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ABSTRACT

This study compared the comprehension monitoring skills of learning disabled (LD) and normal elementary school children. Comprehension monitoring, the ability to evaluate one's level of understanding of incoming messages, was assessed using two separate tasks. In the first (referential task), the child took the role of the listener in a referential communication situation and was asked to monitor his comprehension of the speaker's messages. In the second (game-learning task), the child learned a new game by listening to rules presented by an adult, and was asked to indicate when he had heard enough rules to play the game. The subjects were 12 younger LD boys (7-8 years of age), 12 older LD boys (9-10 years), 12 younger and 10 older normal boys matched on age and IQ with the LD subjects. Results showed that compared to normals, LD children made more comprehension monitoring errors for both adequate and inadequate messages on the referential task, and were more likely to say they knew how to play before they had heard enough rules on the game-learning task. Possible explanations of the results in terms of inattention or impulsivity of the LD children were considered and rejected. No age effects were observed. Thus, the major finding was that, relative to a matched sample of normals, LD children were deficient in comprehension monitoring skills. (Author)

Comprehension Monitoring in Learning Disabled and Normal Children

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Running Head: Comprehension monitoring

Comprehension Monitoring in Learning Disabled and Normal Children

Abstract

This study compared the comprehension monitoring skills of learning disabled (LD) and normal elementary school children. Comprehension monitoring, the ability to evaluate one's level of understanding of incoming messages, was assessed using two separate tasks. In the first (referential task), the child took the role of the listener in a referential communication situation and was asked to monitor his comprehension of the speaker's messages. In the second (game-learning task), the child learned a new game by listening to rules presented by an adult, and was asked to indicate when he had heard enough rules to play the game. The subjects were 12 younger LD boys (7-8 years of age), 12 older LD boys (9-10 years), 12 younger and 10 older normal boys matched on age and IQ with the LD subjects. Results showed that compared to normals, LD children made more comprehension monitoring errors for both adequate and inadequate messages on the referential task, and were more likely to say they knew how to play before they had heard enough rules on the game-learning task. Possible explanations of the results in terms of inattention or impulsivity of the LD children were considered and rejected. No age effects were observed. Thus, the major finding was that, relative to a matched sample of normals, LD children were deficient in comprehension monitoring skills.

Comprehension Monitoring in Learning Disabled and Normal Children

Since large portions of children's time in school are spent in listening, it is not surprising that listener skills are good predictors of children's academic performances (Atkin, Bray, Davison, Herzberger, Humphreys, and Selzer, 1977). Effective listening requires skill in comprehension monitoring, the ability to monitor or assess one's own level of understanding of incoming messages. Accurate comprehension monitoring leads to discovery of problems and may trigger the use of strategic listener behaviors (e.g., question-asking) to resolve comprehension difficulties (cf. Flavell, 1980; Markman, 1980; Patterson & Kister, 1980).

Comprehension monitoring skills show considerable improvement during the elementary school years. Patterson, O'Brien, Kister, Carter, and Kotsonis (Note 1) found that even first graders could give good comprehension monitoring performancesif stimulus conditions were very simple, but they and others have reported deficits in young children's performances under increased task demands (cf. Flavell, Speer, Green, & August, Note 2; Markman, 1977, 1979, 1980; Rysberg, 1977; Wellman, Rysberg, & Sattler, Note 3). For example, Markman (1977) found that first graders were far less likely than third graders to notice inadequacies in instructions about how to perform two different tasks (viz., play a card game, do a magic trick). Rysberg (1977) taught children the rules for a game and asked each child to tell her as soon as he/she knew enough rules to play. Younger children (3, 5, and 7 year olds) professed complete knowledge of the game long before older children (9 year olds) did, and long before they had heard all of the necessary rules. Wellman and his colleagues (Note 3) also found that second graders were not good judges of their own levels of comprehension of passages they had read; sixth graders were much more accurate in this regard.

While there is evidence of the development of comprehension monitoring skills in normal children, almost no information is available concerning the development of these skills in learning disabled (LD) children. The communication skills of LD children have recently been the subject of research (e.g., Bryan, 1977, 1978; Bryan, Wheeler, Felcan & Henek, 1976) and problems have been identified, for example, in LD children's ability to express an idea and to decode nonverbal cues. Guthrie (1973) reported that LD children understood less of what they read than normal children, even though his LD and normal groups were equivalent in terms of their vocabulary skills and syntactic processing. There have, however, been no investigations directly concerned with the development of comprehension monitoring in LD children.

Our main aim was to investigate the comprehension monitoring skills of LD children. We employed two different tests of skill in comprehension monitoring. The first, taken from Patterson et al. (Note 1), was cast in the context of a referential communication task. The second, adapted from Rysberg (1977), involved the child's judgments as to when he had received enough information to play a game. Each task was administered individually both to younger (7-8 years) and older (9-10 years) LD children, and to younger and older normal children matched with the LD subjects on age and IQ. In each case, dependent measures assessed children's ability to recognize when they did or did not have enough information to satisfy task requirements.

Method

Subjects and Experimenters

Forty-six boys (24 LD and 22 normal children) from local elementary schools served as subjects. The LD subjects were the 12 oldest and 12 youngest male students in 4 special classes conducted under the auspices of the University of Virginia Learning Disabilities Research Institute (LDRI). The normal children were taken from the same schools as the LD children and were matched on age and IQ.

From the population of children in two local school districts who had been labelled LD, children were selected for the LDRI classes using several criteria. First, the children were nominated by resource teachers as showing attentional problems (i.e., consistently engaged in off-task behavior); over half the LD children in this population were so nominated. Those nominees who were achieving at more than 90% of their IQ-predicted aptitude in reading or mathematics, those manifesting severe behavioral disturbances, and those who did not receive parental permission were excluded. The remaining sample constituted the LDRI classes. There were too few girls in the classes to allow systematic inclusion of subjects' sex as a variable in this study, so the present sample was limited to boys.

The younger group of LD subjects (n=12) had a mean age of 7 years 10 months (SD=5 months) and a mean IQ of 109.4 (SD=14.4). The younger group of normal subjects (n=12) had a mean age of 7 years 8 months (SD=5 months) and a mean IQ of 109.9 (SD=15.3). The older group of LD subjects (n=12) had a mean age of 10 years 4 months (SD=6 months) and a mean IQ of 98.2 (SD=13.5). The older group of control subjects (n=10) had a mean age of 10 years 3 months (SD=8 months) and a mean IQ of 96.5 (SD=15.3). IQ's for the present study were calculated from the results of the Peabody Picture Vocabulary Test (Dunn, 1965) administered to each subject within a week of testing.

A female graduate student served as experimenter. Five male undergraduate students alternated in the role of speaker for Task 1; each was present at approximately the same number of sessions, and their assignments occurred randomly across groups.

Overview of Procedure

Each subject was tested individually in a quiet room in his school. In the referential task, the subject was asked to take the role of the listener in a referential communication game. After the speaker offered a message on each trial, the child was asked to evaluate whether he had enough information to select the target referent. In the game-learning task, the experimenter taught the child a game by explaining the rules one by one. After the description of each rule, the child was asked to evaluate whether he had heard enough rules to allow him to play the game.

Referential Task

A small table and 3 chairs were placed in the testing room. A cardboard divider in the middle of the table prevented the speaker and listener, sitting at opposite ends of the table from each other, from seeing the table top in front of the other player. A microphone inserted in the divider permitted the unobtrusive recording of each testing session.

The sets of stimulus items (i.e., potential referents) for each trial were drawn on posterboard cards measuring approximately 23 cm X 30 cm. The cards were divided into quadrants, and one of the 4 potential referents for the trial was drawn in each quadrant. There were 5 types of stimulus sets, each of which varied systematically on binary attributes (e.g., red-blue, large-small, etc.). The practice set consisted of table utensils; the other sets were fish, clocks, flowers, and kites. Each stimulus set except the practice set was used 3 times (once for each of 3 message types), for a total of 12 trials. On each trial, both the listener and the speaker received identical cards with the full set of potential referents for that trial.

A small marker was also provided for the child's use in indicating his choice among referents on each trial.

A certificate of participation ("Good Player Award") was given to each subject after he had completed the two tasks (see Cosgrove & Patterson, 1977).

Upon entering the experimental room, the child was seated opposite the adult speaker. He was shown a Good Player Award and was told that he could win points toward such an award by "doing a good job" on the game he would be playing. The experimenter asked whether the child would like to participate, and all children agreed.

The experimenter then produced the cards with the set of referents for the practice trial. She put one in front of the adult speaker and one in front of the listener. She explained that the speaker would describe a target referent on each trial, and that the child's job would be to pick out the target from among the potential referents. She also explained that, after the speaker had offered a message on each trial, she would ask whether the child needed another clue in order to be sure which one was the target referent. If more information was needed, the child was to indicate that he needed another clue. The experimenter would then ask him to specify the necessary information, the speaker would provide it, and finally, the child could select the target referent when he was sure of its identity. On the practice trial, the speaker produced a fully informative message (see below) and all children picked the target referent. However, each child was cautioned that sometimes the speaker might be "tricky" and not give adequate messages.

For each trial, the listener's card was identical to that of the speaker. The trial began when the speaker produced a message about the target referent. Across trials, the speaker's messages varied systematically in their informational adequacy. On a third of the trials, the speaker produced fully informative messages. These named the two crucial attributes of the target referent and contained all of the information necessary for identification of the target. On another third of the trials, the speaker's messages were partially informative. These named one of the two crucial attributes of the target referent, thus narrowing the choice to two of the potential referents. On the remaining third of the trials, the speaker gave uninformative messages. These named only characteristics shared by all the potential referents, thereby providing no useful information. Four trials with each message type were administered. The order of messages was initially determined on a random basis; once established, however, it was the same for all subjects.

A few seconds after the speaker had delivered his message on each trial, the experimenter asked the child whether he needed another clue. If the child said that he did, he was asked to specify the additional information. After the speaker provided this information, the experimenter repeated her question. When the child indicated that no further clues were needed, he was asked to choose the target from among the potential referents. The experimenter asked questions, recorded the child's responses, and initiated new trials. After the 12 trials had been completed, the experimenter praised the child's performance and introduced the next task.

Game-Learning Task

The divider on the table was moved aside to leave room for the materials for the game-learning task. This task was based on a color-matching game adapted from the commercially available game, "Candyland". The playing board showed two houses connected both by a "high road" and a "low road". Each of the two roads was made up of a number of colored squares. A pair of dice and a pack of cards with colors on one side were placed on the game board. Care was taken to place the cards on the board in such a way that the child did not see that they were colored on one side. Four jacks (red, blue, green, and silver) were also placed on the game board. Extra materials (two possible starting points, two possible routes, different possible means of moving, and superfluous playing pieces) were included to ensure that children could not surmise the rules of the game merely by visual inspection of the playing materials.

The experimenter began by asking the child whether he would like to learn a new game. All children agreed that they would. The experimenter then explained that she would give the rules for the game one at a time, and that the child could determine the number of rules that he heard by saying "another rule" or "no more rules" after each rule. The child was told to stop the experimenter from giving additional rules only when he was sure that he knew how to play.

The five rules, in the order given, were:

1. I am the red person and you are the blue one (pointing to the jacks).
2. We start the game by putting our people on the yellow house.
3. We always follow the road this way (pointing counter-clockwise).
4. To find out where to move, pick up a card. look at the color, and go to the next place with that color (pointing to colored squares on the board).
5. The very first person to get to the red house is the winner.

After giving each rule, the experimenter asked, "Do you know how to play yet, or do you want to hear another rule?" If the child asked for another rule, she gave the next rule and repeated the question. This procedure was continued for all 5 rules, or until the child said that he didn't need any more rules (whichever came first). After the child indicated that he had heard enough, the experimenter immediately administered a standard 5-question interview concerning the child's knowledge of the rules. The 5 questions (each of which corresponded to one of the 5 rules) were:

1. Which person are you?
2. How do we start the game?
3. How will we know who the winner is?

4. Which way do we follow the road?

5. How do you find out where to move?

If a child requested a rule different from or in addition to those given above, he was asked to formulate a specific question about the information he sought (e.g., "What are the dice for?"). Straightforward answers were given to such questions. Their occurrence was scored only if they were asked prior to the beginning of the interview assessing rule knowledge. After that point, additional questions were viewed as having been provoked by the interview (rather than having arisen from spontaneous comprehension monitoring) and were therefore not counted.

Following the interview, any rules that the child had missed were explained, and each child played the game with the assistant. The colored cards were arranged so that, after a brief but exciting game, the child won. The experimenter then presented the child with a Good Player Award with his name written on it, asked him not to talk about the games with other children, and escorted him back to his classroom.

Dependent Measures and Coding

All sessions were tape recorded. Data were collected by the experimenter on a trial-by-trial basis and verified against the taped records.

For the referential task, the main dependent measure was the number of correct comprehension monitoring judgments (i.e., each child's judgments as to whether he had enough information to choose the target referent). The experimenter also coded each child's explanations of any missing information as either adequate or inadequate. An adequate explanation specified the nature of the missing attribute (e.g., size, color). A child could have made 0, 1, or 2 adequate explanations on an uninformative message trial (2 missing attributes) but could have made only 0 or 1 adequate explanations on partially informative trials (1 missing attribute). Inadequate explanations included any others (e.g., requests for information that had already been given, requests for irrelevant information, etc.). The overall frequency of inadequate explanations was very low (a total of 29), averaging less than one per subject. The explanations on a sample of 12 subjects' tapes were also coded by an independent coder. Reliability of this coding, calculated as the number of agreements between coders divided by the total number of explanations coded, was .99. A final dependent measure for this task was the number of correct referent choices.

The main dependent measure for the game-learning task was the number of game rules requested. We also recorded the number of rules correct (i.e., the number of correct answers on the interview) and the number of "extra" rules (i.e., those departing from the original 5) requested by each child.

Results

Multivariate analyses of variance were performed using the SPSS-MANOVA program (Cohen & Burns, 1976). The consistent multivariate extensions of recommendations made by McCall and Appelbaum (1973) for treatment of repeated measurement data were used.

Referential Task

To assess the overall relationships between age, diagnostic condition, and message type with children's skill in comprehension monitoring, a multivariate analysis of variance was conducted on the data for number of correct comprehension monitoring judgments, number of adequate explanations of these judgments, and number of correct referent choices.

Age and Diagnostic Condition. The question of main interest was the relationship between age, diagnostic condition, and skill in comprehension monitoring. The multivariate analysis demonstrated a significant effect of diagnostic condition on comprehension monitoring, F (3,40) = 3.98, $p < .01$; normal children were more successful than LD children in monitoring their own comprehension levels. Univariate analyses showed that diagnostic condition affected comprehension monitoring judgments, F (1,42) = 4.65, $p < .04$[1], but not explanations or choices. The data for comprehension monitoring judgments are shown in Table 1. There was no effect of age, F<1, and no significant age by condition interaction, F (3,40) = 1.15, n.s. Thus, the principal result was the greater comprehension monitoring skill of normal as compared to LD children.

Insert Table 1 About Here

Message Type. We also assessed the effects of variations in the informational adequacy of the speaker's messages. In the overall MANOVA, message type had the expected significant effect on children's performance, F (5,38) = 603.22, $p < .001$; children did better when messages were informative rather than ambiguous. None of the interactions of message type with age or diagnostic condition approached significance. Univariate tests of the message type effect were significant for judgments, F (2,41) = 4.23, $p < .02$, explanations, F (1,42)= 384.84, $p < .001$[2], and choices, F (2,41) = 6.81, $p < .005$. Children gave more adequate comprehension monitoring judgments on informative compared to partially informative trials, F (1,42) = 4.72, $p < .04$, and on uninformative as compared to partially informative trials, F (1,42) = 5.82, $p < .02$ (see Table 1). Thus, children found it easier to judge messages that were either clearly adequate or clearly inadequate than those which were only slightly ambiguous.

Game-Learning Task

The question of primary interest in the game-learning task was the relationship of age and diagnostic condition to children's comprehension monitoring ability, as evidenced by the number of game rules requested and the number correct on the interview. The data are shown in Table 2.

Insert Table 2 About Here

A 2(age) x 2(condition) MANOVA was performed on the data for rules requested and rules correct. This analysis revealed a significant effect of diagnostic condition, $\underline{F}$ (2,41) = 5.20, $\underline{p} < .01$. Univariate analysis showed that normal children requested more rules than LD children, $\underline{F}$ (1,42) = 9.62, $\underline{p} < .005$. Univariate analysis also revealed a trend for normal children to have more rules correct on the interview than LD children, $\underline{F}$ (1,42) = 3.43, $\underline{p} < .08$. Neither the effect of age nor the interaction of age and diagnostic condition approached significance.

We also recorded the number of "extra" requests for information (e.g., "What are the dice for?") made by each child prior to the interview testing his knowledge of the rules. Of the 14 such questions, 3 (21%) were asked by LD children and 11 (79%) were asked by the normals. While only 2 of the 24 LD children asked any extra questions, 9 of the 22 normal children did; this difference attained statistical significance, χ^2 (1) = 6.95, $\underline{p} < .01$.

In summary, the results of the game-learning task indicated that normal children were more effective than LD children in monitoring their own level of comprehension. Normals requested more rules for a game, tended to learn more rules, and asked spontaneously for more information.

Discriminant Analysis

To determine the degree to which performance on the two comprehension monitoring tasks differentiated between LD and normal children, we performed a stepwise discriminant analysis. The 2 principal measures of comprehension monitoring from our tasks---correct judgments about need for more information on the referential task and number of rules requested on the game-learning task---were used in the analysis. Because scores on the referential task were skewed toward the upper end of the scale, each subject's performance was recoded as falling into one of 3 categories: perfect score (no errors), one error (the mean), and more than one error. Scores from the game-learning task were used in their raw form (i.e., the number of rules requested by each child).

Performance on the game-learning task was the more powerful discriminator, and hence was entered into the equation first, with $\underline{F}$ (1,44) = 9.91, $\underline{p} < .003$. This variable alone was capable of classifying 67.4% of the cases correctly, χ^2 (1) = 5.57, $\underline{p} < .02$. When the referential task variable was entered into the equation, the overall discriminant function remained highly significant, $\underline{F}$ (2,43) = 6.26, $\underline{p} < .004$; however, the incremental contribution of this variable was of borderline statistical significance, $\underline{F}$ (1,44) = 2.32, $\underline{p} < .08$. The full model, including both referential task and game-learning task variables, correctly predicted the diagnostic categories for 71.7% of the sample, χ^2 (1) = 8.70, $\underline{p} < .003$. Of the 24 LD children, 17 were classified correctly; of the 22 normal children, 16 were so classified. Thus, results of the discriminant analysis suggest that LD and normal children are discriminable in terms of their success in comprehension monitoring.

Discussion

The major finding was that, relative to a matched group of normal children, LD children were deficient in comprehension monitoring skill. Overall, LD children appeared less sensitive than normal children to the adequacy of information they received. This conclusion is strengthened by the similar results obtained with the two different tasks. On the referential task, LD children not only made more errors on the comprehension monitoring judgments, but they also made different kinds of errors than normal children. Only LD children said they they needed more clues when in fact they did not, and only LD children refused further information when the speaker's message was completely uninformative. When, in the game-learning task, the children needed to compare the rules they had already heard with the game materials and with their knowledge of the likely game structure in order to determine whether another rule was needed, comprehension monitoring performances of LD children again lagged behind those of their normal peers.

Both the referential and the game-learning task called for "elicited" comprehension monitoring in that they required the subject to assess his level of comprehension when asked directly to do so. In addition, the game-learning task also yielded information about what might be called "spontaneous" comprehension monitoring--the active engagement of comprehension monitoring processes in the absence of a specific suggestion (e.g., from the experimenter) to do so. Spontaneous comprehension monitoring in this task was evidenced when children asked for extra rules. A greater proportion of normal than LD children required such extra rules. This suggests that relative to their normal peers, LD children are deficient not only in elicited but also in spontaneous comprehension monitoring. Thus, LD children may be less likely than normal children to initiate the chain of events resulting in active questioning of a speaker whose messages are unclear (cf. Patterson & Kister, 1980).

One possible explanation of our results might attribute LD children's inferior performance to simple inattention. If these children were not paying full attention to the tasks, then poor performances might certainly have resulted. Our observations of the children during testing, however, do not fit with such an interpretation; LD children appeared as motivated and attentive as normals. From a more objective standpoint, the lack of difference between normal and LD children in their ability to provide adequate explanations of comprehension monitoring judgments (i.e., by specifying the nature of missing information) also argues against interpretations based on inattention to the task. A child who was not paying attention to the task should not have been able to provide adequate explanations of missing information in this way.

LD children have sometimes been characterized as impulsive (e.g., Hallahan, Kauffman,& Ball, 1973). Thus,another possible explanation of our findings might be that LD children's deficiencies were due to such a response style. Had those in our sample responded to the experimenter's questions too rapidly, without reflection, this might indeed have resulted in deficient performances. To check on this possibility, we reoorded response latencies (i.e., the time between the experimenter's presentation of the first rule--which all subjects received--and the subject's decision as to whether he needed another rule) for both LD and normal children on the game-learning task. Results showed that the mean response latency for LD children was actually about a half second longer than the mean for normal children, although the difference was not significant. Thus, it seems unlikely that deficiencies in comprehension monitoring exhibited by LD children are attributable to an impulsive response style.

In light of the literature on development of comprehension monitoring (e.g., Flavell et al., Note 2; Markman, 1977, 1979; Patterson et al., Note 1; Rysberg, 1977; Wellman et al., Note 3), the absence of age trends in the present data may seem surprising. One may recall, however, that our LD sample consisted simply of the 12 oldest and 12 youngest boys in four LD classes. The IQ's of the younger LD children in this sample averaged over 10 points higher than those of the older LD children. Comparison groups of younger and older normal children were matched on age and IQ to the available LD children. The IQ difference between age groups probably minimized age trends in our sample. The present data are therefore not necessarily representative of age trends (or their absence) in the general population of normal children.

The extent to which our LD sample is representative of the population of LD children is difficult to assess. In much of the research on learning disabilities, LD children whose IQ's exceed a given level are selected for study; mean IQ's as a function of age are often not reported. When these figures have been given (e.g., Tarver, Hallahan, Kauffman, & Ball, 1976), the IQ's of younger children have typically been higher than those of older children. The present sample was also selected from those nominated as showing attentional difficulties, but over half of the population of LD children from which the present sample was drawn was nominated on this basis. In sum, we believe our sample to be reasonably representative of the LD population from which it was drawn.

Comprehension monitoring is a skill essential to success in academic settings. The ability to make an accurate assessment of one's own level of comprehension is important in reading, in following instructions, in listening to teachers' presentation of curricular materials, and in many other tasks as well. A child with deficiencies in this area might therefore be expected to encounter difficulties in school. The present finding that LD children show deficits in comprehension monitoring is consistent with this line of reasoning, and it suggests the importance of developing techniques for training comprehension monitoring skills.

Reference Notes

Note 1. Patterson, C. J., O'Brien, C., Kister, M. C., Carter, D. B., and Kotsonis, M. E. Stimulus complexity, message ambiguity, and the development of skill in comprehension monitoring. Unpublished manuscript, University of Virginia, 1979.

Note 2. Flavell, J. H., Speer, J. R., Green, F. L., and August, D. L. The development of comprehension monitoring and knowledge about communication. Unpublished manuscript, Stanford University, 1979.

Note 3. Wellman, H. M., Rysberg, J. A., and Sattler, H. E. The development of accurate assessments of comprehension readiness: A study of cognitive monitoring in young readers. Unpublished manuscript, University of Michigan, 1979.

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Footnotes

[1] All of the parametric analyses (for the data from both tasks) were also conducted using IQ as a covariate. Results were essentially identical to those reported in the text. For example, the univariate main effect for diagnostic condition in the referential task was, $\underline{F}$ (1,41) = 5.10, $\underline{p} < .03$, in the covariance analysis. To minimize redundancy, results of the covariance analyses will not be discussed further.

[2] This effect is of little interest since it results from the fact that there were more missing attributes for children to specify when messages were uninformative (2 missing attributes) as compared to partially informative (1 missing attribute). When scores were corrected to adjust for this difference, the significant effect of message type on children's explanations disappeared.

Table 1

Mean Number of Correct Comprehension Monitoring Judgments as a Function of Diagnostic Condition, Age, and Message Type (Referential Task)*

		Message Type					
		Fully Informative		Partially Informative		Uninformative	
Diagnostic Condition	Age Group	Mean	S.D.	Mean	S.D.	Mean	S.D.
LD	Younger	3.7	0.5	3.1	1.6	3.4	1.4
LD	Older	3.9	0.3	3.6	0.9	3.7	1.2
Normal	Younger	4.0	0.0	3.9	0.3	4.0	0.0
Normal	Older	4.0	0.0	3.8	0.4	4.0	0.0

* Maximum possible score in each cell = 4.

Table 2

Mean Number of Rules Requested and Mean Number of Rules Correct as a Function of Diagnostic Condition and Age (Game-Learning Task)*

Diagnostic Condition	Age Group	Rules Requested		Rules Correct	
		Mean	S.D.	Mean	S.D.
LD	Younger	2.8	1.3	2.5	1.4
LD	Older	2.9	1.4	2.9	1.6
Normal	Younger	3.9	1.3	3.6	1.4
Normal	Older	4.1	1.0	3.3	1.1

* Maximum number of rules = 5.