

Some Cognitive and Social Correlates of Children's Fluency in Riddle-Telling

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Cognitive and social correlates of riddle-telling were investigated in a matched-pairs design. Fluent riddle-tellers from two age groups (six to eight years and eight to eleven years) were matched with their peers who told few riddles or none at all. The children's cognitive abilities were measured on nine verbal and four non-verbal tasks, and their social adjustment estimated by teacher reports and sociometric tests. Riddle-tellers in the younger age group were further advanced cognitively and less well-adjusted socially than their peers who did not know any riddles. Only cognitive correlates of riddle-telling were found for children in the older age group. The results suggest the need for future investigations of riddle-telling to consider both cognitive and social factors and to expect different patterns of correlates according to children's degree of experience in riddle-telling.

Several recent studies have examined children's riddle-telling in its relationship to cognitive development (Athey, 1977; Whitt & Prentice, 1977) and to the understanding of specific linguistic forms such as ambiguity (Shultz, 1974; Goldstein, 1976; Hirsh-Pasek, Gleitman & Gleitman, 1978). Riddle-telling, as with other verbal humour, may also have strong social correlates such as dominance or popularity (McGhee, 1976) and social adjustment (Wolfenstein, 1954).

A variety of cognitive and social skills may be associated with riddle-telling. In the present study two possible characteristics of riddle-tellers were selected for contrast, so that some assessment could be made of the relative contribution of social and intellectual factors to children's riddle-telling at different ages. The two factors were social adjustment and cognitive skills.

Social Adjustment

General social adjustment and, in the case of older children, popularity were selected as examples of the social factors that may be associated with fluent riddle-telling.

Adjustment at school, to peers and to teachers, would appear to be one aspect of the social competence needed for enjoyable riddle-telling. Fluent riddle-tellers might be expected to be well-adjusted socially, especially at an age when riddles are often told. Such children possess a 'friendship currency' appropriate to their age group and to the playground situation (Wolfenstein, 1954; Bernstein, 1971).

Popularity, another social factor that may be associated with fluent riddle-telling, is an additional aspect of social adjustment investigated in the present study, among children in the older age group. Fluent riddle-telling might be characteristic of leaders. It might also be characteristic of less popular children, who may tell riddles to imitate the symptoms of popularity.

Cognitive Skills

Several recent studies have discussed the relationship between children's understanding and appreciation of riddles and their cognitive development, with cognitive development assessed by tasks drawn from Piagetian theory (Athey, 1977; Whitt & Prentice, 1977). The present investigation goes beyond the measurement of general cognitive development to examine the cluster of abilities and skills more specifically related to riddle-telling. The hypothesized cognitive factors were of three main kinds: verbal abilities, recall and some non-verbal cognitive skills.

Verbal factors Fluent riddle-tellers might be expected to show greater proficiency than their peers in a number of verbal capacities and skills: general verbal ability, vocabulary (Prentice & Fathman, 1975; Athey, 1977), general knowledge (McGhee, 1977) knowledge and experience of the abstract linking of ideas and recognition of verbal absurdity. A previous study (Bowes, in press) showed that about 50 per cent of riddles told by six- to twelve-year-old children used one of the four kinds of ambiguity isolated by Shultz (1974) - lexical, phonological, surface structure or deep structure - and 10 per cent of riddles contained figurative speech. We might expect that fluent riddle-tellers would show greater ability than their peers in their detection of ambiguity and in their knowledge of and ability to interpret figurative speech. These factors assume that children understand the riddles that they tell, an assumption not always valid (Shultz, 1976).

Recall With or without comprehension of a remembered riddle, accuracy in the recall of wording is essential for a riddle's impact.

Non-verbal cognitive skills Advanced riddle-tellers, assuming again that they understand the riddles they produce, might be more proficient than their peers in several aspects of flexible thought: a general capacity for classification (Athey, 1977), the ability to see two meanings at once, and a capacity for reversibility (McGhee, 1971, 1977).

One way of investigating the cognitive and social correlates of riddle-telling is to examine the characteristics of children who tell many, few or no riddles. Two

age groups were selected for contrast, since the relative importance of cognitive and social skills may vary according to whether children are learning riddles for the first time (six-year-olds) or have been telling riddles for several years (eight- to eleven-year-olds). We might expect variables related to cognitive mastery to have more influence than social considerations on a six-year-old's riddle-telling: the child may simply not understand riddles. For children of eight years or more, social factors may be important. These older children may be able to understand riddles, but choose to tell them or not for reasons related to their social adjustment and the expectation of their friends.

METHOD: AGE GROUPS 1 AND 2

Design and Sample

The basic design contrasts children who recall varying numbers of riddles. The sample consisted of 21 matched pairs drawn from a study in which 156 boys and girls aged from six to twelve were asked to tell riddles (Bowes, in press). Testing for the present investigation took place three months later. Non-riddle-tellers were asked again to tell riddles, but none had learned any in the intervening period.

Since the importance of cognitive and social factors may differ for younger and older children, the children were divided into two age groups: age group 1, consisting of 18 younger children, 16 from Year 1 and two from Year 2 (age range, 6 years 8 months to 8 years), and age group 2, consisting of 24 older children taken in equal numbers from Years 3, 4 and 5 (age range, 8 years 4 months to 11 years 6 months). The basis for division into pairs was different for each group. Within age group 1, children who could tell at least three riddles were paired with those who could not produce one. For age group 2 the comparison was between children who told an unusually large number of riddles (nine or more) and children who told five riddles or fewer.

The pairs in both groups were matched, as far as possible, for age, sex, grade level and the number and ages of siblings. Since there were few riddle-telling girls in Year 1, it was necessary to have three mixed-sex pairs in age group 1. However, sex differences in performance on the tasks used were either non-existent or favoured the girls; the latter bias worked against the hypotheses of the study.

Tasks

The tasks were a mixture of standardized tests and tasks devised to measure skills potentially related to riddle-telling.

Measures of verbal ability

1. WISC Verbal IQ (Wechsler, 1949).
2. WISC Comprehension: an indicator of general knowledge (Wechsler, 1949).
3. WISC Vocabulary (Wechsler, 1949).
4. WISC Similarities: a measure of the ability to link ideas with abstract concepts (Wechsler, 1949).
5. Verbal Absurdities: chosen as a test for detection of logical inconsistencies outside a humorous context. It comprised four one-sentence stories, adapted from

the revised Stanford-Binet tests of intelligence (Terman & Merrill, 1937).

6. **Ambiguous Words:** a measure of detection of ambiguity in five single words. Children were asked whether a word such as 'bit' could be used in more than one way.
7. **Ambiguous Sentences:** devised to measure, in a non-joking context, detection of the same kinds of ambiguity as those found in riddles. Children were asked the meaning of eight spoken ambiguous sentences and, after a first answer, were then asked if the sentence could mean anything else. Ambiguity was of four kinds, with two examples of each kind: lexical, phonological, surface structure and deep structure. Examples are respectively: 'The girl bought some new glasses'; 'There was a sale (sail) at the boat shop'; 'The girl ran when she saw the bus stop'; 'The police chief told the police to stop speeding'.
8. **Figurative Speech:** devised to measure, in the same way as in the Ambiguous Sentences task, detection of the potential ambiguity of four examples of figurative speech. An example is: 'The man hit the roof when he saw the broken plate'.

Measure of recall **Memory for Stories:** children were asked for immediate recall of two stories, one a straightforward action tale about animals, the other a story based on a myth outside the children's experience.

Measures of non-verbal ability

1. **WISC Digit Span:** a measure of general memory capacity, to supplement the verbal Memory for Stories task (Wechsler, 1949).
2. **Raven's Coloured Progressive Matrices:** this test provided a non-verbal measure of general mental development (Raven, 1965, p.3), and can also be seen as a test of multiple classification (Raven, 1965), a characteristic important in riddle structure (Sutton-Smith, 1976).
3. **Children's Embedded Figures Test:** chosen as a test of ability to detect two meanings in the one stimulus pattern (Witkin et al, 1971).
4. **Reversible Figures:** devised as a non-verbal measure of general reversibility. Children were asked to say what they saw when presented with five well-known reversible figures: old man's face/rat; vase/profiles; Necker cube; reversible spring; reversible stairs. They were then asked if they could see the other possibility.

Measures of social adjustment

1. **Bristol Social Adjustment Guide for the Child at School:** teachers were asked to underline the descriptions of behaviour that applied to each child (e.g. 'chats only when alone with teacher'; 'associates with one other child only and ignores the rest'). Each child was given scores for the core behaviour groups of over-reaction and under-reaction, in addition to the constituent behaviour groupings of inconsequence (impulsiveness), hostility, peer maladaptiveness and non-syndromic over-reaction (constituents of over-reaction score), and unforthcomingness, withdrawal, depression and non-syndromic under-reaction (constituents of under-reaction score). The scale also contained 10 items that indicated anxiety for the acceptance of adults, one of the 12 behaviour groupings in the previous edition of the BSAG (Stott, 1969) and regarded as worth returning to for a study of riddle-telling, since McGhee (1976) found that

children's initiation of verbal humour was significantly correlated with anxiety to please adults (Stott, 1974).

2. Sociometric Measure: children were asked to write the names of three children in their class that they would most like to play with, if they could play with anyone they liked.

The tasks used were the same for both age groups, with two exceptions. The Ambiguous Words task was not used with the older children, as pilot testing showed that children of this age were all able to give more than one meaning for these simple words. Sociometric testing was used for the older age group only.

Procedure

Children were interviewed individually in a quiet room during two sessions, each lasting 45 minutes. The tests were presented in the same order for each child on each testing session.

RESULTS: AGE GROUP 1

Measures of Cognitive Ability

In general, the riddle-tellers showed superior performance on the cognitive tasks; the strongest differences occurred on the Ambiguous Words and Ambiguous Sentences tasks. In contrast, some non-verbal measures did not yield differences (see Table 1).

On analysis with a Wilcoxon Matched Pairs design (Siegel, 1956) the riddle-tellers showed a significantly higher performance on the following tests: WISC Vocabulary ($T(9) = 6, P = 0.05$); WISC Similarities ($T(8) = 4, P = 0.05$); Ambiguous Words ($T(7) = 0, P = 0.02$); Ambiguous Sentences ($T(9) = 0, P < 0.01$). Since these results are based on nine matched pairs only, they represent a strong difference between riddle-tellers and non-riddle-tellers.

On all tasks except the Figurative Speech test every child showed some competence in the ability measured; in most tasks, then, differences were in degree of ability. The difference on the Figurative Speech test was more 'all-or-none' in kind. Eight of the nine riddle-tellers could detect ambiguity in at least one example of figurative speech, whereas only two non-riddle-tellers could do so ($\chi^2(1) = 5.63, P < 0.02$).

Detection of ambiguity Scores for the Ambiguous Sentences task were further analysed by kind of ambiguity: lexical, phonological, surface structure and deep structure. The riddle-tellers were successful in detection of lexical, phonological and surface-structure ambiguity. The non-riddle-tellers were able to detect lexical and phonological ambiguity; only one non-riddle-teller explained any deep-structure ambiguity and none was successful with surface-structure ambiguity. In contrast, all but one riddle-teller detected at least one example of surface-structure ambiguity. The mean group scores for the four kinds of ambiguity are presented in Table 2.

Wilcoxon tests showed that the riddle-tellers were more successful than the non-riddle-tellers in detection of lexical ambiguity ($T(7) = 0, P = 0.02$) and surface-structure ambiguity ($T(8) = 0, P = 0.01$).

Table 1. Mean performance scores for riddle-tellers and non-riddle-tellers on cognitive measures: Age Group 1 (nine matched pairs)

Task	Riddle-tellers (R)		Non riddle-tellers (NR)		Direction of difference: R - NR	No. of Rs superior to matched NR
	Mean	SD	Mean	SD		
WISC Verbal IQ	124.2	8.7	110.7	13.6	+	6
WISC Comprehension (max. 28)	12.0	2.3	10.5	1.4	+	7
WISC Vocabulary (max. 80)	28.7	10.6	27.6	5.1	+ (= 0.05) ^a	8
WISC Similarities (max. 24)	5.8	2.4	4.3	2.4	+ (= 0.05)	6
Verbal Absurdities (max. 4)	3.0	1.4	2.4	0.9	+	5
Ambiguous Words (max. 5)	4.4	0.5	2.7	1.4	+ (= 0.02)	7
Ambiguous Sentences (max. 8)	4.4	1.2	1.9	1.0	+ (< 0.01)	9
Figurative Speech (max. 4)	0.8	0.8	0.3	0.5	+	6
Memory for Stories (max. 16)	9.1	4.0	8.0	4.8	+	6
WISC Digit Span (max. 17)	7.9	3.3	8.0	1.2	-	4
Ravens (Raw Score) (max. 36)	20.1	8.2	20.5	2.8	-	5
Embedded Figures (max. 25)	12.6	6.3	10.4	4.9	+ (< 0.05)	6
Reversible Figures (max. 5)	2.0	1.3	2.4	1.7	-	3

^a Significance level: P value based on Wilcoxon Matched Pairs (two-tailed test).

Table 2. Mean detection rate for four kinds of ambiguity: Age Group 1

Kinds of ambiguity	Riddle-tellers (R)		Non-riddle tellers (NR)		Direction of difference: R - NR
	Mean	SD	Mean	SD	
Lexical (max. 2)	1.89	0.31	1.00	0.47	+ (= 0.02) ^a
Phonological (max. 2)	1.33	0.82	0.78	0.63	+
Surface structure (max. 2)	1.11	0.57	0.00	0.00	+ (= 0.01)
Deep structure (max. 2)	0.11	0.31	0.11	0.31	0

^a Significance level: P value based on Wilcoxon Matched Pairs (two-tailed test).

Social Adjustment

Teachers rated more riddle-tellers than non-riddle-tellers as showing some problems in adjustment. Only two non-riddle-tellers were rated as showing any sign of

'maladjustment': both showed a slight tendency towards unforthcomingness or shyness. In contrast, seven of the nine riddle-tellers were reported as showing 'maladjusted' behaviour of some kind.

Six riddle-tellers and none of the non-riddle-tellers were given scores for over-reaction; the mean difference between the groups was significant ($T(16) = 3.28, P < 0.01$). There was no significant difference between the groups on reported under-reaction. Six riddle-tellers displayed scores that indicated an anxiety for the acceptance of adults, while no such behaviour was reported for non-riddle-tellers; a Wilcoxon test showed that the difference between groups was significant ($T(6) = 0, P = 0.05$).

RESULTS: AGE GROUP 2

Measures of Cognitive Ability

In general, fluent riddle-tellers scored higher on the cognitive tasks than the children who told few riddles. Differences were less sharp, however, than for Age Group 1 and seldom statistically significant. The strongest differences were found for performance on the WISC Similarities test and for verbal intelligence scores. Mean scores and the significance levels of differences are presented in Table 3.

Table 3. Mean performance scores of children who told many riddles and children who told few on cognitive measures: Age Group 2

Task	Many riddles (MR)		Few riddles (FR)		Direction of difference: MR - FR	No. of MRs superior to matched FR
	Mean	SD	Mean	SD		
WISC Verbal IQ	115.5	14.1	103.2	13.5	+ (<0.05) ^a	8
WISC Comprehension (max. 28)	15.6	5.0	13.3	3.9	+	8
WISC Vocabulary (max. 80)	39.3	5.4	35.3	5.5	+	9
WISC Similarities (max. 24)	10.8	3.5	6.6	3.4	+ (<0.02)	11
Verbal Absurdities (max. 4)	3.8	0.5	3.8	0.6	0	2
Ambiguous Sentences (max. 8)	6.3	1.0	5.5	1.6	+	7
Figurative Speech (max. 4)	2.8	1.3	2.8	1.4	0	4
Memory for Stories (max. 16)	13.6	2.3	12.2	3.6	+	8
WISC Digit Span (max. 17)	10.1	1.9	10.5	2.1	-	4
Ravens (Raw Score) (max. 36)	29.2	4.8	27.5	5.6	+	6
Embedded Figures (max. 23)	18.1	3.6	17.4	3.4	+	6
Reversible Figures (max. 5)	3.7	1.1	3.6	1.0	+	4

^a Significance level: P value based on Wilcoxon Matched Pairs (two-tailed test).

Wilcoxon tests showed that fluent riddle-tellers scored higher than their matched peers on WISC Similarities ($T(12) = 9.5$, $P < 0.02$) and had higher WISC intelligence quotients ($T(12) = 13.5$, $P < 0.05$).

Detection of ambiguity Scores for the Ambiguous Sentences task were further analysed by kind of ambiguity: lexical, phonological, surface structure and deep structure. Although there was a high level of detection of ambiguity, only three children could identify the ambiguity in all examples. All but one child were able to explain at least one example of each of the first three kinds of ambiguity: lexical, phonological and surface structure. With deep-structure ambiguity, nine children could not detect ambiguity in either example, and only five explained both examples. The means for the matched groups are presented in Table 4.

Table 4. Mean detection rate for four kinds of ambiguity: Age Group 2

Kind of ambiguity		Many riddles (MR)		Few riddles (FR)		Direction ^a of difference: MR - FR
		Mean	SD	Mean	SD	
Lexical	(max. 2)	1.92	0.28	1.58	0.64	+
Phonological	(max. 2)	2.00	0.00	1.67	0.63	+
Surface structure	(max. 2)	1.42	0.49	1.58	0.49	-
Deep structure	(max. 2)	1.00	0.71	0.67	0.75	+

^a All differences were not statistically significant, based on Wilcoxon Matched Pairs (two-tailed test).

There were no significant differences between the groups on any kind of ambiguity.

Social Adjustment

Twenty children were rated as showing some signs of 'maladjustment'; two children in each group were rated as normal in social adjustment. The fluent riddle-tellers had higher mean scores than the poor riddle-tellers on over-reaction and lower mean scores on under-reaction: these differences were not significant. Fluent riddle-tellers also showed a greater (non-significant) tendency to be anxious to please adults.

Popularity A Wilcoxon test showed no significant difference between the groups when popularity was expressed in scores that ranged from 1 (isolate) to 5 (star). One difference between the groups, however, was in the distribution of popularity. Whereas four of the fluent riddle-tellers were at the extremes of popularity (one star and three isolates), the children who told few riddles were grouped around the average in popularity.

DISCUSSION

The main results of this study are (a) that riddle-telling has some correlates in both cognitive and social domains, and (b) that the correlates vary with the age group studied.

The finding of cognitive correlates substantiates the literature that shows some relation between the understanding of riddles and cognitive development as measured by Piagetian tasks (Athey, 1977; Whitt & Prentice, 1977) or vocabulary (Prentice & Fathman, 1975). In addition, this study provides a more detailed account of the cognitive abilities associated with riddle-telling; verbal abilities were found to be more important than non-verbal abilities but, surprisingly, high scores on measures of recall bore little relation to fluent riddle-telling.

Cognitive correlates differed for the two age groups. For younger children who had just learned to tell riddles, riddle-tellers had higher scores on a variety of cognitive tasks, both verbal and non-verbal; cognitive correlates were fewer for the advanced riddle-tellers at higher grade levels, and were restricted to verbal measures. The results of the present study indicate that the importance of social correlates also differs with age: only the younger group of advanced riddle-tellers differed significantly from their peers in social adjustment.

The results raise three further issues. The first is the question of which cognitive abilities and skills are necessary for children to tell riddles. Inspection of patterns of scoring among the six-year-olds in the present study indicates the multiplicity of skills involved.

In the test performances of the young riddle-tellers there were many scores higher than any of the non-riddle-tellers, on the ambiguity tasks (words and sentences), the Embedded Figures test, the Figurative Speech task and the WISC Vocabulary and Similarities tests. There appeared to be three possible 'core' combinations of high-scoring tasks: Ambiguous Words, Embedded Figures and Vocabulary (three children); Ambiguous Words, Ambiguous Sentences and Similarities (three children); and Ambiguous Words, Ambiguous Sentences, Vocabulary and Figurative Speech (three children). Depending on the 'core' abilities, there were several tasks that were 'optional' additions to this array of scores. These were the Embedded Figures, Vocabulary, Similarities and Figurative Speech Task.

It is possible that one of these patterns of skills may be more important than the others for initial riddle-telling, or that additional abilities are required. However, these predictions would need to be tested with larger numbers of children before any firmer conclusions could be made.

Another issue arises from the unexpected finding that young riddle-tellers are more often rated as socially 'maladjusted' than their non-riddle-telling peers. It may be that riddle-telling and 'maladjustment' have some kind of common correlate such as extraversion, or there may be a more direct link between the two. For example, the children's anxiety for the acceptance of adults, one aspect of their 'maladjustment', may prompt them to use riddles as one way of gaining the attention and approval of their teachers, parents and other adults.

On the other hand, the higher maladjustment scores of the riddle-tellers may be an artifact of the sampling. Since more boys than girls told riddles in Year 1, more boys were included in the riddle-telling group. Boys show more signs of social maladjustment than do girls (Stott, 1974, p.29), and so the sex of the children, with more boys in the riddle-telling than in the non-riddle-telling group, may have artificially increased maladjustment scores for the riddle-tellers.

It could also be argued that this result represents the true situation at that time. In Year 1 boys are more likely than girls to be both riddle-tellers and more socially maladjusted. Again, a further study would be needed to decide between these various interpretations.

A third issue arises from the popularity scores of the older group of children. The children who told nine riddles or more were even more likely than their matched peers to be at the extremes of popularity: one child was a 'star', having received more than five friendship choices, and three were isolates, having received none. This result suggests that there may be several reasons for children's having such a large stock of riddles. Popular children may tell a lot of riddles as part of their leadership and entertainment role in the playground, and, having more friends, may also have access to more sources of riddles than less popular children.

Whatever the reasons for the riddle-telling of popular children, an unpopular child may observe popular children and conclude that telling a lot of riddles is a criterial attribute of popularity, and so may strive to learn riddles to be popular. According to the results of the present study, however, the ability to produce many riddles on request does not guarantee popularity, as evidenced by the three isolates in the advanced riddle-telling group. Popularity may depend not on the number of riddles told but on their novelty and style of presentation.

The question of why some very good riddle-tellers should have high popularity and some not remains a question to be answered with a larger sample of children and a wider investigation of other social characteristics associated with leadership roles. The results point clearly, however, to the need for future investigations to consider both cognitive and social factors, and to expect different patterns of correlates according to children's degree of experience in riddle-telling.

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