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Comparison of Proverb Interpretations Provided by Right Hemisphere-Damaged Adults and Adults with Probable Dementia of the Alzheimer Type

Shelley B. Brundage

When speech–language pathologists and other professionals assess the abstract thinking abilities of non–brain-damaged and brain-damaged adults they often use proverb interpretation tasks (Burns, Halper, and Mogil, 1985; Erickson and Binder, 1986; Lezak, 1983; Strub and Black, 1988). The Random House dictionary defines proverbs as "short, popular sayings that express . . . some commonplace truth or useful thought . . . requiring interpretation" (Stein, 1980). In order to arrive at a correct interpretation of a given proverb, the proverb must be "analyzed, abstracted, and applied to daily life situations" (Strub and Black, 1988, p. 284), and the presence of brain damage is thought to interfere in some way with these processes.

The proverb interpretation abilities of non–brain-damaged (NBD) and schizophrenic subjects have been studied extensively (Carpenter and Chapman, 1982; Cunningham, Ridley, and Campbell, 1987; Gorham, 1956a, 1956b; Reed, 1968; Shimkunas, Gynther, and Smith, 1966), whereas the proverb interpretation abilities of brain-damaged (aphasic) subjects have only recently been given systematic attention (Brundage and Brookshire, 1995). Although earlier studies analyzed the proverb interpretations of vaguely defined subject groups with "organic [pathology]," "cerebral damage," or "brain pathology" (Elmore and Gorham, 1957; Fogel, 1965; Gregg and Frank, 1967), this lack of subject information makes it difficult to determine the proverb interpretation abilities of persons with specific types of disorders, such as aphasia, right hemisphere damage, or Alzheimer dementia.

A further problem with previous studies of both brain-damaged and NBD subjects is that rationales for the choice of proverbs used are vague or absent. Proverbs are chosen because they are "well-known" (Code and

Lodge, 1987), "useful" (Gorham, 1956a), or "common" (Purdy and Loos-Cosgrove, 1991). This is problematic because proverbs differ in familiarity, abstractness, and syntactic complexity, and these variables may influence how easy or difficult a proverb is to interpret.

Additionally, operational definitions of scoring rules and information about the reliability of using the scoring rules, often are absent in studies of proverb interpretation (Code and Lodge, 1987; Krueger, 1978), although certain authors provide them (Hertler, Chapman, and Chapman, 1978). In other studies the ambiguous scoring rules make one skeptical of the high reliability coefficients reported (Gorham, 1956a).

Poorly defined subject populations, the unsystematic choice of proverbs to interpret, and the lack of reliable scoring systems make it difficult to describe the proverb interpretation performance of brain-damaged persons with specific disorders such as aphasia, right hemisphere damage, and probable Alzheimer dementia. It is also difficult to make statements about differences between groups in terms of proverb interpretation performance. For instance, we might hypothesize that proverbs with high syntactic complexity might be more difficult for aphasic subjects to interpret, given their documented difficulty with syntactically complex structures (Shewan, 1979; Shewan and Canter, 1971), or that RHD subjects would have more difficulty with highly abstract proverbs, given their tendency toward literalness (Myers, 1986). A final hypothesis might be that subjects with probable dementia of the Alzheimer type (PDAT) would have the most difficulty with the proverb interpretation task regardless of the type of proverb, given that language tasks requiring higher cognitive processes are the most vulnerable to the effects of dementing disease (Bayles and Boone, 1982).

In 1995 Brundage and Brookshire published a reliable system for scoring the proverb interpretation performance of NBD and aphasic subjects on a set of 24 proverbs that differed in familiarity, abstractness, and syntactic complexity. Using this system, they found that NBD subjects provided more adequate proverb interpretations than APH subjects did. The two groups were affected in similar ways by manipulations of proverb familiarity and syntactic complexity. For both groups, familiar proverbs were easier to interpret than unfamiliar ones. Syntactic complexity did not significantly affect the performance of these two groups. Proverb abstractness had a significant effect on the performance of the APH subjects, but not on the NBD subjects' performance.

The purpose of the present study was to use the Brundage and Brookshire scoring system (1995) to describe and compare the proverb interpretation performance of right hemisphere-damaged adults and adults with PDAT, and to compare the performance of these two groups to that of the aphasic group described by Brundage and Brookshire.

METHOD

Subjects

There were three groups of subjects. The aphasic (APH) group was the same group described by Brundage and Brookshire (1995). The 10 subjects in this group (7 men, 3 women), aged 59 to 79 years ($\underline{M}$ = 69.1; $\underline{SD}$ = 8.7) had all sustained a single, thromboembolic, left hemisphere stroke. Time post onset ranged from 1 to 64 months. Seven of the subjects exhibited either an anomic or fluent-mixed aphasia (fluent speech and the presence of verbal and literal paraphasias); the remaining three subjects exhibited mild to moderate nonfluent aphasia. The mean number of years of education for the aphasic group was 12.3 years (range = 10–16 years).

The right hemisphere-damaged (RHD) group consisted of 10 men, aged 56 to 76 years ($\underline{M}$ = 66.4; $\underline{SD}$ = 6.3). Eight had sustained a single, right hemisphere, thromboembolic cerebrovascular accident. Two subjects had had a small lacunar infarct in the right basal ganglia followed by a recent, larger right hemisphere stroke; they reported no residual effects from these earlier subcortical events. Time post onset ranged from 1 to 32 months. The mean number of years of education for the RHD group was 11 (range = 7–16 years).

The probable dementia of the Alzheimer Type (PDAT) group consisted of 10 subjects (9 men, 1 woman), ranging in age from 66 to 82 years ($\underline{M}$ = 72.9; $\underline{SD}$ = 6.2). They were recruited from the Geriatric Research, Education, and Clinical Center (GRECC) at Minneapolis VA Medical Center. Each subject had received a diagnosis of PDAT from professionals in the GRECC, based on the criteria of McKhann and colleagues (McKhann, Drachman, Folstein, Katzman, Price, and Stadlan, 1984). Scores on the Mini-Mental State Examination (Folstein, Folstein, and McHugh, 1975) ranged from 10 to 25. Time post onset of symptoms ranged from 48 to 108 months. The mean number of years of education for the PDAT group was 12 (range = 6–16 years). Descriptive information for the three groups of subjects is shown in Table 1.

Stimulus Selection

Twenty-four proverbs, with differing levels of familiarity, abstractness, and syntactic complexity, were used in this study (see Appendix A for examples). The categorization of proverbs has been validated by Brundage and Brookshire (1995), and is summarized briefly here. Proverb familiarity and abstractness were determined by a group of 10 speech–language pathologists. These judges rated each proverb on a

Table 1. Means, Standards Deviations (SD), and Ranges of Descriptive Information for Aphasic (APH), Right Hemisphere-Damaged (RHD), and Probable Dementia of the Alzheimer Type (PDAT) Subjects

	Age (Yrs.)	*Educ. (Yrs.)*	*IQ Est.*	*Special Tests**	*Months PO***
APH Group					
MEAN	69.1	11.7	103.4	71.8%	21.5
SD	8.7	2.0	6.7	10.0	21.0
RANGE	56–79	8–16	92–119	51–86%	1–64
RHD Group					
MEAN	66.4	11.0	99.5	−0.75	8.7
SD	6.3	2.6	9.2	26.3	11.7
RANGE	56–76	7–16	87–115	−58–35	1–32
PDAT Group					
MEAN	72.9	12.1	106.1	14.9	74.6
SD	6.2	3.2	10.9	4.3	21.7
RANGE	65–80	6–16	87–119	10–25	48–108

*Special tests are as follows: the PDAT group scores are for the *Mini-Mental State Examination* (MMSE; total possible score = 30). For the APH group, scores are the overall percentiles from the Shortened version of the *Porch Index of Communicative Ability* (total possible score = 100%). For the RHD subjects, scores given are from a series of informal tests of visual neglect. Negative neglect scores indicate the presence of right neglect; positive neglect scores indicate the presence of left neglect. Two of the RHD subjects were discharged from the hospital before neglect testing could be completed.

**Months PO = months post onset of brain damage.

5-point scale of abstractness, and then they rated each proverb as *familiar* if they had heard it before, and as *unfamiliar* if they had not heard it before. Although the brain-damaged subjects were not asked to rate the abstractness of each proverb, they were asked if they had heard each one before. The percent agreement between the familiarity ratings of the RHD group and the speech–language pathologists was 80% or above for 23 of the 24 proverbs. The percent agreement between the PDAT group and the speech–language pathologists was 80% or above for 17 of the 24 proverbs.

Rules for syntactic complexity were written based in part on those suggested by Schulte and Brandt (1989). Proverbs were considered high in syntactic complexity if they contained negatives, comparatives, temporal markers, or conjunctions.

Procedures

Subjects were tested in a quiet room. The investigator presented a card with a proverb printed on it, said the proverb aloud, and then asked the subject to "tell me what it means." After the subject interpreted each proverb, he or she was asked if it was familiar to them. All proverb interpretations were audiotape-recorded and transcribed orthographically.

Scoring System

A categorical scoring system, similar to Nippold and Martin's (1989) system for scoring idiom interpretations, was created to assess the quality of each interpretation. Rules were written to allow independent judges to place proverb interpretations into one of five categories. **Unrelated** responses were those that had no apparent relationship to the proverb. **Rejection** was scored when a subject refused to attempt an interpretation. Responses were considered **related** if they were based on the words in the proverb, but ignored the proverb's abstract meaning. Verbatim repetitions of proverbs and general comments about proverbs were also scored as related responses. A score of **abstract/inadequate** was given to interpretations that were abstract, but were inappropriate interpretations of the proverb's abstract meaning. A score of **abstract/adequate** was given to interpretations that conveyed the proverb's abstract meaning (scoring examples are provided in Appendix B).

Reliability

A block of eight proverbs was randomly selected from each of three randomly selected subjects in each group. The proverbs were selected so that one complete set of 24 proverbs was represented within each group. These randomly selected sets of proverbs constituted 20% of the total sample and were used to determine the reliability of the scoring system.

A student in communication disorders received training on the scoring system. Training consisted of reading a set of instructions for scoring adequacy, and then independently scoring transcripts other than those chosen for reliability measures. The student's scores on the training transcripts were then discussed and compared to those of the experimenter. After training, the student independently scored 20% of the total sample (described previously). Point-to-point percent agreement ranged from a low of 87% for the abstract/inadequate category to a high of 92% for the related category.

RESULTS

For the purpose of this paper, abstract/adequate scores were labeled *adequate*, and abstract/inadequate scores were labeled *inadequate*. The related, unrelated, and rejection categories were combined into a single *error* category. These three categories were then assigned numerical ratings, with adequate scores assigned a value of 2, inadequate scores a value of 1, and errors receiving a zero (0) value. The total possible score per group for each proverb was 20 points, if each of the 10 subjects produced an adequate interpretation of the proverb.

In order to determine if the order of difficulty of proverbs was similar for non–brain-damaged and brain-damaged subjects, the NBD subjects' mean scores (from Brundage and Brookshire, 1995) were arranged in descending order of adequacy (Figure 1). The RHD and PDAT groups' mean scores for each proverb were then arranged in descending order,

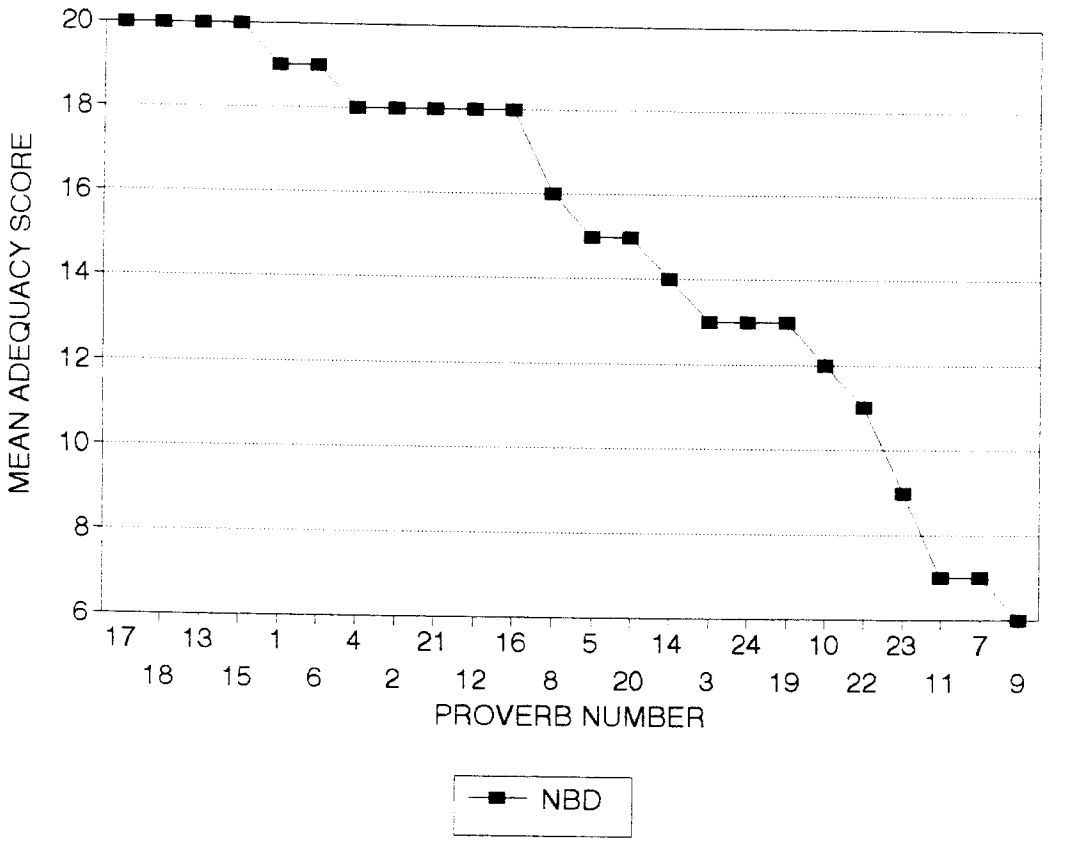

Figure 1. Scores of the non–brain-damaged (NBD) group arranged in descending order of adequacy (from Brundage and Brookshire, 1995).

based on the NBD group's mean scores (Figure 2). For most of the proverbs, the RHD group received higher average adequacy scores than the PDAT group. A Pearson correlation coefficient calculated between the RHD and PDAT subjects' average scores on the 24 proverbs yielded ($r = .82$, $p < .001$), suggesting that proverb difficulty affected these two groups in the same way.

The mean scores of the RHD and PDAT groups were then compared to those of the APH group (Figures 3 and 4). For most of the proverbs, the RHD group received higher average scores than the APH group did. The PDAT group's performance appears somewhat more variable, in that their average score was higher than those of the APH group for some proverbs, and lower for others. However, the slope of the lines for the three groups was similar. A Pearson correlation coefficient calculated between the APH and RHD subjects' average scores on the 24 proverbs

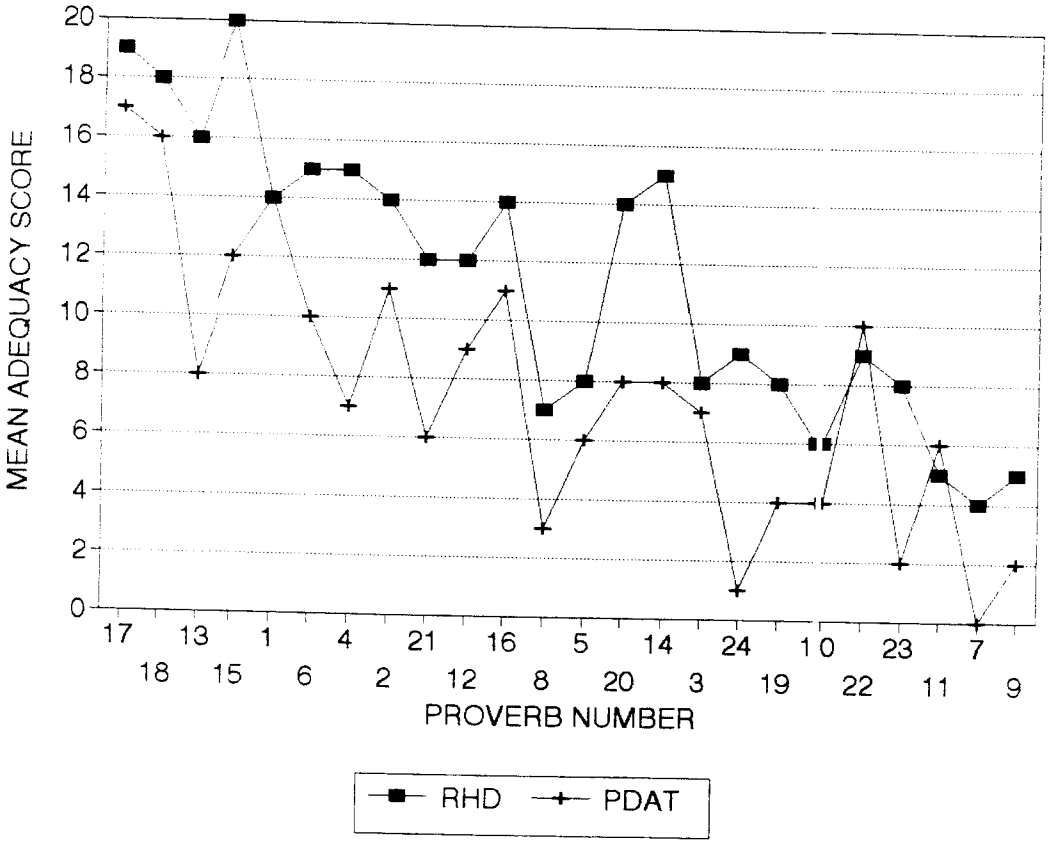

Figure 2. Scores of the right hemisphere-damaged (RHD) and probable dementia of the Alzheimer Type (PDAT) groups, arranged in descending order of adequacy for the NBD subjects.

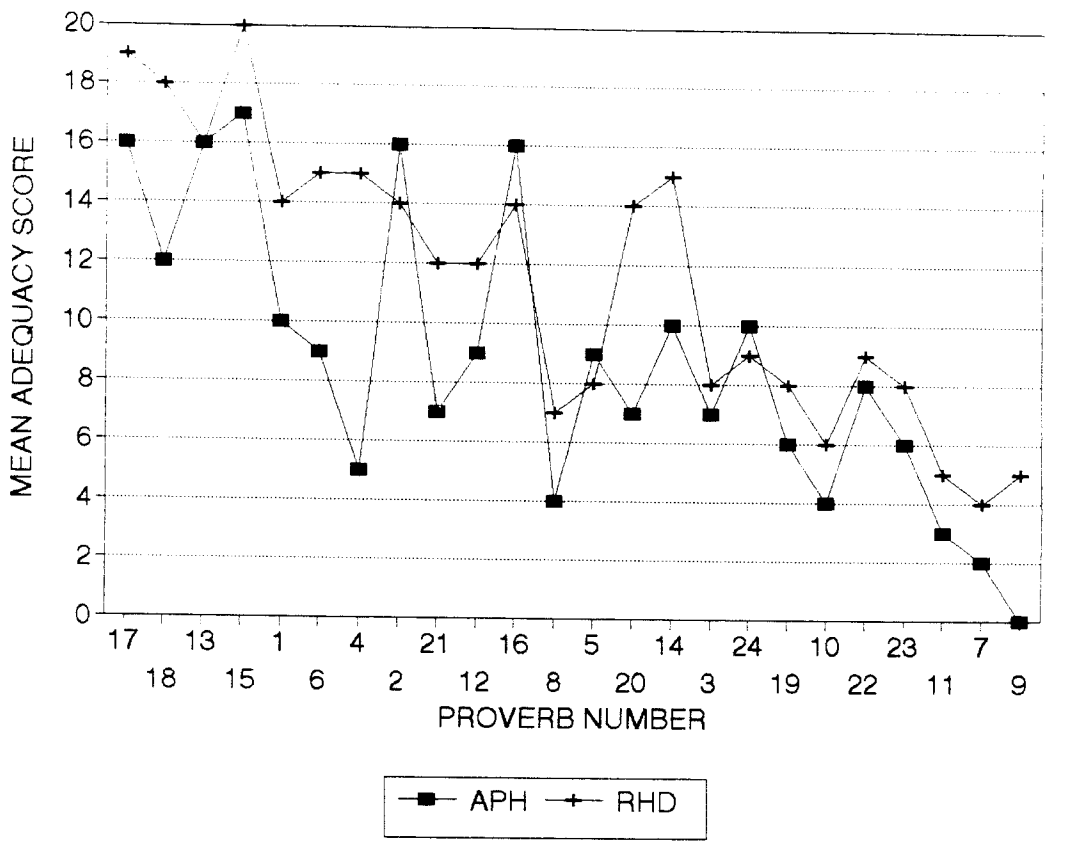

Figure 3. Scores of the aphasic (APH) and right hemisphere-damaged (RHD) groups, arranged in descending order of adequacy for the NBD subjects.

yielded (r = .80, p < .001); a similar calculation between the APH and PDAT subjects' average scores yielded (r = .71, p < .001), suggesting that proverb difficulty affected the three groups in the same way.

The mean score for the APH group across all proverbs was 8.70 (SD = 4.71). The mean score for the RHD group was 11.46 (SD = 4.59), and for the PDAT group the mean score was 7.58 (SD = 4.45). To determine if the three groups differed in their average adequacy scores, a one-way analysis of variance was calculated. The main effect for groups was significant (F (2, 69) = 4.34; p = .017). Post hoc comparisons with Bonferroni's procedure (Howell, 1987) indicated that the RHD group had significantly higher mean adequacy scores than the PDAT group did (t = 2.86, p < .05). The mean response adequacy scores of the RHD and APH groups were not significantly different (t = 2.03, p > .05). The mean response adequacy scores of the PDAT and APH groups were not significantly different (t = 0.83, p > .05).

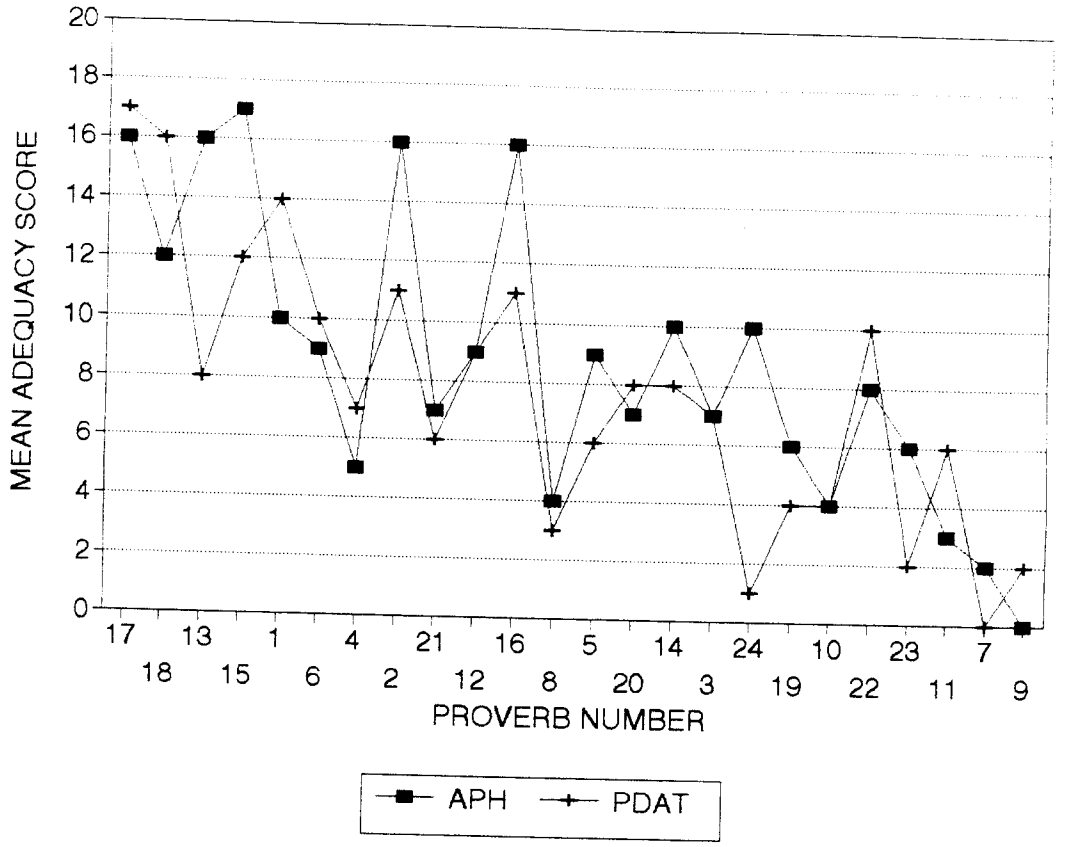

Figure 4. Scores of the aphasic (APH) and probable dementia of the Alzheimer Type (PDAT) groups, arranged in descending order of adequacy for the NBD subjects.

Effects of Syntactic Complexity

Each brain-damaged group's mean scores for proverbs with high levels of syntactic complexity and those with low levels of syntactic complexity are given in Table 2. The effect of syntactic complexity was analyzed separately because it seemed to have minimal effects on the adequacy of proverb interpretations. Eliminating syntactic complexity from subsequent analyses promised to simplify the analyses, and to lessen the chances of obtaining uninterpretable higher-order interactions. The effect of syntactic complexity on the adequacy of responses for each subject group was evaluated by means of three one-way analyses of variance. The levels of syntactic complexity addressed in this study did not significantly affect the adequacy of proverb interpretations for the APH ($\underline{F}$ (1, 22) = .043; $\underline{p}$ = .83), RHD ($\underline{F}$ (1, 22) = .002; $\underline{p}$ = .96), or PDAT ($\underline{F}$ (1, 22) = .504; $\underline{p}$ = .48) groups. Thus, syntactic complexity was omitted from subsequent analyses.

Table 2. Means, Standard Deviations, and Ranges of Adequacy Scores for the Aphasic (APH), Right Hemisphere-Damaged (RHD), and Probable Dementia of the Alzheimer Type (PDAT) Groups for Proverbs with High and Low Levels of Familiarity, Abstractness, and Syntactic Complexity

Group		*Familiarity*		*Abstractness*		*Syntactic Complexity*	
		High	**Low**	**High**	**Low**	**High**	**Low**
APH	*MEAN*	11.92	5.50	6.50	10.91	8.50	8.91
	SD	4.14	2.97	4.37	4.31	5.53	4.20
	RANGE	0–17	0–10	0–16	6–17	0–17	3–16
RHD	*MEAN*	14.67	8.25	9.41	13.5	11.41	11.50
	SD	3.70	3.13	4.27	4.31	4.92	4.66
	RANGE	8–20	4–14	4–15	8–20	4–20	5–19
PDAT	*MEAN*	10.66	4.58	6.58	8.58	6.91	8.25
	SD	3.55	3.23	4.01	4.99	4.18	4.97
	RANGE	6–17	0–10	0–14	1–17	0–14	1–17

Effects of Familiarity and Abstractness

Each group's mean scores for proverbs with high levels of familiarity and low levels of familiarity are given in Table 2. Each group's mean scores for high levels of abstractness and low levels of abstractness are given in Table 2. To evaluate the effects of proverb familiarity and abstractness on the mean scores from each subject group, a two-way (familiarity by abstractness) analysis of variance was carried out within each group. These analyses indicated a significant main effect for familiarity within all subject groups (APH: $F(1,20) = 29.85$; $p < .001$; RHD: $F(1, 20) = 31.50$, $p < .001$; PDAT: $F(1, 20) = 18.64$, $p < .001$). There were significant main effects for abstractness for the APH ($F(1, 20) = 14.14$, $p < .001$) and RHD ($F(1, 20) = 12.75$, $p < .002$) groups, but not for the PDAT group ($F(1, 20) = 2.07$, $p = .16$). There were no significant interactions between abstractness and familiarity within any of the subject groups. For all three groups, familiar proverbs led to significantly higher response adequacy scores than unfamiliar proverbs did. For the APH and RHD groups, proverbs' low inabstractness led to significantly higher response adequacy scores than proverbs with high abstractness did.

DISCUSSION

Group Effects

These data suggest that these three groups of brain-damaged subjects responded similarly to the proverb interpretation task. Although the aphasic and PDAT groups' scores were always lower than those of the right hemisphere group, proverb familiarity and syntactic complexity affected the performance of all three groups in similar ways. When the right hemisphere group was affected so were the aphasic and PDAT groups. On the other hand, when the right hemisphere group was not affected, neither were the aphasic nor PDAT groups. The abstractness of proverbs affected the performance of the RHD and APH groups, but not that of the PDAT group.

Proverb familiarity had a significant effect on proverb interpretation performance for all three groups. For all groups, familiar proverbs were easier to interpret than unfamiliar ones. These findings support those of Penn, Jacob, and Brown (1988) who found that familiar proverbs were easier to interpret than unfamiliar ones for their group of NBD subjects. When given a familiar proverb, the brain-damaged subjects in the current study provided more adequate (abstract) responses than when they were given unfamiliar proverbs, a finding similar to those of Cunningham and colleagues (Cunningham, Ridley, and Campbell, 1987). These findings also suggest that proverb familiarity should be controlled when evaluating proverb interpretations, as other authors have also suggested (Douglas and Peel, 1979; Nippold, Martin, and Erskine, 1988).

The abstractness of proverbs significantly affected the performance of the APH and RHD groups, but not the PDAT group. Right hemisphere-damaged subjects are commonly reported to produce more literal or *non-inferential* explanations than NBD controls in response to verbal and visual stimuli (Brownell, Potter, Bihrle, and Gardner, 1986; Myers, 1979; Wapner, Hamby, and Gardner, 1981). A lack of appreciation for abstract meanings is also reported when RHD subjects are asked to comprehend figurative language forms such as idioms, proverbs, and metaphors (Myers and Linebaugh, 1981; VanLancker and Kempler, 1987; Winner and Gardner, 1977). The findings of the current study suggest that this literalness is also present when RHD subjects are asked to produce figurative language.

Interestingly, proverb abstractness did not affect the performance of the PDAT group. This finding is similar to those of Kim and colleagues (1977), who reported that proverb abstractness did not influence the proverb interpretation performance of their two NBD subjects. The findings of the current study are surprising, however, given that moderately severe PDAT is characterized by difficulties with tasks, such as proverb interpretation that require higher-order cognitive abilities (Bayles and Boone, 1982).

Syntactic complexity, at least at the levels considered in this study, did not affect the performance of any of the three groups. This is a surprising finding for the aphasic subjects, whose difficulty comprehending complex syntactic structures is well documented (Shewan, 1979; Shewan and Canter, 1971).

Clinical Implications

These findings present a clinical dilemma for the speech–language pathologist. Unfamiliar proverbs are more difficult for brain-damaged patients to interpret; therefore the speech–language pathologist may elect to use familiar proverbs to assess abstract thinking in brain-damaged adults. However, recent papers by VanLancker (1990) and others (Phillips, Phillips, and Shearn, 1980; Weintraub and Mesulam, 1985) suggest that familiar proverbs may not tap abstract thinking abilities to any great extent. This is because familiar proverbs may be stored and retrieved as units, similar to a hypothesized storage of idioms (Estill and Kemper, 1982; Swinney and Cutler, 1979). Because the proverb's abstract meaning is stored with the proverb itself, patients are not required to develop abstract interpretations on their own.

So what is a speech–language pathologist to do? Unfamiliar proverbs, although more challenging for brain-damaged subjects than familiar proverbs, may be the most useful for discerning if patients realize that an abstract interpretation is expected, and in evaluating their ability to formulate such a response. It may be unrealistic to assume that *one* task can adequately assess abstract thinking skills, because abstract thinking encompasses many abilities, such as the ability to develop concepts, generate inferences, and solve problems (Lezak, 1983). Perhaps a battery of tasks should be sampled (idiom and proverb interpretation, comprehension of implied meanings, and generation of alternative solutions to hypothetical problems) if one wishes to assess abstraction abilities in brain-damaged adults.

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APPENDIX A: EXAMPLES OF PROVERBS WITH DIFFERING LEVELS OF FAMILIARITY, ABSTRACTNESS, AND SYNTACTIC COMPLEXITY

Proverb	*Familiarity*	*Abstractness*	*Syntactic Complexity*
Blood is thicker than water.	High	High	High
The squeaky wheel gets the oil.	High	High	Low
Two heads are better than one.	High	Low	High
The early bird catches the worm.	High	Low	Low
The hot coal burns, the cold one blackens.	Low	High	High
The bread of strangers can be very hard.	Low	High	Low
The rich never lack relatives.	Low	Low	High
Wild colts make good horses.	Low	Low	Low

From a system for scoring proverb interpretations provided by non–brain-damaged and aphasic adults by S. Brundage and R. Brookshire, 1995, in M. Lemme (Ed.), *Clinical Aphasiology, 23,* 165–177, Austin, TX: PRO-ED.

APPENDIX B: SCORING EXAMPLES FOR THE PROVERB, THE EARLY BIRD CATCHES THE WORM

Scoring Category	*Response*
Unrelated	I used to live in Topeka.
Related	The rooster, who is usually the first one up, is going to get more than his share of food.
Abstract/Inadequate	It means the same as, "Don't let the sun go down on your anger."
Abstract/Adequate	The sooner you get the job done, the better off you are.
Rejection	"I don't know that one."