. The age effect, $F(1,8) = 8.27$, $p < .05$ and the story effect were significant $F(4,32) = 11.68$, $p < .001$ but the story by age interaction was not $F(4,32) = 1.46$, $p > .05$. The age effect was the result of better performance by the younger women ($M = 65.09$) than by the older women ($M = 48.73$). Follow-up analyses yielded significant age differences between the young ($M = 54.54$) and the old ($M = 33.09$) on "The Call," $t(8) = 2.99$, $p < .05$, and between the young ($M = 57.41$) and the old ($M = 40.32$) on "The Teacher," $t(8) = 2.96$, $p < .05$ as well as between the young ($M = 78.48$) and the old ($M = 57.27$) on "Camping," $t(8) = 2.52$, $p = .036$. Different results were obtained for the two fables. On "The Stream," recall performance of the older women ($M = 43.17$) did not differ significantly from that of younger ($M = 63.49$), $t(8) = 1.87$, $p > .05$. Similar results were found on "The Wolf," with older women recalling an average proportion of 69.82 propositions, and for the young women, $M = 71.58$, $t(8) = .20$, $p > .05$. In summary, for this subsample the hypothesis of no age differences on the figurative materials was supported for the fables but not for metaphoric stories.

Pairwise t-tests were performed on these data as a follow-up to the significant story effect. Results were similar to the ones obtained with the full sample. In

descending order, the means of the five young and five old top scorers in vocabulary for percent of propositions recalled were: "The Wolf" (M = 70.70), "Camping" (M = 67.87), "The Stream" (M = 53.33), "The Teacher" (M = 48.87), and "The Call" (M = 43.81). Of all the paired comparisons of these means, four were not significant at the .01 level. These were "The Call" with "The teacher," $t(9) = -1.07$, $p > .05$, "The Call" with "The Stream," $t(9) = -1.79$, $p > .05$, "The Teacher" with "The Stream," $t(9) = -0.78$, $p > .05$, and "The Wolf" with "Camping," $t(9) = .52$, $p > .05$. Recall results for this subsample are shown in Figure 2.

Insert Figure 2 about here

A MANOVA was performed on the figurative interpretation tasks with scores on the metaphor interpretation task (M(young) = 4.02, M(old) = 3.22), the fable interpretation task (M(young) = 3.47, M(old) = 3.55), the word meaning task (M(young) = 1.63, M(old) = 1.66) and the proportion of symbolic items in the feature listing task (M(young) = 29.92, M(old) = 30.03) as the dependent variables, and age group as the independent variable. The age factor was found to be non-significant, Wilks' $F(4,5) = 2.184$, $p > .05$.

Further analyses were done on another subsample chosen according to high performance in metaphor interpretation. This sampling procedure was intended to be parallel to the

preceding one based on vocabulary score. The ANOVA performed on the recall variable yielded a significant age effect, $F(1,8) = 5.85$, $p < .05$ and a significant story effect, $F(4,32) = 21.31$, $p < .001$, as well as a significant Age x Story interaction, $F(4,32) = 4.09$, $p < .01$. The age effect is the result of the younger women ($M = 63.85$) recalling a higher proportion of propositions than the old ($M = 49.02$).

Follow-up t-tests on the age effect revealed a different pattern of results than the one in the preceding analysis. With this subsample, only the first metaphoric story ("The Call") showed significant age differences. In "The Call," the older women recalled an average of 60.00% of the propositions, whereas the young recalled an average of only 31.63% of the propositions in the story ($t(8) = 4.80$, $p < .01$). All the other stories did not show significant age differences. In "The Teacher," the older women ($M = 44.51$) also had lower recall than the young ($M = 51.93$), but this difference was not significant ($t(8) = 2.96$, $p > .05$). In recalling the first fable ("The Stream"), the older women's performance ($M = 43.49$) did not differ significantly from the performance of the younger women ($M = 64.44$), $t(8) = 1.91$, $p > .05$. Non-significant results were also found between the older ($M = 67.01$) and the younger group ($M = 76.84$), $t(8) = 1.90$, $p > .05$ on the second fable ("The Wolf"). On the control story ("Camping"), the older women

also remembered only slightly less (M = 58.48) than the young (M = 66.06), $t(8) = 1.12$, $p > .05$. The recall results for this subsample are shown in Figure 3.

Insert Figure 3 about here

Because of the significant Age x Story interaction, pair-wise t-tests were done on story recall performance of the top five scorers on the metaphor interpretation task seperately for the two age groups. For the younger women, the results were similar to the ones obtained in the vocabulary subsample. In descending order the means were: "The Wolf" (M = 76.84), "Camping" (M = 66.06), "The Stream" (M = 64.44), "The Call" (M = 60.00), and "The Teacher" (M = 51.93). Of all the paired comparisons, three are significant at the .05 level. These are: "The Call" versus "The Wolf," $t(4) = -3.55$, $p < .05$, "The Teacher" versus "The Wolf," $t(4) = -5.10$, $p < .05$, and "The Teacher" versus "Camping," $t(4) = -3.26$, $p < .05$.

The results obtained with the older women were somewhat different. In descending order of proportion of propositions recalled the means were: "The Wolf" (M = 67.01), "Camping" (M = 58.48), "The Teacher" (M = 44.51), "The Stream" (M = 43.49), and "The Call" (M = 31.63). With this group, the pairwise t-tests were significant at the .05 level on all of the comparisons except for two, namely, "The

Call" versus "The Stream," ($t(4) = -1.93$, $p > .05$) and "The Teacher" versus "The Stream," ($t(4) = .14$), $p > .05$).

Finally, similarly to the top vocabulary sample, the top scorers on the metaphor interpretation task yielded no age differences on metaphor interpretation (M(young) = 4.57, M(old) = 3.80), fable interpretation (M(young) = 3.90, M(old) = 3.90), proportion of symbolic items in feature listing (M(young) = 28.53, M(old) = 27.62) or word meanings (M(young) = 1.73, M(old) = 1.66), Wilks' $F(4,5) = 4.09$, $p > .05$.

A third set of analyses was done on the top five scorers of both age group on the fable interpretation task. The ANOVA on recall performance of these top scorers on fable interpretation showed a non-significant age effect, $F(1,8) = .41$, $p > .05$, a significant story effect, $F(4,32) = 12.25$, $p < .001$, and a non-significant Age x Story interaction, $F(4,32) = .92$, $p > .05$. These results show a similar trend to the ones obtained with the top performers on metaphor interpretation where only one of the stories yielded significant age differences. Figure 4 shows recall performance of the age groups separately to facilitate comparison with the other subsamples.

Insert Figure 4 about here

Follow-up t-tests on the story effect resulted in a somewhat similar pattern to the other two subsamples. When the stories were ordered according to performance on recall, the order changed only slightly from the one obtained in the last two subsamples. For the five stories, the percent of propositions recalled was: "The Wolf" (M = 58.59), "Camping" (M = 57.72), "The Teacher" (M = 40.96), "The Stream" (M = 39.36), and "The Call" (M = 37.81). Again, four pairwise comparisons were not significantly different at the .01 level: "The Call" with "The Teacher," $F(9) = -.77$, $p > .05$; "The Call" with "The Stream," $F(9) = -.39$, $p > .05$; "The Teacher" with "The Stream," $F(9) = .39$, $p > .05$; and, "The Wolf" with "Camping," $F(9) = .27$, $p > .05$.

With this group, the MANOVA with metaphor interpretation (M(young) = 3.42, M(old) = 3.12), fable interpretation (M(young) = 4.20, M(old) = 4.17), proportion of symbolic items in feature listing (M(young) = 21.07, M(old) = 30.03) and word meanings (M(young) = 1.63, M(old) = 30.03 as the dependent variables tasks did not show a significant age effect, Wilks' $F(4,5) = 1.120$, $p > .05$.

The three subsamples obtained were, for the most part, made up of different individuals. Only one young women was part of all three subsamples, and two young women were in two of the subsamples. For the older women, one consistently high scoring individual appeared in all three subsamples, but the 4 other women in each subsample appeared

only once.

A second set of analyses were done using a different subsampling technique. A median split was done on the older sample on vocabulary performance, and these 15 individuals were compared to a random sample of 15 young individuals. This type of subsampling has been widely used by Meyer and her colleagues. Rice and Meyer (1985) proposed that the use of such subsamples is similar to the comparisons of university alumni with undergraduate students used in many prose recall studies. Furthermore, Meyer (1983) proposed that young and old adults with differences in vocabulary scores may in fact have comparable levels of verbal aptitude.

A 2 (age) x 5 (story) ANOVA with repeated measures on the story factor was performed on the percent of propositions recalled. With this analysis, the age effect did not reach significance, $F(1,28) = 4.13$, $p > .05$ with the 15 younger women remembering an average proportion of 57.54 propositions and the 15 highest scorers on vocabulary from the older group remembering an average of 49.31% of the propositions across the five stories.

The mean differences between the performance of the two groups was larger for the metaphor stories than for either the fables or the control story. In "The Call," the older group remembered 33.82% of the propositions, while the younger women remembered 48.48%, with a mean difference of

14.66. In "The Teacher," the older group remembered 43.87% of the propositions, and the young 54.73%, with a mean difference of 10.86. For the two fables and the control story, the mean differences between the recall performance of the two age groups are smaller. The younger women recalled 47.51% of the propositions and the older group 42.75% in "The Stream," and in "The Wolf," the younger women again recalled only slightly more (M = 69.70) propositions than the older group (M = 65.49). For "Camping," the younger women's performance was 67.27, and the older group's was 60.60. Although follow-up tests of the age effect were not justified since the age effect was not significant, these comparisons of the means suggest that a similar trend to the one found with the top scorers on vocabulary seems to be emerging, that is, smaller, or no age differences were found with the fables than with the other story types. Recall performance of the two age groups on five stories are shown in Figure 5.

Insert Figure 5 about here

In this subsamples, the story effect was significant, $F(4,112) = 50.83$, $p < .001$, but the Age x Story interaction was not, $F(4,112) = 1.83$, $p > .05$. The story effect was followed up with pairwise t-tests. In descending order of

means of propositions recalled for each story, the order was the same one found for the full sample, and for the subsample of top scorers on the fable interpretation task: "The Wolf" (M = 67.60), "Camping" (M = 63.93), "The Teacher" (M = 49.30), "The Stream" (M = 45.13), and "The Call" (M = 41.15). Three of the pairwise comparisons were not significant at the .001 level: "The Call" with "The Stream," $t(29) = -1.47$, $p > .05$; "The Teacher" with "The Stream," $t(29) = 1.86$, $p > .05$; and "The Wolf" with "Camping," $t(29) = 1.49$, $p > .05$.

Finally, with this subsample, a MANOVA yielded a non-significant age effect, Wilks' $F(4,25) = .195$, $p > .05$, with metaphor interpretation (M(young) = 3.02, M(old) = 2.93), fable interpretation (M(young) = 3.62, M(old) = 3.61), proportion of symbolic items in feature listing (M(young) = 30.07, M(old) = 26.80), and word meanings (M(young) = 1.58, M(old) = 1.56) as the dependent measures.

Because of the larger sample size obtained with this type of subsampling, correlational analyses were done to test hypotheses about relationships between the tasks. Overall, hypotheses about a close relationship between the figurative ability measures and text recall performance were not supported. In general, the results were similar to the ones obtained with the full sample, since no significant positive correlations were found between the two variables. In fact, relatively large negative correlations were found

for the older group for "The Call" (r = -.26, p > .05) and for "The Stream" (r = -.22, p > .05). All other correlations were small, ranging from .12 to -.08.

The relationship between recall performance and vocabulary scores was also calculated. Values were generally very small, except for that of vocabulary with recall of "The Teacher," where the older women had a correlation of -.42 (p > .05). Correlations between vocabulary and recall when the age groups are collapsed were significant for "The Call" (r = -.39, p < .05) although these numbers are difficult to interpret since they probably reflect subsampling biases.

In summary, no consistent pattern was found of relationships between interpretation and vocabulary scores with recall performance for this subsample. These results are presented in Table 6.

Insert Table 6 about here

Similarly, hypotheses about different patterns of relationships between the hypothesized component tasks for the two age groups were not strongly supported. The correlations between metaphor interpretation performance and (a) feature listing, and (b) vocabulary were expected to be lower for the older women than for the younger, and similar

results to the ones obtained with the full sample were found. The hypothesis was supported for vocabulary, where the young had a correlation of r = .32 (p > .05) and for the old, r = .20 (p > .05). This pattern was also found for total items listed in the feature listing task, where both age groups produced high correlations (for the old r = .44, p < .05, and for the young r = .65, p < .01). As with the full sample, the correlations between metaphor interpretation and proportion of symbolic items produced in the feature listing task did not support the hypothesis, with the young having a correlation of r = .10 (p > .05) and the old of r = .16 (p > .05).

The predictions for the fable materials were similar to the ones for the metaphoric materials, and also reproduced findings obtained with the full sample. The hypothesis was not supported for the vocabulary measure, since both groups had negative correlations (for the young, r = -.14, p > .05, and for the old, r = -.17, p > .05). Correlations between performance on the word meaning task and fable interpretation were strong for both young (r = .48, p < .05) and old women (r = .55, p < .05), but the older group did not have weaker correlations than the young as predicted.

Finally, the correlations between vocabulary and the exploratory measures of feature listing and word meaning were all relatively weak, except for vocabulary with word meanings for the older women which yielded a significant

correlation (r = .56, p < .05). These results are presented in Table 7.

Insert Table 7 about here

In conclusion, the patterns of correlational results found with this subsample were quite similar to the ones found with the full sample. This suggests that although age differences on recall were no longer significant when the highest scorers on vocabulary from the older group were compared to younger women, there were no strong differences in the relationships of the tasks between these top vocabulary scorers and the entire sample.

V: Discussion

Hypotheses ensuing from the model of progressive adult development presented by Labouvie-Vief and her colleagues predicted that age differences in recall in favor of younger women would be found only for the control story. However, the data yields significant age differences in favor of younger women on recall of the metaphor and fable stories as well as the control story. On this measure, the present study replicates the findings of Dixon and Backman (in press) who found age differences in recall of metaphoric texts in favor of young adults and contradicted the findings of Adams et al. (1987) who found no age differences on text-based variables with the recall of fables.

For the metaphoric materials, the possibility of metaphor comprehension aiding in recall was investigated in the present study by comparing the recall of the older women who remembered the metaphor with the recall performance of older women who did not recall the metaphor. The results supported the hypothesis for the story titled "The Teacher" but not for "The Call." The validity of this analysis could be questioned however, due to the possibility of a linear dependency between the variables involved. For example, the possibility of an individual recalling any sentence is probably increased given that the individual recalled the sentence preceding it. For an adequate investigation of the hypothesis that metaphors increase recall of accompanying

text a between subjects design, with texts equivalent on all but the metaphoric or literal sentence would be needed. Other interesting questions for further study are (a) the recallability of metaphors depending on their location in the story, (b) the recallability of metaphors depending on the importance within the text of the information presented metaphorically and especially (c) the possibility of age differences with these effects.

In the present study, it was decided to use stories containing one metaphor that summarized the entire story in order to make these metaphorical stories as similar as possible to fables conceived as a metaphor of a situation, and to control for length by condensing the fables used in previous work by Labouvie-Vief and her colleagues (Adams, 1986; Labouvie-Vief et al., 1981). The use of short texts made it possible to get entire stories based on a single metaphor, in the same way that the information contained in a fable is hypothesized to be organized around its moral.

It is possible that the metaphors and fables used in the present study produced age differences in recall because of specific fable effects as proposed by Adams et al. (1987). In other words, the stories would have produced age differences in recall because they were not interesting, illuminating or figurative enough. It is very difficult, however, to judge the quality of a metaphor or a fable. Even the literary criticism literature, except for

upbraiding writers who mix metaphors, does not offer any guidelines on how to judge the worth of figurative materials. A further question is whether the fables and the metaphoric materials were equal in difficulty. The stories used were equated on the Fry (1974) readability scale used by Adams et al. (1987) but such a scale does not include subject factors, and has been shown to be insensitive to levels of figurative complexity (Congleton, 1982). This scale does only what it was developed to do, which is to measure the difficulty of the text as defined by sentence and word length. On other dimensions, it is possible that the texts were more difficult for some readers than for others. In fact, anecdotal evidence suggests that some participants found the metaphor in "The Call" difficult to understand, since some even asked whether the first sentence contained an error. Unfortunately, comprehension of metaphors in the recall stories was not measured. A very sensitive scoring scale would be necessary to do this, because it would be necessary to compensate for the fact that the metaphor is somewhat explained in the story already.

Contrary to the findings of age differences in favor of the younger women for the proportion of propositions recalled, the older women in this study produced consistently more elaborations and macrostatements. Although floor effects are a possible explanation for these

results, this could also be suggestive of qualitative differences in recall styles. This difference in styles would be characterized by an adaptive increase in macrostatements, which leave out details but summarize the main parts of the story. An increase in the use of elaborations, likewise, could be indicative of a more subjective approach to the task, characterized by an attempt to integrate events from one's life with events from the story, through the addition of elements that are not explicitly contained in the story. On the other hand, the lack of an Age x Story interaction indicates that both age groups use more macrostatements and elaborations for the same stories. For the elaborations, both age groups used more elaborations in the least recalled stories, suggesting that this type of statement is used when there is difficulty in recalling the story. If so, both age groups would seem to be using a similar strategy and qualitative age differences would not be present.

In the second part of this study, figurative text interpretation was measured in young and old women. The data support the hypothesis that older women are as good or better as young women at interpreting figurative materials. The metaphor interpretation results support Kramer and Woodruff's (1984) findings of no age differences on this task, but do not replicate Dixon and Backman's (in press) or Boswell's (1979) findings of age differences in favor of the

older group. One possible explanation for these contradictory findings is differences between the raters employed in the different studies. However, both Boswell (1979) and Kramer and Woodruff (1984) used English literature graduate students as raters, as was done in the present study. Furthermore, scoring reliability is very high in all three studies. In Boswell's study, 76 to 83.6% of the ratings made by the 5 judges differed by 1 point or less on a five-point scale, and 93 to 96.2 differed by 2 points or less. In Kramer and Woodruff 64% of the decisions were agreements or disagreed by 1 point, and 83% disagreed by 2 points or less. In the present study, 88.7% of the decisions made by the 2 judges were agreements or differed by 1 point, and 97.9% of the decisions differed by 2 points or less.

Another interesting question as pertains to the raters doing the scoring is the possibility that their age has an effect on their ability to judge metaphors produced by adults of different ages. Szuchman and Erber (1988) investigated the ratings given by young and old adults who did not have professional training in the interpretation and evaluation of written materials. They found that the young nonprofessional raters (mean age = 23.6 years) tended to give higher ratings to young respondants on the metaphor interpretation task than to old. The old nonprofessional raters (mean age = 71.4 years) were found to be less

stringent in their ratings than the young raters, and to give equally high scores to both age groups of respondents. When professional raters (i.e., English teachers, mean age = 40.6 years) were used, they did not rate the productions of one age group of respondents as better than the other, but used a slightly more stringent criterion than the old nonprofessional raters. It may be that Szuchman and Erber's data simply illustrate an age-related widening of criteria for what is considered acceptable metaphor interpretations, since their three groups of raters belong to different age cohorts. However, the data obtained in the present study do not seem to support this position, because although young adults, the raters did not judge the responses of the young women to be superior to those of the older women. On the other hand, the correlations between the ratings of the two judges showed that they were more reliable when they scored the young women's productions than when they scored the productions of the older women. This could mean that young raters are not simply more stringent in their scoring than older raters, but that they experience comprehension difficulties with older women's interpretation styles. In some cases, these comprehension difficulties may mask actual age differences in interpretation ability. This hypothesis suggests the necessity of following up the work of Szuchman and Erber (1988) with comparisons of not only the ratings of young and old nonprofessionals but also of young and old

professionals on the metaphor interpretation task and on other tasks where qualitative age differences may emerge.

It was hypothesized in the present study that older women might be able to use well understood metaphors and morals to organize and enhance their recall of these stories. The findings of age differences in favor of the young suggest that the older women were not able to use their metaphor and fable interpretation skills to compensate for age related losses when recalling figurative stories. One possible explanation for this finding is that older adults are not able to maintain their performance in figurative interpretation tasks when the processing demands are increased (Szuchman & Erber, 1988), such as in a task that involves both interpretation and recall. Another explanation for these findings is that the figurative text interpretation tasks are not sufficiently related to recall for this skill to be used to compensate for age related memory losses (Dixon & Backman, in press). This explanation is supported by the weak correlations found in the present study between recall performance and the figurative interpretation performance. As proposed in the child literature, it is possible that figurative explanation tasks tap mostly into metalinguistic skills, and that a more multidimensional approach to measuring figurative interpretation skills is required.

Predictions about specific patterns of relationships

between the hypothesized component tasks of figurative interpretation in the two age groups were not supported. No clear pattern emerged in the correlational data. This is possibly due to the relatively small group size used in the present study. The lack of clear patterns in the correlational data also makes it difficult to judge whether the fable tasks and the metaphor tasks were tapping into parallel aspects of figurative ability, and whether they were similar on such dimensions as difficulty and interest.

Different patterns of recall performance results were found when only the top scorers on some key variables were analyzed. This type of subsampling was based on suggestions by Hultsch and Dixon (1984) and Dixon and Backman (in press). They proposed that the type of qualitative age differences described by Labouvie-Vief and her colleagues might occur only in high verbal and highly educated older populations. Analyses were done comparing the top five scorers in the young group to the top five scorers in the old group on the variables of metaphor interpretation, fable interpretation and vocabulary.

The results obtained when the young and old top scorers on the figurative interpretation measures were very different from those obtained with vocabulary. With the top scorers on metaphor interpretation, only the first metaphoric story yielded significant age differences and the subsample of top scorers on fable interpretation did not

yield significant age differences at all. It had been hypothesized that figurative ability would compensate for age related losses and permit the older women to maintain high levels of performance, but this was predicted for the figurative stories only. Since no age differences were found in the control story, these results do not support the hypothesis that figurative interpretation skill is compensating for age related losses in recall of figurative stories. These results also do not support the hypothesis that older women find metaphoric and fabular stories easier to remember than non-figurative narratives. Indeed, the results obtained with the top scorers on the metaphor and fable interpretation tasks suggest that figurative interpretation could be interpreted as a measure of verbal ability, so that when it is used to choose top performers, older adults who have maintained their recall performance levels are chosen. This conclusion is supported by the fact that a significant age difference was obtained only on "The Call" which was the least remembered, and possibly most difficult story. It is important to note, however, that the generalizability of results obtained with analyses on extreme groups is questionable (Hultsch & Dixon, 1984). Furthermore, the variables of fable and metaphor interpretation used to choose these subsamples were of an exploratory nature.

The results obtained when vocabulary score was used to

choose the subsamples are quite different than those obtained with the subsamples based on fable and metaphor interpretation scores. When the five top scorers on vocabulary from the older group were compared to the five top scorers from the younger group, no age differences were found in recall of the fables, but age differences in favor of the young were found for the metaphoric stories and the control story. Similarly, when the fifteen best scorers on vocabulary from the older group were compared to a random sample of fifteen young women, the age effect was found to be non-significant, and the smallest age differences were found on the two fables. Contrary to the pattern obtained with the subsamples chosen according to figurative interpretation scores, the stories on which the largest age differences are found with the vocabulary subsamples are not simply the least remembered stories across the subsamples. This suggests that at least some older adults in this study were performing better on the fables than on the other materials. Therefore, these findings seem to offer at least partial support for the findings of Adams et al. (1987) that older adults find fables easier to remember than other stories, and that even on text based recall variables, their performance can be as good as that of younger adults.

It is difficult, however, to determine the basis of these findings with cross-sectional data. Cohort differences such as schooling could also be a key factor in

understanding older adults facility at comprehending and remembering fables if the schooling received by the older generation focused more on the moralistic aspects of stories than did that of the young. Furthermore, the universality of an age-related shift in processing style would need to be supported in cross-cultural research. Likewise, it is necessary to better understand the effects of such variables as text structure and scoring methods through experimental manipulation before we conclude that the text effects are due to qualitative age differences such as more metaphorical processing styles. It may be that older adults find fables easier to remember because of specific organizational and coherence patterns rather than their moralistic basis.

The impact of scoring schemes is also a very important factor in understanding contradictions between studies on aging and text recall. As proposed by Labouvie-Vief and her colleagues (e.g., Adams et al., 1987) it is possible that qualitative differences are not captured by scoring schemes such as the one used in the present study. However, modifications to this scoring technique are possible that would result in scoring that is more sensitive to qualitative differences in recall styles, and yet is usable with both figurative and literal narratives as well as expository types of texts. In the Kintsch (1974) technique, the number of macrostatements and elaborations are simply

counted and compared between the age groups, but could be analyzed in more detail. The macrostatements could be analyzed into the text-based information it contains, which would give a better indication of the amount of information recalled from the story, rather than simply the number of propositions recalled as is done presently. Furthermore, statements other than text-based propositions or macrostatements could be presented as a proportion of total length of recall protocols, which would give a fairer estimate of qualitative differences in recall styles. These modifications to the text based scoring would not exclude, of course, the potential usefulness of such qualitative analyses as ratings of writing styles, or clustering techniques such as that utilized by Adams et al. (1987) to identify patterns of recall style.

Some of the subsample analyses done in the present study suggest that with at least certain groups of high verbal older adults, even recall performance might be maintained for certain materials. Although these findings are somewhat suggestive of a shift toward greater facility in processing figurative materials in older adults, these written recall data do not offer very sensitive measures of qualitative differences in processing styles. Possibly, more sensitive measures of hypothesized qualitative age differences would be available in the analyses of oral protocols. In such settings as oral story telling, the

hypothesized goals of inter-generational socialization would be optimized, and metaphorical and emotionally laden verbal productions would be more likely to appear, thus increasing the probability of readily observable qualitative age differences.

In conclusion, the results of this study do not support the notion of a universal, qualitative shift in processing style that results in equal recall performance between young and old women on figurative texts. However, these results have replicated the finding that older women show no age related losses when they are asked to interpret complex, figurative materials.

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Appendix A

Stories Used in Text Recall Tasks.

1. The Call. The call was a winged car. Coming from a friend who is far away and from whom he had not heard for a very long time, the call brought him a joyous feeling. The distance between them no longer mattered. They quickly caught up on what had happened in their lives since their last conversation. They could be instantly intimate, sharing recent stories and secrets as only good friends can. In additiion, the call carried them both back to happy times spent together in their long friendship. The conversation lasted for almost one hour, but it seemed like only a moment. It made him eager to see his dear friend again.

2. The Teacher. The old teacher is an encyclopedia. She has been teaching for many, many years. After all these years of teaching, she has read hundreds of books. Through her reading, she has acquired knowledge about many different topics. When her students ask her questions, she is often able to answer them correctly, and they greatly admire her for this. Sometimes, she does not know the answer to her student's question. Then she and her student search for the information together. They go look for books at the library, and the teacher helps the child choose the appropriate book. Then they read the book together and both the old teacher and the young student learn something new.

Every day, the teacher gains more knowledge.

3. The Stream and the Desert. Once there was a stream on a journey. It reached the desert, and tried to cross this barrier. But as it ran into the sands, its waters disappeared. The stream was convinced, however, that its destiny was to cross the desert. A hidden voice from the desert whispered: "You must allow the wind to absorb you and to carry you over to your destination." The stream, however, did not want to lose its individuality by being absorbed. "Can I not remain the same as I am today?", inquired the stream. "You cannot in either case remain so", the voice said, "your essence is carried away and forms a stream again." So the stream raised its vapour into the wind. The wind gently took it along, letting it fall many miles away. The stream reflected, "Now I have learned my true identity."

4. The Wolf and the Crane. A wolf was gorging on an animal he had killed when, suddenly, a bone in the meat stuck in his throat. He soon felt terrible pain and attempted to induce everyone he encountered to remove the bone. "I would give anything" he said, "if you would take it out." Finally, the crane agreed and told the wolf to open his jaws as wide as possible. Then the crane put its long neck down the wolf's throat and with its beak loosened

the bone till at last it got it out. "Will you kindly give me the reward you promised?" asked the crane. The wolf grinned and said: "You have put your head inside a wolf's mouth and taken it out again in safety: that ought to be reward enough."

5. Camping. Bill and Jane are camping in Northern Ontario again this summer. They like camping because it gives them a chance to enjoy the clean fresh air and a more relaxed life. They have been spending their summers here for twenty-three years. They always rent the same cabin because of its location. It is sunny in the morning and shady after noon. Bill and Jane enjoy seeing the families that come back to the area every year, but they also enjoy meeting the families that are visiting for the first time. They especially like sharing outdoor meals with these old and new friends. Bill and Jane dearly love their home near Toronto, but every year they look forward to their camping vacation.

Appendix B

Instructiond for Participants: Interpreting Metaphors

This is a study of how people use metaphors in ordinary speech. We all use metaphors in speaking, although we may not be aware that we are doing so. For example, "John is blue"; "Sue is sweet"; etc.

In a typical metaphor, two separate lines are presented together so that the reader gains a new perspective on a subject. For example, in the metaphor, "Snowflakes are lace on the window," the reader is given a new perspective from which to view snowflakes, i.e., as resembling lace.

Sometimes metaphors require more explanation in order to be fully understood. That is, metaphors may at first appear to be nonsensical, until the reader can imagine a context or situation in which the metaphor becomes a meaningful observation. For example, the metaphor, "The cow is a dog," is a nonsensical statement. However, if you were told that this particular cow was raised by a little future farmer as his personal pet, then the metaphor "The cow is a dog" becomes meaningful. Furthermore, this metaphor now tells you a great deal about the child's behavior toward the cow, and vice versa.

Your task in this experiment is to make up a story or situation which will make the following metaphors meaningful sentences. Your explanantion of the situation may be an ordinary, everyday event, or it may be rather unusual.

There is no "correct" story or explanantion. Anything you can imagine to make the sentence meaningful is "correct". Please write your explanation for the sentence as it is given; do not change the order of the words. Please take your time and be sure to write something for each of the four metaphors.

Appendix C

Instructions for Raters: Metaphor Interpretation

In this part of the study, I am investigating the manner in which people comprehend or infer meaning for metaphors and I have asked them to create contexts or situations which will make these metaphors meaningful.

What I would like you to do is to judge these contexts on how relatively poetic vs. literal they are. I would like for you, in your evaluations of these productions, to ignore the person's style, clarity, length, and grammaticalness of expression. Your judgments should be made only on the basis of the type of interpretation, i.e. poetic vs. literal, that the context gives to the original metaphor.

Let me explain as precisely as possible what I mean by poetic and literal interpretations. The following examples may be most illustrative. Given the metaphor "A village is a train", the following productions are obtained:

1. "A train is a means of transportation which takes people from one city to another. A village is in between these two cities, also taking people from one city to another."

2. "A village was made in the shape of a train, so a village is a train."

3. "A village is a train in that it is always moving in some direction (to become prosperous). A train goes from the village to the cities, and villages want to prosper and

become big like the cities."

4. "A village is a train, carrying those that dwell inside through the course of their lives."

5. "Each day the people of the little mining village followed the same regimented pattern. Always on the same track -- always in the same direction, each person so dependent on the next, coupled together for life."

These five individuals' productions represent a range of interpretations, from the literal to the poetic. Although each of the interpretations is metaphorical, in the strictest sense, numbers 1 and 2, for example, seem to give the metaphor a more "literal" meaning. Similarly, numbers 4 and 5 seem to be more "poetic". Frequently, a person may have given a literal definition or explanation for one or both of the nouns in the sentence, rather than using them metaphorically. This would also constitute a "literal" interpretation as I am using the term. There are no simple criteria for making these judgments: I would like us to work together on some examples that I will provide to try to find some criteria that we agree on to make these judgments.

For each of the four metaphors, I will be asking you to sort the participants' stories into five categories ranging from poetic to literal, with varying degrees between. You may go back and change your mind on any category if you so wish.

We will begin with some examples.

Slavery is the world's frost

level 1. Frost is a natural event that harms gardens and kills plants of all kinds. Slaves live in these gardens and suffer from the frost.

level 2. Frost happens only in some places and at some periods of the year, and slavery happens only in some countries, and at some periods of history.

level 3. Frost is harmful to living things, and so is slavery. They are both blights upon the world. They are cold, and horrible.

level 4. Frost is destructive, harmful event that covers our planet in cycles, that comes and goes, and will never disappear completely. Slavery is part of man's nature, and appears in different forms at different times, but is never quite absent from our existence.

level 5. Frost creates pretty patterns on the surface, but underneath, it is killing that which it covers. Slavery, likewise, results in societies where on the surface material goods are abundant, and for some conditions are good, but the people who are the victims of slavery are being viciously exploited and destroyed.

N.B. These examples were presented to the raters disordered and uncategoriezed to encourage discussion. Similar examples were presented for the three other metaphors used in the study.

Appendix D

Instructions for Raters: Fable Interpretation

In this part of the study, I am interested in the manner in which people comprehend fables and infer the moral of the fables. A fable is a narration, especially one in which animals speak and act like human beings, and this narration is intended to enforce a useful truth. I have presented individuals with four fables and I have asked them to write down what they believe is the moral of the fable. They were simply told that a moral is a practical lesson implied by the story.

Fables can be understood on many levels. One way is when the lesson implied by the stort is understood within the context of the story itself and its characters. Another way is to see the characters in the story as being symbols of people and of how they feel and act. This leads to a more generalized understanding of the moral of the fable, and of how the lesson in the story applies to all of us.

What I would like you to do is to judge the participants' productions on a five-point scale ranging from a literal understanding of the story to a complete understanding of the metaphoric value of the fable.

I would like for you, in your evaluations of the answers, to ignore the individuals' style, clarity, length, and grammaticalness of expression. On the next page you will find a copy of the first fable given to the

participants: The Crow and the Pitcher. It is followed by some definitions and exemplars that should clarify your instructions, and be most helpful in making your judgments.

The Crow and the Pitcher

A crow, ready to die with thirst, flew with joy to a pitcher. He found water in it, but so near the bottom, that with all his straining, he was not able to reach it. Then he tried to overturn the pitcher, that so at least he might be able to get a little of it; but his strength was not sufficient for this. At last, seeing some pebbles, he cast them one by one into the pitcher; and thus raised the water up to the brim, and satisfied his thirst.

Lessons:

-think before you act

-be perseverant, don't give up

-use intelligence rather than strength

-etc.

Definitions of levels and exemplars

level 1: This is a very literal understanding of the story where the moral pertains only to the characters and the settings of the fable.

e.g. The crow should have thought about his situation before wasting his energy on trying to overturn the pitcher.

level 2: This is a somewhat literal interpretation of the

story. The moral is seen as applying only for either the fable character or the fable situation, but an attempt is made to generalize the lesson.

e.g. It was only when faced with failure at accomplishing a task that the crow started being clever, he should have started earlier.

e.g. When a person wants a drink, they should drink from the brim of the pitcher rather than overturn it.

level 3: Only one part of the complex lesson implied by the story is given.

e.g. When faced by a problem, don't give up.

level 4: This is a somewhat complete understanding of the story. A relatively incomplete summary of the moral of the story is given.

e.g. When faced with a problem, people should sit down and think, that is to say they should consider all the options available to them, and use brain rather than brawn to solve the problem they are faced with.

level 5: This is a very complete understanding of the moral of the story. All (or most) of the aspects of the moral are given, and the lesson is understood to be applicable to all of us, and to everyday life.

e.g. When faced with a problem, we should think

through the situations, and be perseverant and use cleverness rather than muscles to find a solution.

The following are the three additional fables given to the participants.

The Man and the Monkey

A monkey once said to a man: "Do you not realize how destitute I am? I have no house, no clothes, no fine food like you, no savings, furniture, lands, articles of adornment - nothing at all. You, in contrast, have all these things and more. Besides, you are a rich man."

The man felt ashamed. He made over everything he had to the monkey, beggaring himself. When the monkey had taken legal charge of his entire possessions, the man said to him: "Now what are you going to do with all this?"

The monkey said: "Why should I talk to a penniless fool like you?"

Lessons:

-one should be generous

-one should have common sense

-money corrupts

-it is not material possessions that determine one's worth

-etc.

The Mouse and the Ocean

A mouse decided to go on a trip to the seashore. "The world is full of terrors", his parents cried. "You must not go". "It is high time that I see the ocean, said the mouse. Nothing can make me change my mind."

The next day, the mouse began his journey. Very soon, he came to know trouble when a cat jumped out from behind a

tree. The mouse ran for his life, but he left a part of his tail in the mouth of the cat.

By afternoon, the mouse had been attacked by birds and dogs. He had lost his way several times. He was tired and frightened. At evening, the mouse saw the seashore. He watched the waves rolling onto the beach. "How beautiful!" cried the mouse. I wish the Mother and Father were here to see this with me.

Lessons:

-parents should let go of their children

-we should listen to those who speak from experience

-we should persevere despite obstacles

-a goal attained despite obstacles is all the more satisfying

-etc.

The Two Pots

An earthen pot and one of brass, standing together upon the river's brink, were both carried away by the flowing in of the tide. The earthen pot showed some uneasiness, as fearing he should be broken; but his companion of brass bid him be under no apprehensions, for he would take care of him. "Oh!" replies the earthen pot, "I entreat you; it is you I am most afraid of: For, whether the stream dashes you against me, or me against you, I am sure to be the sufferer; and therefore, I beg of you, do not let us come near one

another."

Lessons:

-the strong are sometimes a threat to the weak

-one cannot always help one's friends

-one should trust one's friends in time of need

-etc.

Appendix E

Instructions for Raters: Feature Listing Task

In this part of the study, I am interested in what people think of when they are asked to list ways that two things (concepts) are similar od different.

I would like you to read each item produced by the participants and to categorize them as referring to the descriptive/literal vs. the symbolic/interpretive meaning of the word pairs.

The following examples might be helpful: Given the word pair CAT and DOG,

1. cats have claws, dogs don't
2. both are pets and make a house a home

Number 1 is simply descriptive, it refers to a fact which is readily observable to everyone. Number 2, on the other hand, refers to pets as symbols of congenial and comfortable places of residence, and for that reason would be classified into the symbolic/interpretive category.

The word pairs that the participants were shown were the following:

1. RIVERS and RIBBONS
2. KINGS and LIONS
3. BUTTERFLIES and RAINBOWS

Here are some examples of possible answers that you would have to categorize.

1. (a) both rivers and ribbons can be wide or narrow

   (b) rivers are the earth's adornment

In this example, (a) is descriptive, and (b) is symbolic, since it identifies rivers as being something they literally aren't, that is, an adornment.

2. (a) both lions and kings must eat to stay alive

   (b) the jungle is the lion's kingdom

Again, (a) is descriptive, and (b) is symbolic, since lions are not rulers in a literal sense, but described as such only in fables and other well-known stories.

3. (a) butterflies have bodies and wings, and rainbows do not

   (b) I think both are very pretty

(a) is simply descriptive, but (b) is symbolic/interpretive since the participant is given a subjective, or personal, opinion of his/her reaction to the objects.

In summary, for each item produced by the participants, I would like you to identify them as being either descriptive/ literal or symbolic/interpretive. You may have as many items as you like in each category. You may go back and change your mind on any category assignment if you so wish. Please do not base your judgments on length, clarity or grammaticalness of expression.

Appendix F

Instructions for Raters: Word Meanings Task

In this part of the study, I am interested in the way that people give the meaning of abstract words. I have presented individuals with the words COURAGE, INGRATITUDE, and WISDOM and asked them to write down what they think these words mean.

There are many different ways to give the meanings of a word. One way is to give a literal description such as that given in dictionaries. Another way is to use images, or symbols that provide a more interpretive explanantion of a concept.

I would like you to read the answers given by the participants, and to categorize these answers as being either a descriptive/literal response or a symbolic/interpretive response.

The following criteria should be used in making your decisions:

COURAGE definitions should be categorized as descriptive/literal when they deal with the accomplishment of actions in physically dangerous situations.

e.g. COURAGE IS: the ability to persevere under danger

COURAGE definitions should be categorized as symbolic/interpretive when they deal with situations that are not physically threatening or dangerous.

e.g. COURAGE IS: keeping your moral values against social

pressure.

INGRATITUDE definitions should be categorized as descriptive/ literal when they deal only with ingratitude for gifts or services.

e.g. INGRATITUDE IS: not thanking someone when they give you something.

INGRATITUDE definitions should be categorized as symbolic/ interpretive when they deal with the feelings of the giver or the recipient, and when the ingratitude is perceived as a moral or attitude characteristic of the person.

e.g. INGRATITUDE IS: a cruel disregard for other people's feelings.

WISDOM definitions should be categorized as descriptive/literal when they deal with moral issues and with the notion of advice-giving.

e.g. WISDOM IS: knowing how and especially when to give advice to others.

Table 1

Descriptive Data

Variables		Age Groups		
		All	Young	Old
Age	(M)	46.04	26.47	65.63
	(SD)	(20.29)	(4.24)	(5.11)
Years of Education	(M)	13.95	15.17	12.73
	(SD)	(20.29)	(2.04)	(2.57)
Vocabulary	(M)	74.68	69.10	80.26
	(SD)	(12.77)	(11.22)	(11.87)
Hours of Reading per Week	(M)	20.67	19.70	21.63
	(SD)	(11.21)	(13.18)	(8.93)
Health				
	Very Good	29	14	15
	Good	22	11	11
	Fair	5	3	2
	Poor	1	1	0
	Very Poor	0	0	0

Table 2

Inter-rater Reliabilities: Metaphor Interpretation

Metaphors	Groups	n	r
(a) Slavery is the world's frost	Young	30	.75
	Old	30	.55
		60	.68
(b) My soul is an enchanted boat	Young	30	.73
	Old	30	.64
		60	.71
(c) Nature is a strong wave	Young	30	.83
	Old	29	.58
		59	.73
(d) A nation is a warm ocean	Young	30	.83
	Old	30	.50
		60	.68

Table 2 (cont.)

Inter-rater Reliabilities: Fable Interpretation

Fables	Groups	n	r
(a) The Crow and the Pitcher	Young	30	.81
	Old	30	.63
		60	.70
(b) The Man and the Monkey	Young	30	.84
	Old	30	.66
		60	.77
(c) The Mouse and the Ocean	Young	30	.87
	Old	30	.53
		60	.64
(d) The Two Pots	Young	29	.59
	Old	28	.74
		57	.67

Table 2 (cont.)

Inter-rater Reliabilities: Word Meanings

Words	Groups	n	r
(a) Courage	Young	30	.67
	Old	30	.67
		60	.67
(b) Ingratitude	Young	30	.73
	Old	30	.63
		60	.68
(c) Wisdom	Young	30	.93
	Old	30	.60
		60	.77

Note. These are binary ratings.

Table 3

Summary of Results for Recall of Five Stories

Story Type:	Story Title	Measures	Groups: Young	Groups: Old
Metaphoric:	The Call	% of props	48.7	32.6**
		macrostatements	.5	.9*
		elaborations	3.1	4.7*
Metaphoric:	The Teacher	% of props	54.4	41.1**
		macrostatements	.6	.8
		elaborations	2.8	4.5**
Fable:	The Stream	% of props	52.3	37.8**
		macrostatments	1.0	1.0
		elaborations	5.9	7.0
Fable:	The Wolf	% of props	69.9	59.1*
		macrostatements	5.5	7.0*
		elaborations	.5	1.0*

Table 3 (cont.)

			Groups	
Story Type:	Story Title	Measures	Young	Old
Control:	Camping	% of props	69.0	56.8*
		macrostatements	4.1	5.0*
		elaborations	1.1	1.7

* p<.05. ** p<.001

Table 4

Correlations Between Recall Performance and Hypothesized Related Task Scores

Variables	Groups		
	All	Young	Old
1. The Call with:			
metaphor interpretation	.35**	.51**	-.06[a]
vocabulary	-.00	.29	.25
2. The Teacher with:			
metaphor interpretation	.20	.08	.16
vocabulary	-.12	.08	.25
3. The Stream with:			
fable interpretation	-.14	-.11	-.25
vocabulary	.17	.42**	.42**
4. The Wolf with:			
fable interpretation	-.05	-.21	.01
vocabulary	.16	.19	.49**
5. Camping with:			
vocabulary	.11	.37*	.28

[a]: $(r_{young}-r_{old})>.306$, p=.05

* p<.05, one-tailed. ** p<.01, one-tailed.

Table 5

Correlations Between Hypothesized Component Task Scores of Figurative Interpretation

Variables	Groups		
	All	Young	Old
1. Metaphor interpretatin with			
feature listing: total	.53**	.52**	.47**
feature listing: % symbolic	.18	.01	.32*[a]
vocabulary	.22*	.53**	.19[a]
2. Fable interpretation with			
word meanings	.48**	.41*	.53**
vocabulary	-.09	-.06	-.06
3. Feature listing with			
vocabulary: total	.14	.41*	-.38*[a]
vocabulary: % symbolic	-.13	.05	-.21
4. Word meanings with			
vocabulary	.08	.13	.16

[a]: $(r_{young}-r_{old})>.306$, p=.05

* p<.05, one-tailed. ** p<.01, one-tailed.

Table 6

Correlations Between Recall Performance and Hypothesized Related Task Scores for the 15 Highest Scorers on Vocabulary from the Older Group and a Random Sample of 15 Younger Women

Variables	Groups		
	All	Young	Old
1. The Call with:			
metaphor interpretation	·02	.12	-.26[a]
vocabulary	-.49**	-.14	.07
2. The Teacher with:			
metaphor interpretation	.10	.12	-.03
vocabulary	-.39*	.03	-.42[a]
3. The Stream with:			
fable interpretation	-.14	-.07	-.22
vocabulary	-.06	.15	.05
4. The Wolf with:			
fable interpretation	.06	-.08	.18
vocabulary	-.14	-.01	.05
5. Camping with:			
vocabulary	-.03	.42	-.09[a]

[a]: $(r_{young}-r_{old})>.441$, p=.05

* p<.05, one-tailed. ** p<.01, one-tailed.

Table 7

Correlations Between Hypothesized Component Task Scores for the 15 Highest Scorers on Vocabulary from the Older Group and a Random Sample of 15 Younger Women

Variables	Groups		
	All	Young	Old
1. Metaphor interpretatin with			
feature listing: total	.54**	.65**	.44*
feature listing: % symbolic	.13	.10	.16
vocabulary	.09	.32	.20
2. Fable interpretation with			
word meanings	.52**	.48*	.55*
vocabulary	-.08	-.14	-.17
3. Feature listing with			
vocabulary: total	-.13	-.04	.19
vocabulary: % symbolic	-.08	.07	.13
4. Word meanings with			
vocabulary	-.02	-.18	.56*[a]

[a]: $(r_{young}-r_{old})>.441$, p=.05

* p<.05, one-tailed. ** p<.01, one-tailed.

Figure Caption

Figure 1. Mean proportion of propositions recalled as a function of story and age.

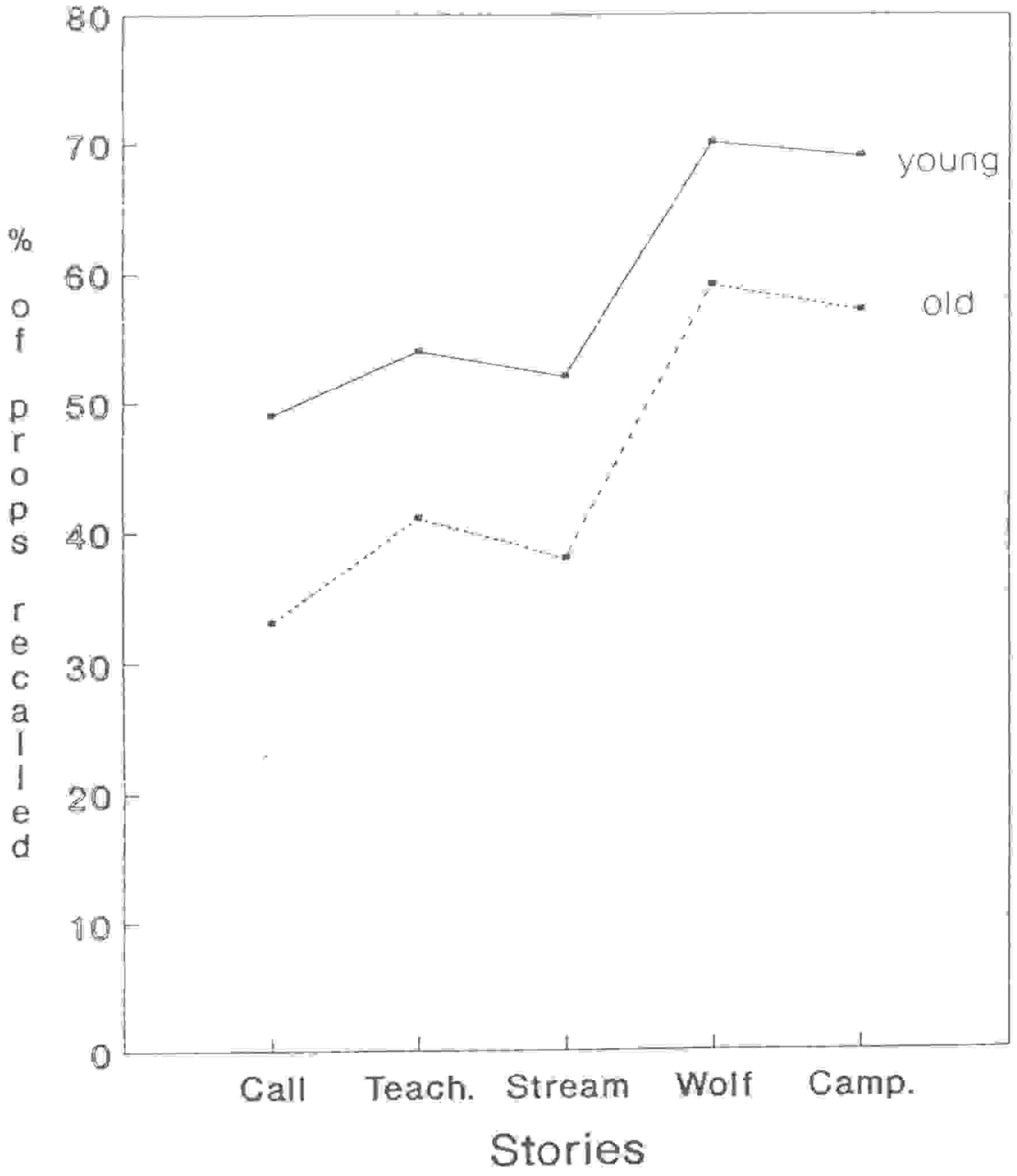


Figure Caption

Figure 2. Mean proportion of propositions recalled as a function of story and age for five top scorers on vocabulary from the two age groups.

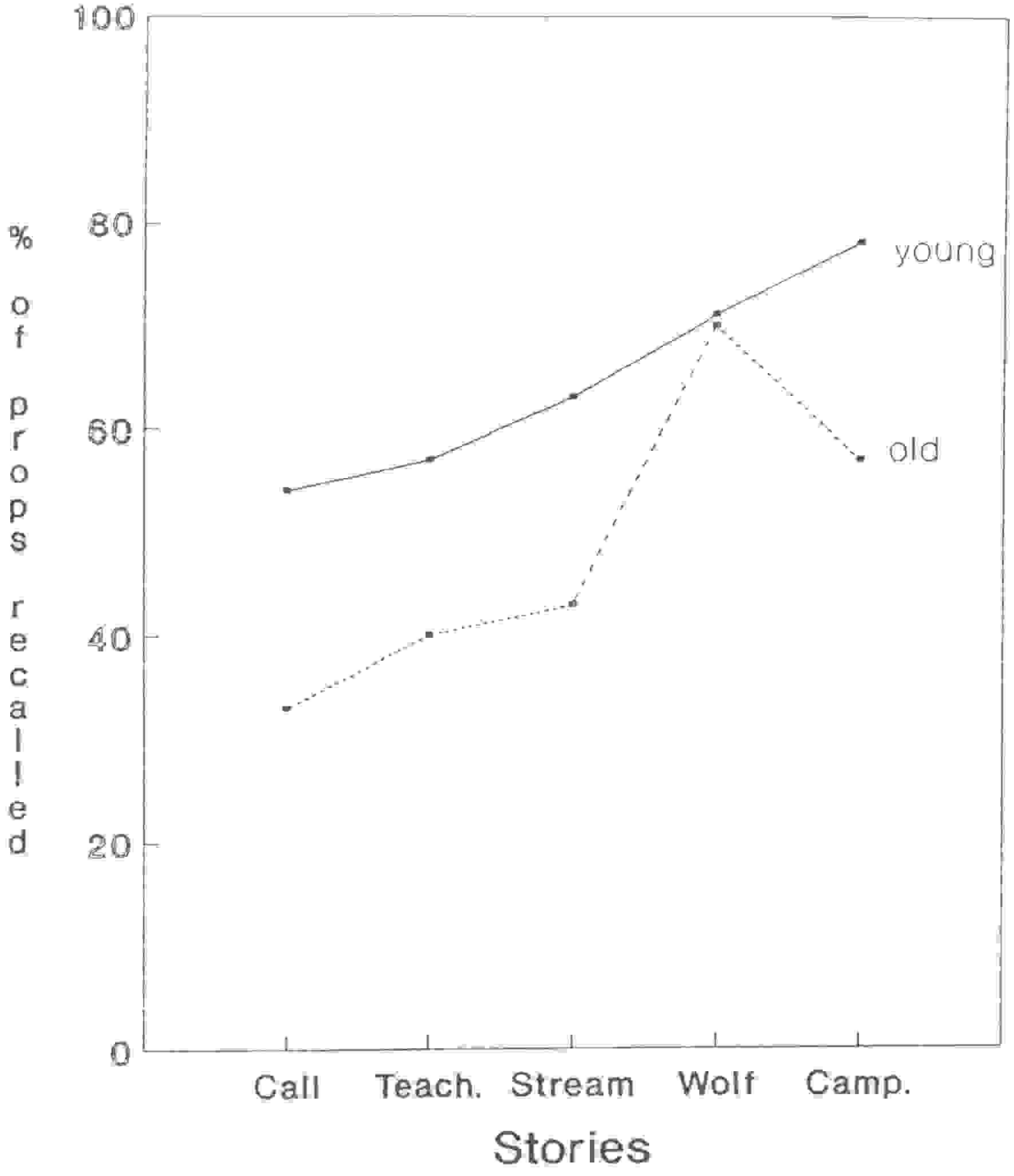


Figure Caption

Figure 3. Mean proportion of propositions recalled as a function of story and age for five top scorers on metaphor interpretation from the two age groups.

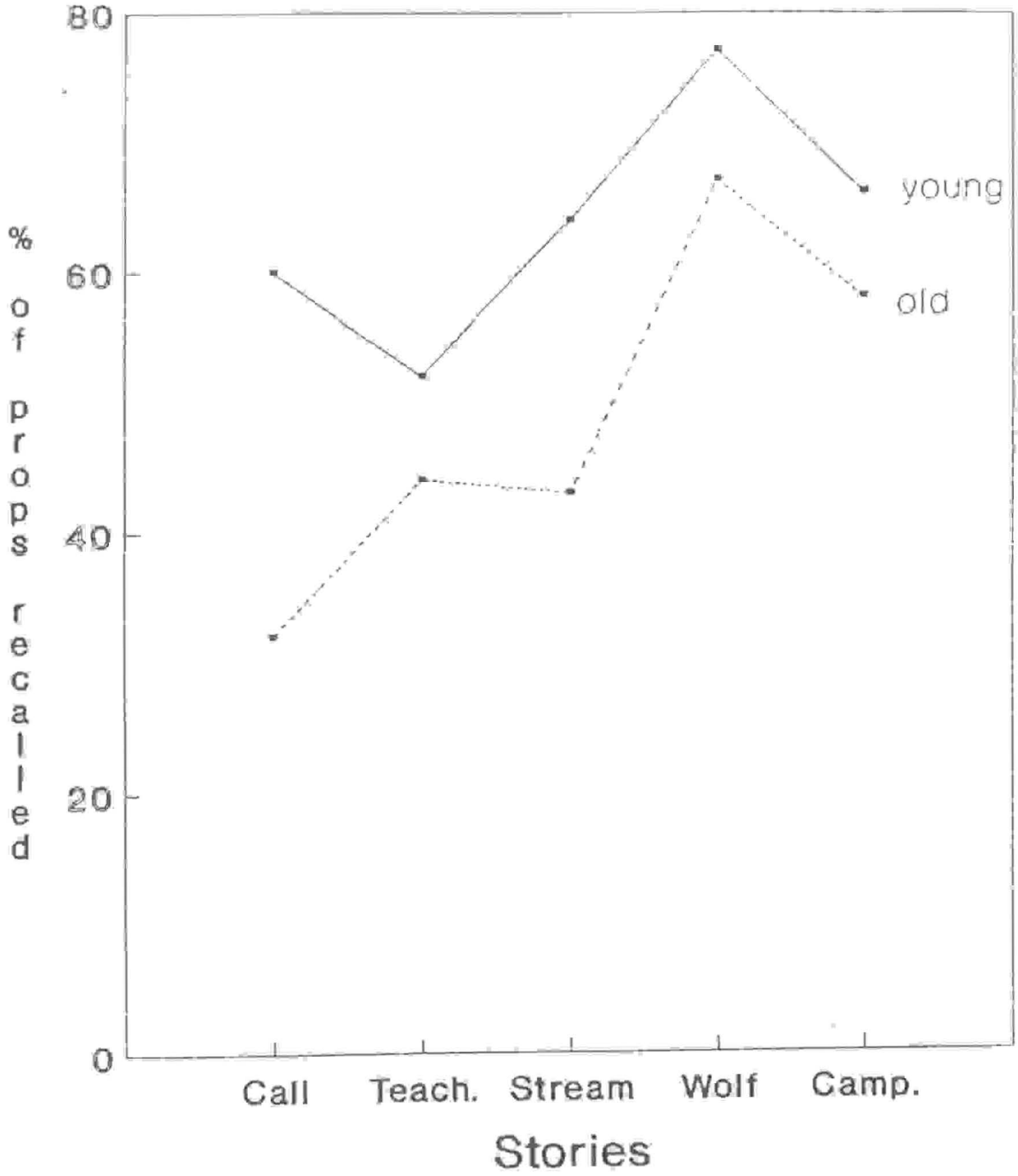


Figure Caption

Figure 4. Mean proportion of propositions recalled as a function of story and age for five top scorers on fable interpretation from the two age groups.

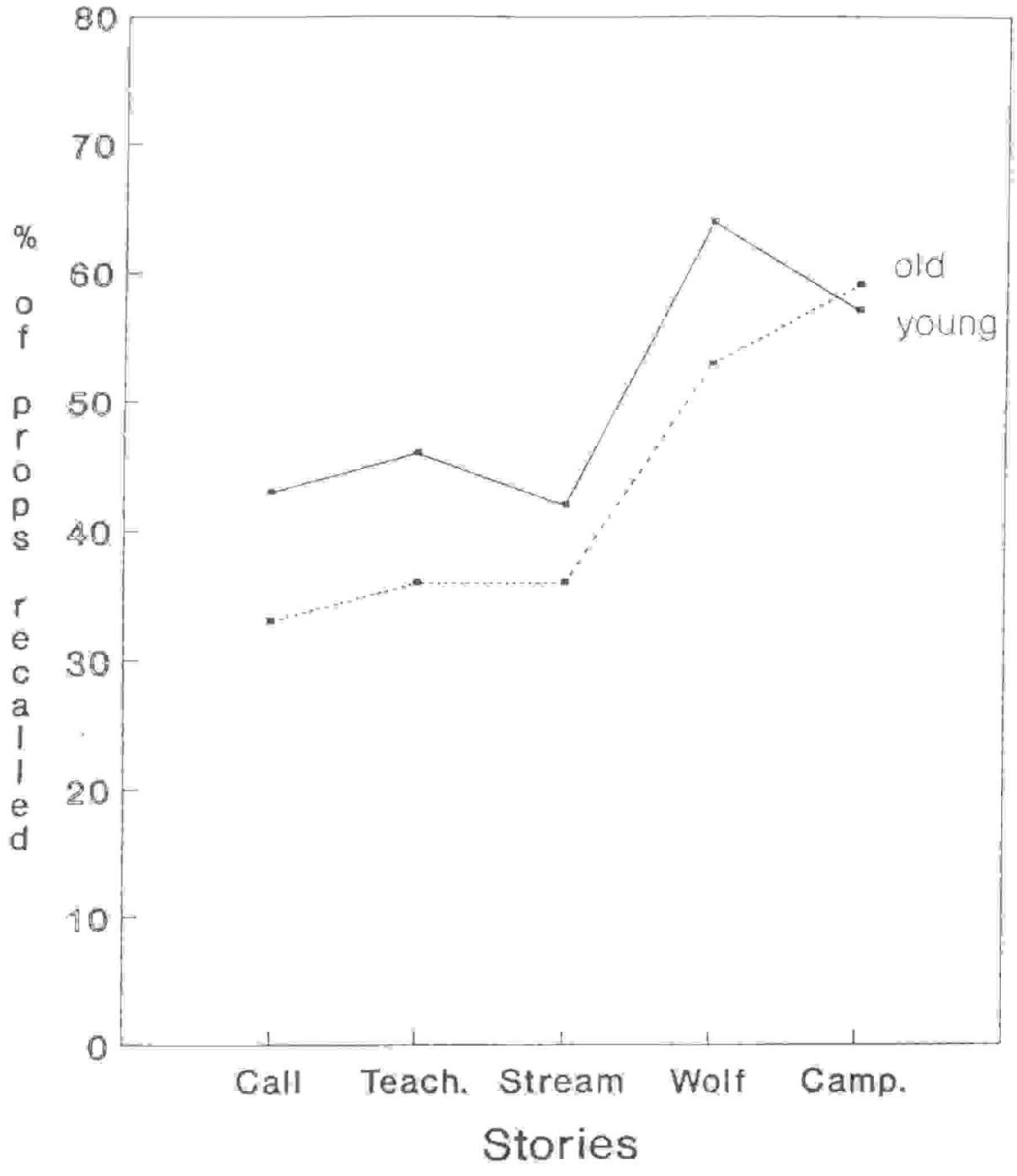
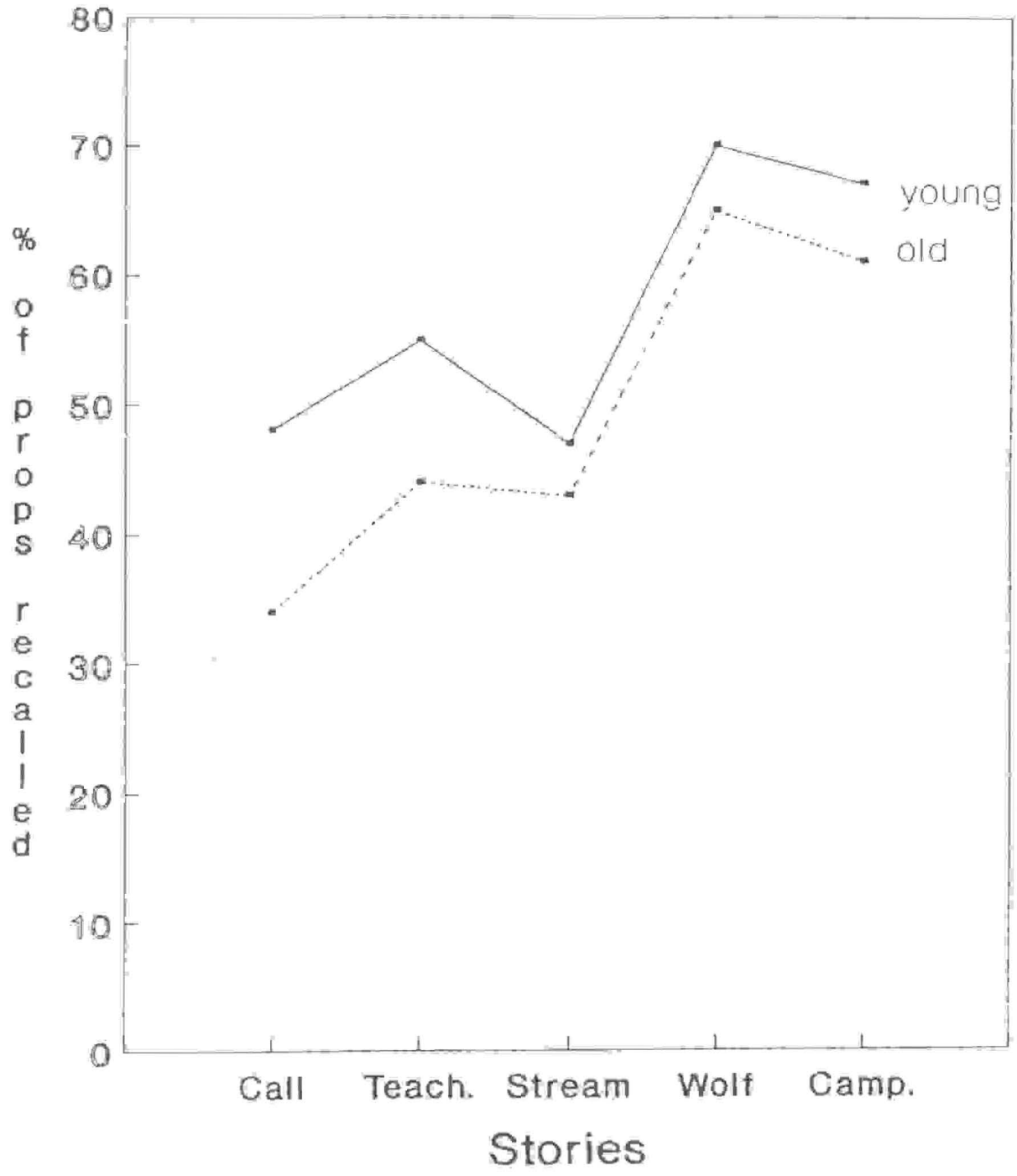


Figure Caption

Figure 5. Mean proportion of propositions recalled as a function of story and age for the top 15 scorers on vocabulary from the older group and a random sample of 15 young subjects.



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Title of Thesis

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Author [redacted]

Odette N. Gould

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