Discourse in healthy old-elderly adults: a longitudinal study

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Abstract

This longitudinal study investigated discourse abilities in 16 normal adults in their 80s and 90s at two separate testing times. The discourse tasks evaluated macro-level processing of narratives as manifested on retells, summaries, gists, and morals, and in explanations of proverbs. The group results showed preservation with increased age on those discourse tasks that required global levels of processing. No significant decreases in performance were found in applying strategies of reduction, generalization, and interpretation, factors associated with preserved discourse function in normal advanced ageing are discussed. The findings have implications for differential diagnosis of dementia and aphasia.

Introduction

Limited normative data exists regarding which aspects of discourse processing are preserved beyond the 70s and which aspects are impaired. That is, little is known about what declines can be expected to occur in normal elderly who live into their 80s or 90s. Even less is understood about what abilities are likely to be maintained or show continued development with advancing age. Consequently, some decline in discourse function may be inappropriately attributed to normal ageing when in fact the change is due to the onset of a dementing process (Snowdon *et al.* 1997). Alternatively, losses that reflect normal age-related changes may be diagnosed as dementia (O'Connor 1994). As a result, speech–language pathologists and neuropsychologists are hampered in ascertaining age-related declines from early changes indicative of pathology, such as dementia, in adults 80 years and older.

In addition to the paucity of normative data in seemingly healthy elderly individuals, heterogeneity complicates early identification of dementia in this group even further. For example, some individuals mask early signs of dementia through pre-morbid intelligence and highly preserved social skills, allowing them to master a repertoire of communicative behaviours to camouflage an underlying dementia. Clearly, not all old people who manifest discourse decline develop a frank dementia. Documentation of aspects of discourse processing that are

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maintained in normal advanced ageing may be more informative diagnostically than even a realization of losses associated with normal ageing as a key to early detection of dementia.

The question of language change with age has been debated in the literature over the past two decades. Research addressing the age-effects on discourse has yielded inconclusive results. On the one hand, considerable evidence has documented age-related deficits in discourse performance for the narrative genre (Cohen 1981, Hultsch and Dixon 1984, Light 1988, Meyer 1987, Ulatowska and Chapman 1991, Zacks and Hasher 1988). The age-related decline is particularly apparent on discourse tasks that (i) measure recall of the story's explicit content, (ii) place heavy demands on working memory capacity, and (iii) assess processing of information that is not recoverable from real world knowledge (Hultsch and Dixon 1984, Olson 1977, Zelinski and Hyde 1996).

On the other hand, some researchers have modified the conclusion of pervasive decline in discourse function with increasing age through qualitative analysis of the nature of the information recalled (Adams 1991, Baltes 1993, Labouvie-Vief 1985, McGuire 1996, Meyer *et al.* 1995). These researchers argue that older adults develop strategies that promote successful encoding of discourse information. In particular, preserved discourse function has been illuminated on tasks in which macro-level or higher level integrative processes are examined. At a general level, macro-level processing refers to the ability to attend to the most important information and to ignore less important details (Adams 1991, Ulatowska and Chapman 1994). This evidence of preserved discourse function has led to the emergence of a new theoretical framework of language change with advancing age as opposed to the previous defect model of language decline with age (Adams 1991, Baltes 1993). It is unclear whether this macro-level processing style develops as a compensatory strategy to overcome memory problems or as a stylistic preference that unfolds with age (Adams *et al.* 1990).

To date, the bulk of the empirical evidence for discourse change with advancing age has been documented on cross-sectional studies with a scarcity of evidence derived from longitudinal studies. A cross-sectional design fails to distinguish between cohort effects and 'real' age effects. The most informative approach for unravelling the complex profile of normal advanced ageing is through a longitudinal evaluation for rate of change (McCleary *et al.* 1996, Snowdon *et al.* 1997).

Based on the current research, a controversy remains as to which aspects of discourse are likely to be preserved with normal advanced ageing and which are likely to be impaired. As implied above, a paradigm which taps macro-level processing in a longitudinal design could be optimal for identifying discourse functions which are likely to be relatively preserved into old age. This present study investigated the ability to construct macro-level representations of discourse texts over time for healthy adults in their 80s and 90s. In particular, we examined their strategies of information reduction, generalization, and interpretation. We hypothesized that as long as the individuals remained non-demented, they would exhibit preserved macro-level discourse processing with advancing age. A secondary objective was to evaluate changes in performance on standardized measures of cognition and language with increasing age. This was done in order to elucidate whether relationships exist between these measures and discourse abilities.

Methods

Subjects

The subjects who participated in this study were enrolled in a contrastive investigation of discourse processing in various elderly adults, 10 females and six males, between the ages of 80 and 95 years at first time of assessment. All subjects were re-tested approximately 3 years after the initial assessment with a mean test interval of 3·2 years and range of 1·5–5 years. Confirmation of no dementia at initial testing was based on lack of case history information indicating cognitive decline or brain damage, a preserved ability to perform activities of daily living, [receiving a score of 0 on the Blessed Dementia Rating Scale (Blessed *et al.* 1968)], and by a cut-off score of 24 or higher on the Mini-Mental State Examination (MMSE) (Folstein *et al.* 1975). All subjects enrolled in the study were right-handed, monolingual, native American English speakers. They represented a relatively well-educated cohort with a mean of 14 years of education. Seven of the individuals held college degrees. All were retired from the work force or were full-time homemakers at the time of assessment. Examination of the occupational category for professional status prior to retirement showed that 14 of the 16 subjects held semiprofessional or professional positions. In the cases of the two homemakers, their spouses' professions were taken into consideration. All lived independently either with family ($n = 7$) or alone ($n = 9$). Self-reports of acute and/or chronic illnesses revealed a generally healthy group. As might be expected, the incidence of chronic illnesses increased with age. With regard to sensory impairments, four had significant visual problems other than acuity problems corrected with glasses and four had hearing losses with a pure-tone threshold average of 30 dB or higher for the frequencies 500, 1000, 2000, and 4000 Hz in their better ear. Two of these four wore hearing aids.

Standardized measures

In addition to a medical questionnaire and demographic profile, the battery consisted of standardized and experimental tests. The standardized tests included measures of language and cognition. These standardized tests were administered to evaluate stability of performance over time on more structured, traditional measures. The language assessment consisted of the *Boston Naming Test* (Kaplan *et al.* 1983) and comprehension subtests from the Boston Diagnostic Aphasia Examination (Goodglass and Kaplan 1983) including the complex ideational material and the reading sentences and paragraphs tests. The cognitive measures included the logical memory subtest from the *Wechsler Memory Scale—Revised* (Wechsler 1987), Raven's *Coloured Progressive Matrices—Revised* (Raven *et al.* 1978), and the block design, picture arrangement, and similarities subtests from the *Wechsler Adult Intelligence Scale—Revised* (WAIS-R) (Wechsler 1981).

Experimental tasks

The research paradigm consisted of tasks that have been shown to be particularly sensitive to macro-level processing (Adams *et al.* 1990, Chapman *et al.* 1994, Ulatowska and Chapman 1994, Ulatowska *et al.* 1995). The stimuli included three

Table 1. Characteristics of the fable and proverb texts

	Fables	Proverbs
Genre	Narrative texts	Mini-texts
Function	Didactic	Didactic
Type	Metaphoric	Metaphoric
Length	11–14 propositions	1 proposition
Form	Canonical	Canonical
Complexity	Relatively low	Varied
Familiarity	Unfamiliar	Familiar and unfamiliar

Table 2. Experimental tasks and type of processing

Fables	Proverbs	Type of processing
Retell	—	Recall
Summary	—	Reduction and generalization
Gist	—	Reduction and generalization
Moral	Explanation	Generalization and interpretation

narratives from the genre of fables and 10 proverbs. A sample fable (*Farmer and Sons*) appears in Appendix 1. In addition to fable retells, we asked the subjects to construct texts in the form of summaries, gists, and morals for the fables to tap macro-level processing. The proverb task was taken from the *California Proverb Test* (Delis *et al.* 1984) and consisted of five familiar and five unfamiliar proverbs (Appendix 1). Subjects were asked to explain the meaning of each proverb. Both the fables and proverbs were presented simultaneously in auditory and written form. Both modalities were utilized to provide the individual maximal support in case of visual or auditory difficulties. The transformed texts for the fables (i.e. retell, summary, gist, and moral) and the spontaneous explanations for the meanings of proverbs were audio-recorded and transcribed verbatim.

Rationale for use of fables and proverbs

Fables and proverbs have been identified as particularly well-suited stimuli for evaluating macro-level processing (Adams 1991, Labouvie-Vief 1985, Ulatowska and Chapman 1994, Ulatowska *et al.* 1998). The characteristics of the fable and proverb texts are outlined in table 1. Although both fables and proverbs represent a text, the two genres differ in that fables have an explicit context, whereas proverbs carry an implicit context. None the less, both text types provide unique measures of pragmatic knowledge since they convey general truths regarding sociocultural principles of appropriate behaviours, making them didactic in nature (Ulatowska *et al.* 1995). It is important to recognize that the didactic theme in fables must be inferred from the characters' actions and their consequences, whereas in proverbs the didactic theme is derived from both the text and its application to real life situations. The meaning that is central to the interpretation of fables and proverbs

is achieved through inferencing and macro-level processing which in turn is reflected in generalized responses. With respect to ageing research, evidence indicates that the pragmatically based knowledge conveyed by fables and proverbs could be preserved with normal advanced ageing (Chapman *et al.* 1994, Ulatowska *et al.* 1995).

Constructing macro-level texts: processes of reduction, generalization, and interpretation

For the fables, the tasks of summary, gist, and moral were utilized to evaluate macro-level processing of the discourse information with different requirements on reducing and making the necessary inferences to construct these various macro-level texts. Table 2 delineates the tasks and the type of processing involved in performing each task. The basic prerequisites for successful production of macro-level texts involve inferential strategies which guide reduction, generalization, and interpretation of information contained in fables. Constructing a macro-level text in the form of a summary is less demanding than a gist which in turn is less demanding than formulating a moral. To reduce fable information in summaries and gists, it is necessary to infer the 'trick' or plan of the main protagonist in a fable. It is then possible to differentiate between the information pertaining to the central events and those that are peripheral to the main goal of the protagonist. Making this inference leads to the appropriate deletion of certain information which guides reduction of information. Generalization is the prevalent process observed in producing a summary, gist, moral, and proverb explanation through inferencing between textual knowledge from the fable or proverb content and extratextual world knowledge. This process is reflected when the individual transforms the information at a higher level of generalization than represented in the original stimulus, but continues to refer to the explicit story content none the less. Sample summary and gist responses are given in Appendix 2. Interpretation, a higher level of generalization, is achieved through inferential processing in which the textual knowledge is integrated within the context of analogous situations from real life (Appendix 2). The ability to make highly integrated interpretations requires that the individual map the actions and goals for the protagonist on to his/her value system, derived from real life experiences within a given culture. It is important to recognize that both generalizations and interpretations reflect a generalized type of response. The primary difference between generalization and interpretation is that generalizations still refer to the explicit story content, whereas interpretations refer to life, in general, beyond the explicit story content.

Analysis

Response coding

The methods for analysing the fable and proverb responses are delineated in Appendix 2 with the categories, definitions, and example responses from the *Farmer and Sons* fable. To evaluate ability to recall information on the fable retell task, a set of *a priori* propositions (story templates) was derived from the original stories. The amount of story information recalled was determined by matching the

subject's retells against the story templates. For the summary and gist responses, our analyses addressed the success or failure of individual subjects over time in applying a strategy of reduction to construct shortened versions (macro-level texts) of the original text. The classification of success on reduction was given for (i) summary responses in which the information was reduced 20% or more and (ii) gist responses in which the information was reduced 50% or more as compared to the individual's own retell. The amount of information was calculated using the number of propositions produced for the summary and gist tasks and compared to the number of propositions given in the subject's retell. Additionally, the responses across all tasks were categorized according to whether a strategy of generalization was evidenced. Responses on summary and gist tasks were categorized as generalization when the responses reflected generalized statements of interpretations in the form of a life lesson (Appendix 2). The responses for the fable morals and proverbs were rated using a seven-point scale, also shown in Appendix 2. This scale represents a continuum from literal to generalized interpretations and includes components related to accuracy and completeness of response. Responses were coded as successful if the individual exhibited the appropriate type of processing as required for the specific task as shown in table 2 and Appendix 2.

The variety of tasks allowed examination of the quantitative and qualitative changes in the group performances as well as in individual profiles. The responses for the fable summaries, gists, and morals, and the spontaneous interpretations of proverbs were coded by two of the authors (A. H. and J. P.). The responses were randomized so that the raters did not have knowledge of which testing time was being scored.

Reliability of coding

Two independent codes analysed 25% of the discourse responses and inter-coder point-to-point reliability was calculated for each variable (i.e. retell, summary, gist, lesson, proverb explanation). Overall agreement ranged from 87–92% with an overall mean of 90·5%. A third coder reviewed response classifications for all responses resulting in discrepancies for less than 5% of the responses. These disparities were discussed to reach consensus.

Statistical analysis

The Wilcoxon signed-rank test was performed to assess whether changes occurred with increased age on the measures of macro-level processing for fables and proverbs and on the standardized measures of cognitive and linguistic function. Specifically, we examined whether there was a directional change in the responses' classification over time on:

(1) ability to reduce and generalize information on the fable tasks of summary and gist;
(2) ability to generalize and interpret the central meaning of the fable in the form of a moral and the meaning of the proverbs;
(3) ability to recall the information on the fable retell task; and
(4) performances on traditional clinical tests.

The non-parametric Wilcoxon signed-rank test was an appropriate test for the present data since the changes occurred over a small range including many 'no changes'. Since this is an exploratory study, the *a priori* α level was set at $p < 0.05$. Correlations were performed to examine the presence of relationships between age and test-interval on the change scores using the Spearman correlation test.

Results

The results are presented in table 3 and are summarized according to the research questions addressed. The primary issue investigated was whether normal adults in their eighties and nineties display changes in macro-level processing of discourse with increased age on measures of ability to (i) reduce information, (ii) generalize information, and (iii) interpret information through inferencing. The results of the Wilcoxon signed-rank test revealed no significant decrease in performance on any of the experimental discourse measures of macro-level processing.

Reduction

No significant changes were found in ability to reduce information on both the summary tasks and the gist tasks (table 3). With regard to individual performance, four subjects increased in performance on the summary tasks for reduction of information relative to retells from initial to second testing, 11 remained the same, and one decreased in performance. For the gist tasks, one improved, 13 remained the same, and two decreased on the measure of information reduction.

Generalization and interpretation

As shown in table 3, there were no significant changes with age in strategies to generalize information on the gist tasks with two increasing, eight remaining the same and six declining from initial to second testing. Some increase in performance was indicated on production of generalized responses on the summary tasks with 11 increasing, three remaining the same and one decreasing. No differences were found from initial to second testing in ability to generalize and interpret the fable content in the form of a moral response where five increased, six remained the same, and five decreased from initial to second testing.

For the strategy of generalization on proverb explanation for familiar proverbs, there was a trend toward increased ability to produce generalized and interpreted responses from initial to second testing. However, no significant changes were found in the ability to generalize the explanation of the meaning for unfamiliar proverbs from initial to second testing.

Recall

We also evaluated the subjects' abilities to recall the information of the fables to determine whether amount of information in retells changed with increased age. No differences were found within subjects from initial to second testing in amount of information retained in their retells.

Table 3. Discourse tasks

Task	Mean difference	Standard deviation	p value
Fable retell	2·573	5·390	0·157
Fable summary			
Strategy:			
Reduction	0·310	0·790	0·250
Generalization	0·810	1·420	0·036
Fable gist			
Strategy:			
Reduction	0·060	0·440	1·000
Generalization	0·190	0·830	0·562
Fable moral	0·094	0·558	0·473
Proverb explanation	0·738	1·199	0·065

Table 4. Standardized measures

Measure	Mean difference	Standard deviation	p value
Linguistic			
Similarities	1·133	2·748	0·132
Wechsler Memory Scale	5·563	7·429	0·009
Boston Naming Test	4·000	7·493	0·057
Complex ideational	1·133	2·800	0·139
Reading sent./paragraphs	0·077	4·663	0·953
Cognitive			
Mini-Mental State Exam.	0·813	1·809	0·090
Raven's	0·786	3·683	0·439
Picture arrangement	1·786	3·786	0·101
Block design	1·231	2·522	0·103

Standardized measures

Performance on standardized measures of cognition and language are presented in table 4. No significant changes were found on the language measures including the comprehension and the reading subtests of the BDAE. The differences on the confrontation naming test (BNT) approached significance with a trend toward lower performance on second testing. No significant changes were revealed on the Mini-Mental State Examination, Raven's *Coloured Progressive Matrices—Revised*, the similarities subtest of the WAIS-R, and the picture arrangement subtest of the WAIS-R.

In contrast to the preserved abilities found in the experimental discourse measures and the above-mentioned standardized measures, significant changes were revealed on the logical memory subtest of the *Wechsler Memory Scale—Revised* and on the block design subtest of the WAIS-R. On both measures, the individuals tended to show decrement in performance from initial to second testing.

We also examined whether either age at the time of testing or the length of the test-interval between initial and second testing were associated with changes on the experimental discourse and standardized measures. No significant correlations

were found between age at time of test or the length of the test-interval and performance on the experimental or standardized measures.

Discussion

The results of this study confirm the hypothesis that macro-level processing of discourse is preserved in normal advanced ageing. The documentation of no change on discourse tasks that require the reduction, generalization, and interpretation of information in a group of normal elderly individuals in their eighties and nineties, over an approximate span of three years between testing, is particularly revealing given the nature of the underlying processes required to achieve this level of success. In order to reduce, generalize, and interpret information at a more global level, the individual must be able to:

(1) differentiate the information pertaining to the central events from those related to less important details,
(2) delete reference to the less important information, and
(3) integrate the central information with real world knowledge through building inferences.

Highly integrative inferencing is necessary to achieve macro-level processing as it cannot be accomplished with only a cursory understanding of the surface level meaning of the text. The importance of studying inferences leading to global processing of information has been stressed in recent literature (Magliano and Graesser 1991), particularly in the context of elucidating the relationship between memory and discourse processing in ageing (Hess 1990, Zacks and Hasher 1988, Zelinski 1988). Our finding of preserved macro-level processing of discourse is consistent with recent approaches that challenge the view that age is associated only with inevitable decline (Adams 1991, Baltes 1993, Hess 1990, Meyer *et al.* 1995).

To date, the evidence is equivocal as to whether discourse processing is altered with increasing age. The results appear to be strongly influenced by what is studied in discourse and how it is elicited. Certain tasks have an inherent structure that naturally encourages making inferences. Several studies concluded that stimuli such as fables activate the drawing of high-level inferences that are essential to macro-level processing (Adams 1991, Adams *et al.* 1990). This ability is manifested by interpretative responses that go beyond the explicit content in the form of generalized gists and morals. Some researchers have proposed that global processing develops with advancing age to compensate for unavoidable losses (Adams 1991, Baltes 1993). For example, Adams and co-workers hypothesized that the tendency for older subjects to give interpretative responses may be associated with a general decline in processing resources. This decline is compensated with adopting global processing strategies. Thus, global processing strategies could become accentuated with advanced ageing to overcome problems in encoding detailed information.

To some extent, the delicate balance between processing resources and preserved global processing could account for the seemingly incongruous finding in our study. The decline on the cognitive measure of memory for information contained in a narrative event (i.e. logical memory subtest of the WMS-R) did not parallel the preserved ability to retell the fable information with increased age. The success of

our subjects on the fable retell tasks may be attributed to the nature of the fable stimuli, which was short, simple, and highly coherent in semantic structure. In contrast, the narratives in the cognitive memory measure were packed with detailed information. The narrative structure in the logical memory task with dense information may have overloaded the processing resources and precluded macro-level processing. Moreover, we submit that such detailed texts are not ecologically salient and the elderly do not encounter them often, if at all, in their daily life. Perhaps the preferential strategies for macro-level processing of discourse information in our elderly individuals were robust enough to allow the subjects to succeed on the fable and proverb tasks. That is, fables and proverbs may have activated macro-level processing due to their inherent structure. The differences between the tasks could explain the fact that decline on cognitive memory testing was not reflected in the performance of our subjects on the experimental discourse tasks.

Another important finding that emerged was the utilization of high-level vocabulary and complex syntax which enabled our elderly subjects to construct condensed and generalized macrostructure texts (i.e. summary, gist, and moral responses). This facility with vocabulary and syntax was evident in a majority of the subjects' summary, gist, and moral responses as reflected in responses such as: ' *The farmer shows his ability to govern his sons' actions after his death to bring them the treasure he wants them to have* ' and ' *To be successful you need hard work and incentive* '. These linguistic skills of complex syntax and high-level vocabulary are often a necessary condition for both processes of reduction and generalization. Previous tasks documenting decline in syntax in the elderly did not use natural tasks (Kempler 1987). Moreover, the tasks in this latter study did not require the use of a high degree of syntactic complexity. Clearly, the failure to use complex syntax may be tied to the task rather than a narrowing in the range of syntactic forms used, perhaps due to working memory limitations with increasing age.

There is increased risk of decline in certain abilities with advanced ageing. However, we found no significant correlation between age at time of test and performance on macro-level discourse processing tasks and standardized measures of language and cognition across the age span of 80–95. Moreover, the length of time between testing did not correlate with a change in performance. Our findings are consistent with those of Schaie (1994) who claimed that certain antecedents such as absence of cardiovascular disease, living in favourable conditions, substantial involvement in activities, and high educational levels were associated with maintaining high levels of functioning well into advanced age. These variables were present in the majority of our subjects and may help explain their preserved discourse function.

Clearly, growing evidence mandates that studies of cognitive-linguistic behaviour in normal ageing shift from the old deficit model to adopt the emergent theoretical framework that views ageing from the perspective of change or maintenance (Baltes 1993, Labouvie-Vief 1985, Adams 1991). This shift in focus led us to develop a method which provided the older normal subjects with optimal conditions to display their strengths rather than vulnerabilities. We also believe that global processing of information and ability to use high-level inferences is essential for their communication in everyday life. This approach has theoretical significance since it identifies and documents processes which could be maintained or even improve with ageing. Consequently, global processing of discourse

information could be maximally adopted to compensate for inevitable cognitive declines of memory and speed of processing. Ultimately, the method described herein may be of relevance in work with clinical populations, such as early differential diagnosis of dementia as well as use in persons with aphasia, where tasks of global processing can be utilized in therapeutic intervention. Appropriate tasks of macro-level processing could also be used to retrain or optimize more efficient processing strategies of normal elderly adults (Willis *et al.* 1992).

Epilogue

To conclude this paper, we would like to emphasize the current trend in ageing literature toward longitudinal studies. As such, individual patterns of change over time can be used to complement information from group studies. We will make the point through the reflection on the life of one of our subjects who was a close personal friend of the first author's and will thus be told as a personal story.

I was privileged to develop a friendship with one of our subjects who happened to be my neighbour. I knew her for 22 years until her death this year at the age of 94. She contributed greatly to our study by providing us with a number of subjects from her close circle of friends. But more importantly, we learned from her wisdom what 'successful ageing' is all about, which for most of us is a mere term, not a way of life. Until 2 years before her death, she showed excellent language abilities, good memory, and an extraordinary ability to tell jokes and enjoy humour. Then gradually, she started losing eyesight, hearing, and memory for even her favourite jokes. Her circle of friends shrunk dramatically. She suffered from cancer, a stroke, and a broken hip. She had to move to a retirement home where she died. Into very old age, she showed an intricate pattern of preserved and eroded skills and the relationship between them. The following joke, which represents a contemporary fable, attests not only to her preserved high-level linguistic and inferencing ability, but also to her continued positive outlook on life:

> This woman went to a meeting for the senior citizens. And she saw a man there that she just could not take her eyes off of. She just kept on looking at him. And it finally got on his nerves. So he walked over and he said, 'Lady, why are you looking at me like that?' And she said, 'You look exactly like my fourth husband.' 'Your fourth husband? How many husbands have you had?' She said, 'Three.'

We would like this study to be a tribute to Effie Mae Carr's memory.

Acknowledgement

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Appendix 1: Experimental task stimuli

Sample fable

Farmer and Sons

A farmer worked in a vineyard and became rich. He wanted his sons to be just like him. On his death bed the farmer told his sons that there was a great treasure buried in the vineyard. After the farmer died, the sons went to the vineyard and dug up the soil. They could not find a buried treasure. At harvest time, the vineyard produced the best grapes ever. Now the sons understood the meaning of the treasure.

Proverbs

Familiar

They see eye to eye.
Rome wasn't built in a day.
Too many cooks spoil the broth.
Don't count your chickens before they are hatched.
Don't judge a book by its cover.

Unfamiliar

Anyone can hold the helm when the sea is calm.
The long way home is often the fastest.
Shallow brooks are noisy.
One swallow doesn't make a summer.
The used key is always bright.
(Delis *et al.* 1984.)

Appendix 2: Scoring criteria

Fable summary and gist

Success: reduction of information with central meaning preserved

Strategy	Definition	Example: summary	Example: gist
Reduction	Condensed primarily through deletion of information	The farmer told his sons that there was great treasure in the soil of the vineyard. The sons looked for the treasure and later realized that it was the vineyard, the production of the vineyard itself that was the treasure	The father and sons and a grape vineyard and what would happen to the vineyard after he died
Generalization	Condensed through inferences and more general statements than represented in the original story, while still referring to the story content	It's a father and sons and a grape vineyard and how to get a bountiful crop of grapes and not expect a miracle out of the soil	The man trying to leave what he knew to the kids in a way that they would do it better than if he had just told them
Interpretation	Condensed as a global interpretation in the form of a life lesson through drawing inferences between the story content and analogous real life situations	A summary of the story is that while we are always looking for the pot of gold at the end of the rainbow, we have to work for it in everyday activities to attain what we want instead of waiting for the pot of gold	The main idea is that you have to work to get what you want

Failure: no reduction of information, or central meaning is not preserved

Example of Summary response with no reduction of information	Well, there was a farmer who had a vineyard, worked in a vineyard and uh, had made a lot of money there with it and he had two sons and he wanted the sons to be like him so he had to figure a way to get them to work hard and so on his death bed he told them that he was leaving them a great treasure and if they would dig up the whole vineyard, why they'd find it. So the digging up was that when the grapes were ripe they would be the best yet and uh, that was their treasure. They had to work for it
Example of gist response that fails to preserve the central meaning	I used to work in the cotton patch and I never did find any treasure

Fable moral and proverbs

Category	Definition	Examples: fable moral ('Farmer and Sons')	Examples: proverb explanation ('One swallow doesn't make a summer')
Generalization			
6—complete	A response that conveys a correct, general sense of the fable/proverb	*To be successful you need hard work and incentive*	*One quick event isn't going to tell what is really going to happen over a long period of time*
5—partial	A response which conveys a correct, abstract sense of the fable/proverb, but part is omitted or is stated concretely	*The moral is that you get other people to do what they should do*	*You shouldn't hang on to just one thing when there are a variety of things that can be accomplished*
4—minimal	A response in which only a minimal sense of the correct abstract interpretation is given	*Be sure of your aim. Be sure it is the better aim*	No examples from this study
Literal			
3—complete	A correct, complete, but literal response	*To cultivate the grapes to get a good crop*	*Summer hasn't come when the first swallow shows up*
2—partial	A response that is literal but is in some way incorrect or incomplete	No examples from this study	*Birds are usually very numerous in the summer*
1—minimal	A response that is not generalized outside the text in which only a minimal reference to the literal meaning of the fable/proverb is given	No examples from this study	No examples from this study
Incorrect	A response which is either literal or generalized but is completely incorrect	*Be prepared*	*One person by itself doesn't do so well. They always need a partner*