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ABSTRACT

NINETY-SIX FIFTH-GRADE CHILDREN--REPRESENTING ALL CCMBINATICNS OF MALE AND FEMALE, LOW AND MIDDLE SOCIOECONOMIC STATUS, AND NEGRO AND WHITE CHARACTERISTICS--WERE ARRANGED IN PAIRS WITH PEERS OF THE SAME SEX, ECONCMIC BACKGROUND, AND RACE. THE PAIRS WERE OBSERVED IN A TWO-PARTY COMMUNICATION SITUATION WHICH INVOLVED THE EXCHANGE OF DESCRIPTIVE INFCRMATION IN CRDER TO IDENTIFY SIMILAR PICTURES. RESULTS SHOWED THAT MIDDLE SCCIOECONCMIC CLASS PAIRS WERE SIGNIFICANTLY MCRE ACCURATE IN THE PICTURE IDENTIFICATION THAN WERE THE LOWER CLASS PAIRS AND THAT WHITE PAIRS WERE SIGNIFICANTLY MORE ACCURATE THAN NEGRO PAIRS. CBSERVED DIFFERENCES COULD NOT BE ATTRIBUTED TO DIFFERENCES IN IQ NOR TO DIFFERENCES IN AMOUNT OF VERBAL DISCUSSION REQUIRED TC COMPLETE THE TASK. DIFFERENCES BETWEEN SES GROUPS WERE PARTLY ATTRIBUTED TO THE MIDDLE-CLASS GROUPS' ABILITY TO COMMUNICATE MORE CRITICAL ATTRIBUTES ABOUT THE PICTURES. THESE DIFFERENCES IN LANGUAGE USAGE WHICH ARE RELATED TO THE ACCURATE EXCHANGE OF INFORMATICN HAVE IMPORTANT IMPLICATIONS FOR THE DESIGN AND CONTENT OF LANGUAGE ARTS CURRICULA. (TABLES OF RESULTS AND SELECTED REFERENCES ARE PROVIDED.) (AUTHOR/LH)

CHILDREN'S COMMUNICATION ACCURACY

RELATED TO RACE AND SOCIOECONOMIC STATUS

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ABSTRACT

Ninety-six fifth-grade children representing all combinations of male and female, low and middle SES and Negro and white characteristics were arranged in dyads with peers of the same sex, SES and race. Dyads were observed in a two-person communication situation which involved the exchange of descriptive information in order to complete a task accurately. Middle SES dyads were significantly more accurate than low SES dyads. White dyads were significantly more accurate than Negro dyads. Observed differences could not be attributed to differences in the mean dyad IQ nor to differences in amount of verbal production. Differences between SES groups were partly attributed to differences in the number of critical descriptive attributes communicated.

CONTENTS

Introduction

Along with the growing interest in cultural differences in cognitive development and in language performance, there has been an increased awareness of the possibility that both the form and use of language may be important factors in academic achievement. Much of the attention to this problem has been devoted to the description of the grammatical form of Black English, or non-standard Negro English, as it contrasts to standard English and as it might be expected to interfere with school achievement. However, in addition to differences in language form it is also reasonable to assume that differences exist in the way language is used. Of particular importance in school, as well as other practical situations, is the use of language to exchange information with others in order to solve problems and complete tasks accurately and efficiently. The intent of this investigation is, first of all, to discover whether differences in this use of language to exchange task relevant information do exist between the inner-city Negro children and the more standard speaking middle class children, and if so, to begin to identify characteristics of their communications which account for these differences in accuracy and efficiency.

Among psychologists interest has recently increased in the study of communication and in the identification of cognitive and linguistic factors related to successful performance. Mehrabian and Reed (1968) provide a review of this literature and Flavell, et al. (1968) offer

another review somewhat different in scope and focus. Many experimental investigations of communication have used a variation of Carroll's Two-Person Communication Game. In this situation, the two communicators are seated opposite one another at a table but are separated by a partition. Each communicator has one or more referent objects in front of him which he must communicate to the other. By manipulating qualities of the referents to be communicated, or characteristics of the communicators, or by placing restrictions on the opportunity to receive feedback, many features of the communication process can be explored. The most frequent use of the paradigm is in a controlled examination of the encoding-decoding process. In this situation verbal exchange or feedback is restricted so that one person describes or encodes a referent object and the other decodes that message, making a selection indicating what he assumes is the referent. The accuracy of this selection, then, is used to assess the accuracy of communication. Three of these encoding-decoding studies have included social class as a variable in their experimental designs (Cowan, 1967; Heider, et al., 1968; Krauss & Rotter, 1968). All three found the performance of middle class children superior to the performance of lower class children.

Heider, et al. (1968) further analyzed the styles of the successful and unsuccessful encodings and found that in their task encodings which described parts of the referent objects were more likely to be successfully decoded than encodings which described the whole object. They also found that this different style of encoding was related to social class. The descriptions offered by the lower class children were

largely "whole-inferential," while those of the middle class tended to be "part-descriptive." A similar cognitive difference in boys from different social classes was reported by Ryckman (1967). A principle component analysis of 18 language ability tests administered to middle and lower class Negro boys yielded a component described as "the ability to classify or label visual input." This component significantly ($p < .01$) discriminated between the two social classes. That is, the lower class Negroes were less able to classify and label visual input then were the middle class Negro children.

This evidence suggests that middle class children might be more successful in solving communication tasks which require the exchange of descriptive information. However, generalizing from the performance of children in these controlled encoding-decoding tasks to predict the accuracy of their performance in more natural situations where questions and feedback can modify the encoding and decoding may not be justified. Krauss and Weinheimer (1966) have demonstrated the important, facilitating effect of feedback on communication accuracy in the two-person communication game paradigm. The particular importance of the feedback and questioning process in communication for the lower class children is suggested by a finding reported by Heider, et al. (1968). Following up their first finding of the social classes' different use of part and whole descriptive styles, they found that with repeated requests for more information, both lower and middle class children eventually described the critical parts necessary for successful decoding.

In this study, therefore, children will be observed performing a communication task where descriptive information is exchanged and no restrictions are placed on the feedback process permitted between the

two communicators. Furthermore, in order to facilitate the feedback process and reduce the effects of an unfamiliar experimental situation, children will be paired with peers of the same sex, race and socio-economic status.

While the previously mentioned studies were concerned with social class differences in language usage, it is interesting to note that the studies of form differences are usually concerned with the racial characteristics of the speaker rather than his socioeconomic status. The studies usually find large differences between low SES Negroes and low or middle SES white speakers (Garvey & McFarlane, 1970; Labov, 1969). A recent study has compared the speech of low SES Negroes to that of middle SES Negroes and begun to explore the language form correlates of social class within Negroes (Wolfram, 1969). Therefore, in light of the importance of race in studies of language form, it is of interest to include race as well as social class as a variable in this study and to consider the two factors independently.

A few related studies have controlled both race and social class but the evidence for racial differences independent of social class differences is sparse and conflicting. There is evidence that white children are superior to black on various tests of vocabulary and verbal reasoning (Carson & Rabin, 1960; Stodolsky & Lesser, 1967; Whiteman & Deutsch, 1968), and these verbal skills would be expected to influence performance on a communication task. Heider, et al. (1968), however, observed both Negro and white, low socioeconomic status children and found that race was not significantly related to encoding or decoding success. Thus, since evidence is incomplete, no predictions concerning racial differences are made, but both Negro and white students from both low and middle socioeconomic status will be observed.

In summary then, there is evidence which suggests that low socio-economic status children would be disadvantaged in communication tasks which required the exchange of information. The available evidence, however, is based on individually administered cognitive and verbal tests and on controlled encoding and decoding tasks. No comparative observations have been made in communication situations where no important restrictions were placed on the ongoing communication process. Moreover, the previous related investigations do not permit an assessment of both socioeconomic and racial factors independently. This study, therefore, will compare the success of both Negro and white and middle and low socioeconomic status children in a communication task where no restrictions are placed on the verbal exchanges between the communicators. Since the solution of practical problems often requires an efficient as well as accurate communication, measures of both accuracy and efficiency will be used to assess successful performance on this task.

Method

Subjects

The sample consisted of Negro and white fifth graders from low and middle socioeconomic backgrounds. Six dyads of girls and six dyads of boys were selected from each of the four population groups (black, white; low and middle SES). The selection procedure consisted of selecting four neighborhoods in Baltimore which, according to census tract data, represented the four populations. Letter-questionnaires were sent home to the parents of the fifth-grade students in the schools serving those neighborhoods, and the sample was selected from those students (approximately 77%) who returned the questionnaires.

Information concerning the occupation of the head-of-household was obtained from the questionnaires and rated according to the Hollingshead occupational scale (Hollingshead & Redlich, 1958). The scale includes seven levels. If the occupation of the head-of-household was rated at one of the three bottom levels (skilled worker, semi-skilled worker or unskilled worker) the S was designated as low SES. If the occupation was rated above that (owners of businesses, executives, managers, professional workers), S was designated as middle SES. Therefore the Ss designated low SES Negro were Negro fifth graders who lived in a largely black urban neighborhood, which was in the first quaritle in the 1960 city ratings of unemployment, poverty and below eighth-grade adult education level. From the letter-questionnaires it was determined that the heads-of-households for all the Ss in this group were engaged

in occupations designated below level three on the Hollingshead occupational scale, and the average number living in a household was 6.46. The low SES white Ss were fifth graders from a largely white urban neighborhood, also in the first quartile in the 1960 city ratings of unemployment, poverty and less than eighth-grade adult education level. The heads-of-households for all Ss in this group were in occupations designated below level three on the Hollingshead occupational scale, and the average number living in a household was 5.33.

The Negro and white middle SES groups both came from neighborhoods located within, but near the edge of, the Baltimore city limits. Both neighborhoods were in the fourth quartile in the 1960 ratings of unemployment, poverty and less than eighth-grade adult education level. The heads-of-households for all Ss in these groups were rated above level three on the Hollingshead scale, and for both the Negro and white groups the average number living in a household was 4.75. The middle SES Negro Ss came from a largely Negro neighborhood; the middle SES white Ss came from a largely white neighborhood.

The population of students considered for selection was further restricted by considering only those students who were of normal age-grade placement and whose Kuhlman-Anderson IQ scores were within a normal range (85-115). The twelve boys and twelve girls were selected randomly from the fifth graders who met all criteria of selection for each of the four population groups.

The twelve students within each sex, race and SES group of the sample were randomly assigned to dyads. Thus, the communication behavior observed occurred between randomly selected peers of the same

sex, age, race and socioeconomic status. This arrangement of Ss in dyads of peers was used in order to avoid factors which would be expected to interfere with fluent communication such as differing status of the two participants and possible cultural differences in the use of referents and communication styles.

Communication Task

A variation of Carroll's two-person communication game was constructed. One person was given a card containing one picture. Another person, seated on the opposite side of a partition was given a page containing seven pictures. No restrictions were placed on the dyad's verbal communication. A task was terminated when the person with the group of pictures pointed out to E the one on his page which he said matched his partner's picture. Ten different tasks were presented consecutively.

The stimulus materials used in the tasks consisted of ten groups of pictures. Each group contained a 3" x 5" index card with a single picture on it and an 8 1/2" x 11" page with seven different pictures on it. Only one of the seven pictures was exactly like the single picture. The pictures in each group consisted of seven variations of one figure which had four attributes that could be varied independently. For example, Figure 1 shows a bird which has a beret or a crown, an open or closed beak, a fluffy or smooth tail, and knobby or straight knees. A random process was used to select the particular combination of four attributes which were included in the single picture. In Figure 1, the bird in position 7 which has the beret, closed beak, fluffy tail and knobby knees is exactly like the single picture. In a similar manner, a random process was used to select two combinations

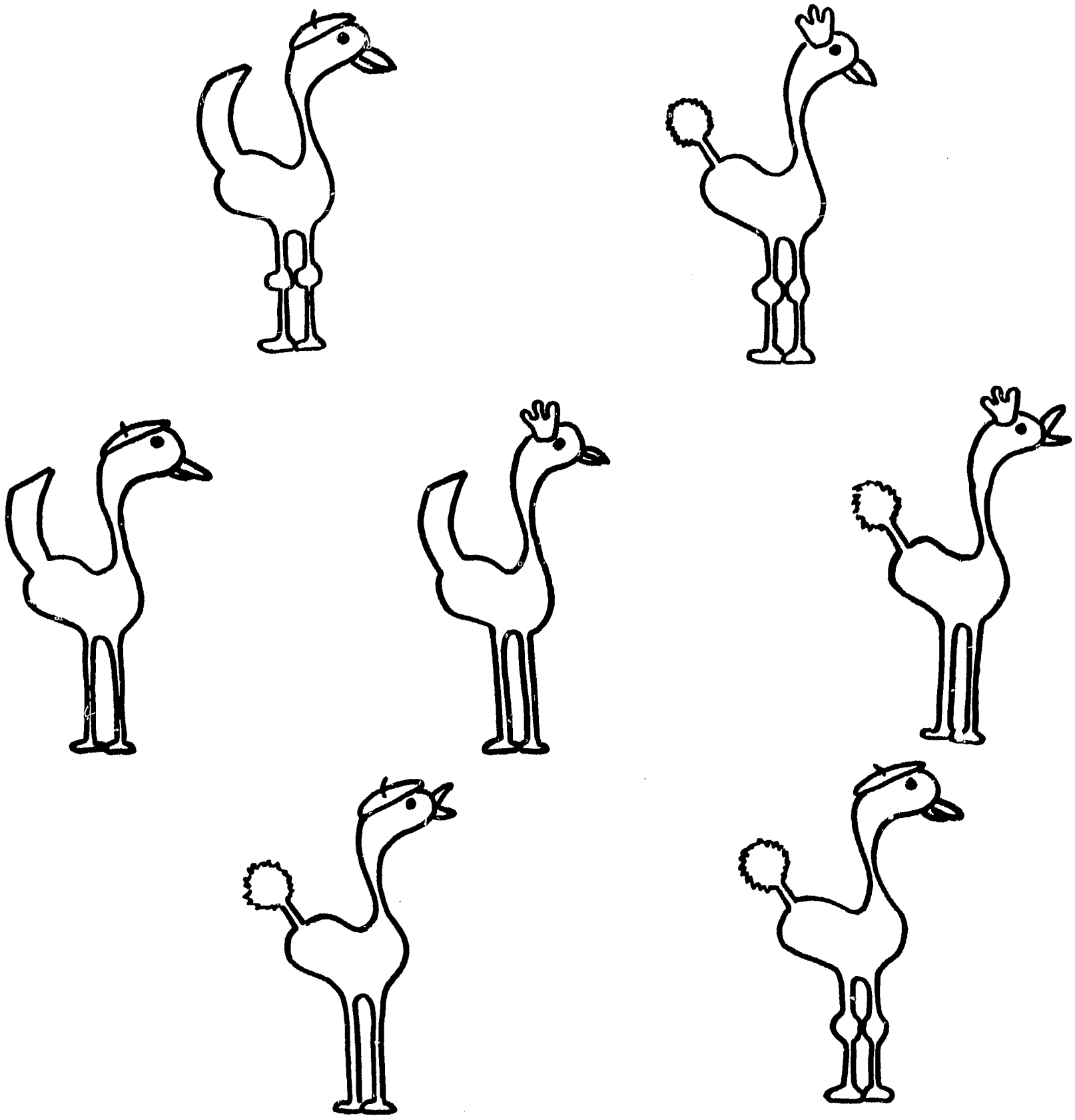

Figure 1.— Experimental Task.

of the four attributes which differed from the single picture on only one dimension, two combinations which differed from the single picture on two dimensions and two combinations which differed on three dimensions. These six combinations plus the combination represented in the single picture were randomly assigned to positions on the 8 1/2" x 11" sheet. The dyad's choice was scored for accuracy by counting the number of critical attributes the chosen and the correct figure had in common. Thus, the accuracy score for one task could range from 1 to 4 (completely correct).

Procedure

Children came from their classroom, two at a time, to a small room in the school building. Male dyads of children were greeted by a male E; female dyads were met by a female E. The two Ss were seated at a table with a screen between them to prevent any non-verbal communication. An Electro-Voice microphone was placed on the screen separating the Ss and a Uher (Model 4000) tape recorder was used throughout the experimental procedure. Two rounds of "Password" were played as a warm up procedure. Then the following instructions were given to introduce the communication game:

> Now you are going to play a different game. In this game, you will have to act as a team if you want to win. Here are the rules: One member of the team will get one single picture. The other member of the team will receive a group of pictures. Only one of the pictures in the group is exactly like the single picture. The team's job is to find out which two pictures are exactly alike. The way you find out which two pictures are alike is up to you. You can both ask each other any questions you want to, and you can take as long as you want to. The only thing you can't do is look at each other's pictures. When you are both sure you know which two pictures are exactly alike, the person with the group of pictures will point out the picture in his group exactly like your single picture. At the end of the game I will tell you how many correct choices the team made. Any questions?

Procedural questions were answered where possible by repeating phrases in the standard instructions and then E presented the ten groups of pictures to the Ss, alternating the recipient of the single picture. E presented the tasks with standard instructions and then withdrew from the interaction. The dyad conversed until the S with the group of pictures was ready to show E his choice. E wrote down the choice and presented the next set of pictures. No feedback was provided by E with regard to correctness of choice until all ten trials had been completed.

Results and Discussion

Communication Accuracy

The first results reported concern communication accuracy. Accuracy was measured by the mean number of critical attributes present in the selections made at the end of each task. Scores, therefore, were means based on ten tasks and could range from 1 to 4. The means of the SES and race groups are shown in Table 1.[1] A 2^3 analysis of variance was performed to assess the variance in accuracy scores attributable to socioeconomic status, race, sex and their interactions. The dyad was the unit of analysis. Significant results were observed for socioeconomic status and race. Middle SES dyads were more accurate than low SES dyads ($F=23.31$, d.f. 1, 40, $p < .01$) and white dyads were more accurate than Negro dyads ($F=4.81$, d.f. 1, 40, $p < .05$). No significant sex effect nor interaction effects were observed.

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[1] In order to estimate an optimal standard of performance, six of the ten tasks were administered to six dyads of junior psychology students at Johns Hopkins University. Their mean accuracy score, based on six tasks, was 3.83.

TABLE 1

Mean Accuracy Scores for

Negro, White; Middle and Low SES Dyads

Race	Socioeconomic Status		Socioeconomic Status Groups Combined
	Low	Middle	
Negro	3.12	3.45	3.29
White	3.28	3.59	3.43
Race Groups Combined	3.20	3.51	

The sampling procedure for selecting students restricted the range of student IQ (85-115, Kuhlman-Anderson scores). This sampling plan was intended to eliminate the effects of abnormally high and low IQ on communication accuracy. As might be expected, however, IQ, though restricted in range, was still significantly related to socio-economic status in the observed sample ($r=.58$, $p < .01$). The mean Kuhlman-Anderson IQ score of the four population groups is shown in Table 2.

Since IQ was also significantly related to communication accuracy ($r=.30$, $p < .05$), the analysis of the communication accuracy scores was repeated using the dyad mean IQ as a covariate. The significant effects in the analysis were unchanged. In other words, even when the

effects of IQ were removed, middle SES dyads were more accurate than low SES dyads ($F=13.34$, $p < .01$) and white dyads were more accurate than Negro dyads ($F=4.35$, $p < .05$).

TABLE 2

Mean IQ for Negro, White; Middle and Low SES Dyads

Race	Socioeconomic Status		Socioeconomic Status Groups Combined
	Low	Middle	
Negro	96.5	99.8	98.15
White	92.2	102.8	97.5
Racial Groups Combined	94.35	101.8	----

The significant difference in accuracy between the middle and low SES groups was predicted. The racial differences, however, cannot be clearly explained by the existing literature. The findings agree with those of Stodolsky and Lesser (1967) who found that race and SES were independent factors in influencing performance on cognitive tests. However, they are not consistent with the study conducted by Heider, et al. (1968) which did not show racial differences in either encoding or decoding tasks. This discrepancy can perhaps be explained by the fact that the two-person communication task used in this study involved more complex communication skills than the task used in Heider's investigation. While simple encoding and decoding ability

is probably one factor related to successful performance in this situation, other skills involved in asking questions and requesting feedback may also account for variation in communication accuracy.

Communication Efficiency

It was assumed that efficiency as well as accuracy was an important consideration in task relevant communication. Efficiency concerns the amount of verbal production required to attain a given level of communication accuracy. The efficiency score, then, was the ratio of accuracy attained to total number of words. The total number of words was counted from typed transcripts of the communications used to complete all ten tasks, and the accuracy score, also based on all ten tasks, was that used in the previous analysis.

Since the units in the two scales, accuracy and number of words, were noncomparable, the scores in both distributions were converted to standard scores and increased by ten. Thus the transformed scores on both scales were positive numbers expressed in standard deviation units, and the efficiency score for each dyad was the ratio of the transformed accuracy scores to the transformed number of words.

A 2^3 analysis of variance was performed on the efficiency scores to assess the effects of socioeconomic status, race, sex and their interactions. The results of this analysis paralleled the accuracy results. Middle SES dyads were significantly more efficient than low SES dyads ($F=15.82$, d.f. 1, 40, $p < .01$) and white dyads were significantly more efficient than Negro dyads ($F=5.26$, d.f.=1, 40, $p < .05$). No significant sex effect nor interaction effects were observed. The means for the four groups are shown in Table 3.[2]

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[2]A mean efficiency score was also computed for the six dyads of Johns Hopkins students using the norms of the ten-year-olds to compute the transformations. Their mean efficiency score was 1.25.

TABLE 3

Mean Efficiency Scores for

Negro, White; Middle and Low SES Dyads

Race	Socioeconomic Status		Socioeconomic Status Groups Combined
	Low	Middle	
Negro	.88	1.02	.95
White	.95	1.11	1.03
Racial Groups Combined	.92	1.06	

Perhaps more interesting than the efficiency scores is the relation of number of words exchanged to other variables in the study. Number of words was not significantly related to accuracy (r=.15) nor to SES (r=-.01) nor to race (r=.11). Therefore, the fact that the results of the efficiency and accuracy analyses are similar is not surprising. The middle SES dyads and white dyads were more efficient than the low SES and Negro dyads respectively because, with approximately the same number of words, they communicated more accurately.

The fact that the total number of words produced by the dyads is similar in the four populations is a somewhat unexpected finding. Others (Entwisle & Garvey, 1969; Lawton, 1968; Williams, 1968) have found verbal productivity related to subcultural differences. A possible explanation for these different findings is that the speech situations observed by the previous investigators were open-ended monologues, i.e., story-telling, written essays, oral responses to

questions about television. The speech situation in this study was different, in that there was a specific task to be completed and the speech occurred in an interaction between two persons. Hence, the end of verbal production was determined by the dyad's implicit agreement that the task was complete. In this goal-directed speech situation, the verbal productivity of the social and racial groups was similar.[3] Thus, it is possible that group differences in verbal productivity are situation specific and the function of speech must be taken into account before cultural differences in verbal productivity are interpreted. Another explanation for the differences between our findings and those previously reported may be the status difference between the addressor and addressee. In the previous studies, the children were talking or writing to an adult experimenter. In this study, children were talking to their peers. It may be that the unfamiliar speech situation with an adult experimenter is more inhibiting for the lower class child, who perhaps converses more often with brothers, sisters and peers than with adults.

Communication of Critical Attributes

One of the skills required in this task was the identification and communication of the critical attributes which distinguished the correct figure from the six incorrect figures. In light of Heider's finding that lower class ten-year-olds used less part-descriptive words than middle class ten-year-olds in their encodings of abstract shapes and faces and Ryckman's similar finding of differences between middle class and lower class Negroes on the tests of visual

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[3]Another measure of verbal productivity was also considered, the number of verbal exchanges between the members of the dyad. Number of exchanges, like number of words, was unrelated to race (r=.10) and SES (r=-.03).

classification, it was expected that the lower class children's less accurate communication could be attributed, in part, to their failure to identify and communicate the critical information required for an accurate solution. The verbal exchanges, therefore, were scored according to the number of critical attributes communicated. In any one task, then, the score could range from 0 (no critical attribute communicated) to 4 (all four critical attributes communicated). Since the tasks did not involve all possible combinations of the four critical attributes, it was sometimes possible to make the correct identification knowing only two or three of the critical attributes. Thus, if the dyad communicated less than four critical attributes but still had sufficient information to make the correct choice, the dyad was given a score of 4.

As expected, the number of attributes communicated was significantly correlated with communication accuracy ($r=.65$ $p < .01$). Point biserial correlations between this variable and the three status variables, SES, race and sex, was computed. Neither sex ($r=.18$) nor race ($r=.11$) were significantly related, but as predicted the socio-economic status of dyad members was ($r=.54$). The mean number of attributes communicated, based on all ten tasks, are shown in Table 4. The column totals reveal the significantly larger number of critical attributes communicated by the middle SES dyads.[4]

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[4]The number of critical attributes communicated per task was also computed for the six dyads of Johns Hopkins students. Only one dyad on one task failed to communicate all of the critical attributes necessary for a correct solution. The group mean, therefore, was nearly a perfect score, 3.97.

TABLE 4

Mean Number of Critical Attributes Communicated

Race	Socioeconomic Status	
	Low	Middle
NEGRO		
Male	2.33	3.07
Female	2.40	3.12
WHITE		
Male	2.30	3.05
Female	2.82	3.30
Total SES Groups	2.46	3.13

It is interesting to compare these findings with Heider's (1968). In a simple encoding task she found that middle class ten-year-olds used more descriptions of parts than low class ten-year-olds. In a follow-up study where E continued to request more description until sufficient information for accurate decoding was available, both low and middle class children mentioned the necessary critical parts of the figures. In the present study, where requests for additional information were not controlled and were provided by a peer from the same socioeconomic status, the findings are similar to Heider's first study. Low SES dyads made their choices and ended the tasks after communicating fewer descriptions of critical parts of the figures than middle SES dyads.

Summary and Conclusions

This initial observation of the communication of Negro and white, low and middle SES ten-year-olds has suggested that there are large differences in the accuracy of communications between dyads of peers from the four population groups. The largest differences were between SES groups, middle SES being more accurate than low SES. The difference between racial groups was also significant, white dyads being more accurate than Negro. An analysis of covariance controlling for IQ differences demonstrates that these findings cannot be attributed to differences in the mean dyad IQ's of the population groups. Also, since all four groups of dyads used approximately the same number of words and exchanges to complete the tasks, differences could not be attributed to simple differences in amount of verbal production. This similarity in amount of verbal production combined with the large differences in accuracy permitted the observation that the communications of middle SES dyads were more efficient than the low SES dyads and the white dyads were more efficient than the Negro dyads.

The differences between the low and middle SES dyads' communication accuracy was partly attributed to their differences in describing and requesting information about the figures, i.e., the middle SES dyads communicated more critical attributes than the low SES dyads. This characteristic could not, however, account for differences between the racial groups.

The fact that racial and social groups exhibited similar amounts of verbal behavior and yet differed in communication accuracy is an encouraging experimental finding for now it is possible to look for subcultural differences in language usage which could account for differences in accuracy of information-exchange. Other goal-directed communication tasks are being observed to increase the sample of communication behaviors and to test the extent to which observations made in the picture selection task generalize to other goal-oriented communications. Differences in language usage which are related to the accurate exchange of information have important implications for the design and content of language arts curricula.

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