

Deictic Categories in the Language of Autistic Children¹

Giampiero Bartolucci² and Robert J. Albers

Hall Mercer Community Mental Health Center, Philadelphia, Pennsylvania

Certain characteristics of the syntactic structures of the language of autistic children, such as their lack of mastery of pronomialization, have been described. It is proposed that further investigation of syntactic structures, particularly those related to deixis, may show a specific deviance in verbal autistic children. A pilot investigation of the production of tense markers in three autistic, three mentally retarded, and two normal children is reported. The testing for the production of tense inflections was done in a standardized structured test situation using pictures and toys. The transcripts were scored according to agreed-upon criteria for expecting the appearance of a certain tense form. Significant differences were found in the production of the past tense; the percent of correct responses was 80% for the normal children, 8% for the autistic subjects, and the mentally retarded subjects fell in between with 60%. It is concluded that the initial hypothesis of deviance of language acquisition in childhood autism, particularly in areas related to language deixis, is strengthened by the results.

The study of language in autistic children is considered an important key to their diagnostic assessment, their prognosis, and possibly to the specific psychopathology of the syndrome (Rutter, Bartak, & Newman, 1971). The extent of the language deficit is indicated by the incidence of mutism, which goes from 28% in the group described by Wolff and Chess (1965) to 61% in the sample of Fish, Shapiro, and Campbell (1966); several other studies place its incidence between these two values. What is described as *mutism* usually involves a definite defect in comprehension and a

¹ This study was supported by grant No. 5 S01 RR05590, from Pennsylvania Hospital, Philadelphia, Pennsylvania. Ms. Lisa Barsky and Ms. Jessica Bondy of Swarthmore College assisted in data collection, transcript preparation, and scoring. Access to subjects was facilitated by The Developmental Center for Autistic Children, Philadelphia, Pennsylvania.

² Requests for reprints should be sent to Dr. Giampiero Bartolucci, McMaster Psychiatric Unit, St. Joseph's Hospital, 43 Charlton Avenue East, Hamilton, Ontario, Canada. L8N 1Y3.

failure to develop nonverbal systems of communication (Provonost, Wakstein, & Wakstein, 1966). The abnormality in speech development is related to IQ (Fish, Shapiro, Campbell, & Wile, 1968; Rutter, Greenfeld, & Lockyer, 1967); the prognostic value of a failure to develop language was stressed by Bender (1964) and by Eisenberg (1956). Failure to develop speech and loss of previous speech habits also seem to be related to a variety of other behavioral and perceptual abnormalities.

In those cases in which language does develop, questions and informative statements are infrequent or absent, and the mean sentence length is shorter in autistic children than in normal children of their chronological age; words are often used idiosyncratically, and stress, pitch, and articulation are deviant (Cunningham & Dixon, 1961; Goldfarb, Braunstein, & Lorge, 1956; Wing, 1966; Wolff & Chess, 1965). Echolalia and pronominal reversal have been among the traditional clinical signs of infantile autism (Kanner, 1943, 1948). Rutter (1965) reports a 75% incidence of echolalia and a 25% incidence of obvious problems in the use of pronouns. Fay (1969; 1971) has discussed the nature of echolalia in childhood autism and suggested that it is based on a lack of comprehension of verbal messages coupled with a wish to retain social contact. Shapiro, Roberts, and Fish (1970) point to the lack of restructuring in the imitative utterances of schizophrenic children; on the other hand, in a normal group, restructuring seemed consistent with the level of mastery of syntactic structures (Menyuk, 1969).

There are only a few available studies of syntactic structures in childhood autism. Hermelin and O'Connor (1967) have demonstrated that autistic children do not seem to use syntactic and semantic structures in the recall of series of words, contrary to what is observed in normal and mentally retarded children. This work and that of others (Frith, 1969; Hermelin & O'Connor, 1970; Tubbs, 1966) suggest that this may be one expression of a general disorder characterized by a lack of appreciation of any kind of a meaningful structure, particularly at the level of auditory-verbal input.

If autistic children do not decode structure, it was hypothesized that they should be handicapped in the acquisition of syntactic structures and that the development of some or all of the syntactic and morphological aspects of their language should deviate from that of both normal and mentally retarded subjects. Therefore, a systematic investigation of the development of syntactic structures in a group of autistic subjects was begun.

The only unquestionable evidence of a systematic problem comes from the often-quoted difficulties presented by autistic children in mastering the pronominal system. However, to state that pronouns are inverted in echolalic utterances and that the tendency to echo is the key abnormality simply shifts the question about pronouns to the origin of the echolalic process. We assumed that Fay's (1971) interpretation is basically correct and that in echoing, the child

betrays his lack of comprehension. Since there was no evidence that pronouns are a self-sufficient syntactic system which can be affected in an isolated fashion, we proposed the hypothesis that the problem shown by autistic children in mastering pronouns is only the most obvious aspect of a more general problem, namely, the development of deictic syntactic categories. All language typically occurs in a certain space, at a certain time, and between a speaker and hearer; each of these parameters frequently shifts in the stream of utterances. These orientational features of language are handled at the morphological level primarily by the personal pronouns, the adverbials of place and time (e.g., here, there; now, then), and the verb inflections. Together, these are called *the deictic system* of language (Lyons, 1968 pp.275-281). It was our hypothesis that the deviance in the language of autistic children would be particularly manifest in these deictic categories. We therefore began our study of syntax development with an investigation of verb tenses in a group of autistic, mentally retarded, and normal subjects. Tenses show the location of an event in time, and, in the English language, an inflection creates a two-way contrast between past and present. The sound *-ed*, uttered by a speaker in "loved," is an inflection which gives form to the fact that the event "to love" is located in the past. Another inflection is the sound *-s*, in "he loves," which marks the fact that a third person is engaged in the act. In this article, the words *inflection* and *marker* are used interchangeably.

A certain amount is known about the development of tense markers in normal children. Berko (1961) tested the appearance of past tense markers in a group of preschool and first-grade children by presenting her subjects with artificial verbs which described a simple action. For example, a man shaking an object was said to know how *to naz*. Then the child was told that the man had done the same thing the day before, and the production of the past tense marker was elicited by saying, "Yesterday he . . .," inviting the child to complete the sentence. The progressive present marker was tested in a similar way. The results indicated that the first-graders were performing better than the preschool children, that the progressive present marker was mastered much better than the past tense marker, and that the performance on these tests depended also on the particular inflection needed to form the past tense. The children produced the correct past tense *binged* more consistently than the past tenses *spowed* or *motted*, and the present progressive marker was produced correctly by 90% of the children. Cazden (1968), in a longitudinal five-year study of three normal children, also found that the present progressive marker was used before the third person present singular marker and that only at a later age did the children use the past marker up to criterion, which in this study is 90% accuracy.

The studies more closely related to our area of investigation are those by Lovell and Bradbury (1967) and Spradlin and McLean (1967), who studied mentally retarded subjects. Both papers demonstrated that mentally retarded

subjects, given the Berko test described above, perform at a level lower than preschool and first-grade children in the use of past, present, and progressive tense markers. Spradlin and McLean (1967) controlled for the influence of socioeconomic factors. In both studies, the mentally retarded subjects show the same trend of a higher frequency of markers forming the present progressive correctly compared to the other forms.

PROCEDURE

Subjects

Three groups of subjects were tested: autistic, mentally retarded, and normal children. The autistic group was identified first, and children in the other two groups were then selected on the basis of *a priori* relevant matching variables. These were race, mental age, and socioeconomic status. Sex has been shown not to be relevant (Berko, 1961) in tasks such as ours. Race was chosen since it is generally known that the linguistic environment differs across races when other variables, such as age, are held constant. The variable was defined using the class system of Hollingshed and Redlich (1958, p. 387 ff). All three groups of subjects were then comparable with respect to these variables, so that any intergroup differences in language production would have greater relevance for our hypothesis.

The autistic children were identified according to the following criteria: (a) a lack of responsiveness or active avoidance of the human figure, including avoidance of eye contact and the tendency to relate to parts only of the human figure; (b) a preoccupation with sameness in the environment as manifested by compulsive orderliness, ritualistic behavior, panic attacks, or temper tantrums following changes in the environment or in routine activities; (c) language deviance characterized by an abnormally slow development or loss of previous speech habits and by obvious echolalia and inaccurate use of personal pronouns. The presence of these characteristics had to be agreed upon by two observers: the senior investigator and the clinician in charge of the child. These criteria are practically identical to the main criteria given by Kanner (1948) in his original description and correspond to criteria 1, 4, and 7 of Creak's working party (1961).

The mentally retarded subjects were chosen according to the history of delayed development and IQ test results. Also, they were required to have negative history regarding the traits which we had identified as typical of the autistic group. Mixed cases where the diagnosis was in doubt were therefore excluded from this study. In both the autistic and the retarded groups, there was no evidence of neurological lesions.

Table I. Subject Characteristics^a

| Subject | Diagnosis | Race | Sex | CA ^b | MA ^c | IQ |
|---------|-------------------|------|-----|-----------------|-----------------|-----|
| Howard | autistic | W | M | 11.6 | 5.4 | 50 |
| David | autistic | B | M | 7.6 | 3.10 | 46 |
| Pam | autistic | B | F | 6.0 | 5.4 | 90 |
| Jimmy | mentally retarded | W | M | 10.6 | 4.5 | 44 |
| Keith | mentally retarded | B | M | 10.0 | 3.8 | 37 |
| Julie | mentally retarded | B | F | 9.6 | 4.3 | 44 |
| Mark | normal | W | M | 4.6 | 6.4 | 131 |
| Tony | normal | B | M | 4.6 | 4.5 | 96 |

^a All subjects were middle class except for the normal children; one of them was lower class and the other was upper class.

^b Chronological age.

^c Mental age.

The normal children were chosen to correspond in mental age. They did not have any history of obvious developmental problems and did not show any evidence of psychological disturbance in their family, their school environment, or in the test situation. The mental age of all the subjects was determined by the administration of the Stanford Binet. Table I gives all relevant background data on the subjects of this study.

Testing and Scoring

The subjects were all tested by the same worker, with variations in the environment kept to a minimum. The subject was first "warmed up" for a period of ten minutes, or longer if necessary. Contact was established by talking with the child, playing with him, or engaging him in any kind of activity which would hold his attention. During this interaction, it was established whether the child used the present tense or the progressive present tense more frequently (-s, copula + *-ing*), and questions were asked of him which would tend to elicit the present tense in his answers. This exchange allowed the interviewer to test the child's comprehension of questions. The child was also asked to shift from one present tense to the other. If the child seemed to have no problems in this first part, an action was described to him or her in the present tense, using drawings or toys, employing regular transitive verbs at first and some irregular forms towards the end of the session.

After presentation of an action in the present tense, the child was then asked to transform the verb into the appropriate past tense. He was asked to do so by saying, e.g., "Ann is drinking the juice. She did the same thing this morning. What did she do?" Alternatively, the child was presented verbally or in writing (if the subject was able to read) with an incomplete sentence such as "Yesterday Ann — the juice," and he was invited to complete the sentence.

Table II. Number and Percentage of Correct Responses for Each Group

| Diagnostic group and subject | Present tense | | | | Past tense | | | | Total correct (%) | |
|------------------------------|-------------------|-----------------------------|----------------|-------------------|-------------------|--------------------------|----------------|-------------------|-------------------|-----|
| | Total occurrences | Correct present progressive | Correct marker | Total correct (%) | Total occurrences | Correct past progressive | Correct marker | Total correct (%) | | |
| Autistic | | | | | | | | | | |
| Howie | 18 | 5 | 11 | 89 | 7 | 0 | 0 | 0 | 0 | 0 |
| David | 28 | 14 | 7 | 75 | 22 | 0 | 1 | 1 | 4 | 4 |
| Pam | 28 | 11 | 5 | 57 | 8 | 0 | 2 | 2 | 25 | 25 |
| Total | 74 | 30 | 23 | 72 | 37 | 0 | 3 | 3 | 8 | 8 |
| Mentally retarded | | | | | | | | | | |
| Julie | 25 | 5 | 8 | 52 | 9 | 1 | 3 | 3 | 44 | 44 |
| Keith | 24 | 15 | 0 | 62 | 6 | 0 | 3 | 3 | 50 | 50 |
| Jimmy | 25 | 12 | 2 | 56 | 15 | 0 | 11 | 11 | 73 | 73 |
| Total | 74 | 32 | 10 | 57 | 30 | 1 | 17 | 17 | 60 | 60 |
| Normal | | | | | | | | | | |
| Mark | 7 | 5 | 2 | 100 | 8 | 4 | 4 | 4 | 100 | 100 |
| Tony | 24 | 17 | 4 | 88 | 12 | 1 | 7 | 7 | 67 | 67 |
| Total | 31 | 22 | 6 | 90 | 20 | 5 | 11 | 11 | 80 | 80 |

If the child showed no problems with this part of the test, he was then presented with the imaginary verbs *bing* and *rick*, each depicting an action, and asked to produce the past tense. The past tense of *bing* was produced correctly by 78% of the normal children and of *rick* by 73% of the normal children tested by Berko (1961).

The tests were recorded on tape and then typewritten; whenever the clarity of the questions asked by the interviewer or the exact content of the child's answers was in doubt, that particular exchange was eliminated from the protocol. Whenever the subjects seemed to fail to answer because of lapses in attention, the exchanges were eliminated. The child's productions were considered correct whenever the child used the appropriate tense marker, (-s for the present and -ed for the past tense), or the appropriate progressive tense, (copula + —ing). When the copula was in the question asked and the child completed the sentence by using the appropriate progressive form (e.g., *Q*. "What is the girl doing? She is . . ." *A*. "Drinking her juice."), the answer was considered to be correct. When appropriate answers occurred which did not contain the expected tense, the exchange was eliminated from the protocol. When irregular verbs were used, both the irregular past tense and the regular but ungrammatical past tense marker were considered to be correct answers (e.g., *bit* and/or *bited*). If the child was asked to shift from a typical tense marker to the use of a progressive form or was asked the same question more than once, all answers were scored as separate answers, even if they remained unchanged following the question. The incidence of this situation was rare.

For each data category, the number of obligatory contexts was counted, and both the frequency and percentage correct were tabulated (Table II).

RESULTS

We first present the results in terms of the relationship between age, sex, race, and socioeconomic factors, and group responses. Chronological age was possibly a factor only within the autistic group; the older the autistic child, the greater the tendency to give correct responses in the present tense and incorrect responses in the past tense. Sex, social class, mental age, and race do not seem to be relevant in the production of the intergroup differences.

In looking at the differences among groups, one should stress the fact that the pilot nature of this study does not provide enough statistical power to detect differences between groups, even when they are present, unless such differences are extremely large. Appropriately then, no statistical significance was found in the differences in the percentage of correct answers in the present tense. However, the trend in each group was toward the more frequent use of the present progressive than the third person present marker, which is in keeping with the

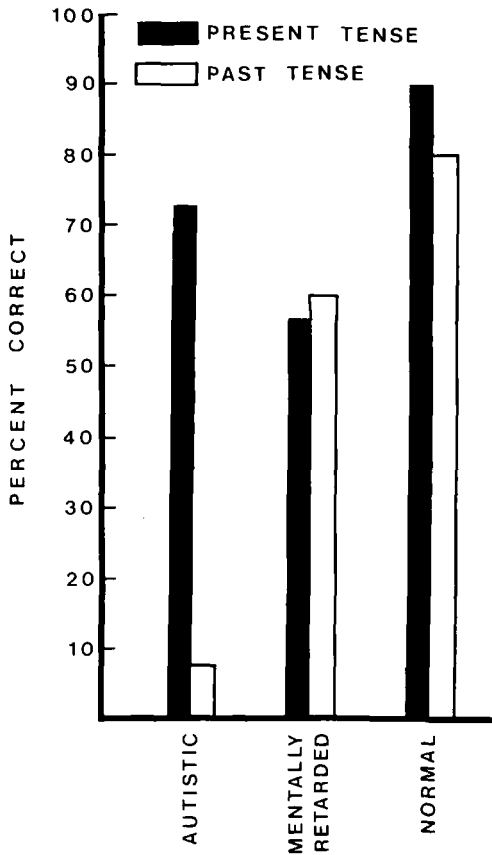


Fig. 1. Percentage of correct answers for autistic, mentally retarded, and normal children.

data available in the literature (Berko, 1961; Cazden, 1968). Figure 1 shows the three groups' average responses in the two modalities, present tense and past tense.

A *t* test for the difference between two independent proportions (Edwards, 1960) shows that the autistic children are, as a group, significantly poorer than the normal and the mentally retarded groups taken together ($z = 1.636, p = .05$).

The only subjects in our study who did well enough on the tests to be given *bing* and *rick* were the normal children. They produced the correct past tense inflections 90% of the time.

Error Analysis

The errors made were classified into only three broad categories. They were (1) omission of the inflection, (2) use of an inappropriate marker, and (3) other atypical constructions. There was no difference in the distributions of the three types of errors across groups. In any given diagnostic group, all individuals exhibited the same pattern of errors. There were only six errors altogether which belonged to the third category, that of atypical constructions. Such a small number does not allow any further elaboration of possible preferential usage of particular atypical syntactic constructions by any of the diagnostic groups.

DISCUSSION

The major finding was that the autistic group was significantly poorer than the normal and mentally retarded groups in the production of the past tense. The autistic subjects' performance on the present tense was about the same as that of the mental retardates'. This significant difference in performance, which is also obvious within the individual scores, suggests that the low level of performance in the production of the past tense is not simply an expression of a global lower level of linguistic and cognitive development. This conclusion is also supported by the lack of an obvious relationship between the correct number of responses in the past tense and the mental age of the subjects. The mentally retarded children performed about equally on the past and the present tense responses. This was also true for the normal subjects. But the autistic group showed a marked discrepancy between performance on the past tense responses and performance on the present tense responses. This is seemingly, then, a characteristic of the autistic group and not a simple variation of a phenomenon observed in other groups as well. It may be said that the findings suggest a specific inability in this group of autistic children to produce past tense markers in the test situation. Although a discrepancy could be expected from what is known about the normal development of these markers, the extent of the discrepancy in performance is highly characteristic of this group.

To begin a critical evaluation of these data, one must exclude the possibility that autistic children are not able to produce the regular past tense inflection because of their phonetic inability to perceive it. This seems most unlikely since past tenses were used by our autistic children, without any problem whenever they were echoing television commercials or other complex utterances which they had heard in some other context. Once we exclude this possibility, we may hypothesize that the difficulty in the production of the past tense was related to (1) the difficulty the autistic children had in understanding the task at hand because of a problem in attention, (2) a problem in decoding the syntactic structure of questions asked, or (3) their general semantic inadequacy. First,

we have mentioned that, as part of our protocol, we excluded all the exchanges where doubt existed as to whether or not the subject was paying attention to the task. In addition, we observed that the autistic children seemed to be more involved in the tasks and seemed to try harder than the other groups; we have, therefore, no reason to believe that a general lack of attention accounts for their performance. Also, the autistic children's poor performance is too selective to be easily attributed to a nonspecific factor such as lack of attention. Regarding the second possibility, the autistic children performed as well as the mentally retarded subjects in the production of the present tense, and this makes the possibility of a significant problem in decoding the syntactic structure of the questions asked somewhat unlikely, since the present tenses had to be produced in answer to questions very similar to those asked to elicit the past tense. Nonetheless, this interpretation becomes somewhat speculative since our protocol did not aim at answering this question. We must say, therefore, that the most likely interpretation of the results, at this time, is that these autistic children showed evidence of a problem at the level of the relationship between the morphological and the semantic aspects of language in the area of the past tense. The autistic children in our group seemed to be unable to consistently make a connection between the semantic, deictic, time-related aspects of sentences and the deictic, time-related, morphological function of the inflection or other markers in the past tense of the verb. One corollary of this assumption is that the more adequate use of the present regular third-person inflection and of the progressive present form are probably not due to a good grasp of the time-related deictic aspects of these markers, but to a form of rote-learning which is relatively more successful, possibly because of the higher frequency with which the present tense is used in the linguistic environment of the child. This hypothesis may explain the observation that the older autistic child had a greater percentage of correct responses in the present tense than those younger than he, but that the older autistic child's correct production of the past tense was not greater than that of the younger autistic subjects.

In general, then, our results strengthen the general initial assumption that the development of morphology in the autistic child is deviant and differs from the deviancy of the mentally retarded subject and that such deviancy seems particularly marked in the development of syntactic structures that relate to deixis.

REFERENCES

- Bender, L. A twenty-five year view of therapeutic results. In P.H. Hoch & J. Zubin (Eds.), *The evaluation of psychiatric treatment*. New York: Grune & Stratton, 1964.
- Berko, J. The child's learning of English morphology. In S. Saporta (Ed.). *Psycholinguistics: A book of readings*. New York: Holt, Rinehart, and Winston, 1961.
- Cazden, B. D. The acquisition of noun and verb inflections. *Child Development*, 1968, 39, 433-448.

- Creak, M. Schizophrenic syndrome in children. Progress report of a working party. *British Medical Journal*, 1961, 2, 889-890.
- Cunningham, M. A., & Dixon, C. A study of the language of an autistic child. *Journal of Child Psychology and Psychiatry*, 1961, 2, 193-202.
- Edwards, A. L. *Experimental design in psychological research*. New York: Holt, Rinehart, and Winston, 1960.
- Eisenberg, L. The autistic child in adolescence. *American Journal of Psychiatry*, 1956, 112, 607-613.
- Fay, W. H. On the basis of autistic echolalia. *Journal of Communication Disorders*, 1969, 2, 38-47.
- Fay, W. H. On normal and autistic pronouns. *Journal of Speech and Hearing Disorders*, 1971, 36, 242-249.
- Fish, B., Shapiro, T., & Campbell, M. Long term prognosis and the response of schizophrenic children to drug therapy: A controlled study of trifluoperazine. *American Journal of Psychiatry*, 1966, 123, 32-39.
- Fish, B., Shapiro, T., Campbell, M., & Wile, R. A classification of schizophrenic children under five years. *American Journal of Psychiatry*, 1968, 124, 1415-1423.
- Frith, U. Emphasis and meaning in recall in normal and autistic children. *Language and Speech*, 1969, 12, 29-38.
- Goldfarb, W., Braunstein, P., & Lorge, I. A study of speech patterns in a group of schizophrenic children. *American Journal of Orthopsychiatry*, 1956, 26, 544-555.
- Hermelin, B., & O'Connor, N. Remembering of words by psychotic and subnormal children. *British Journal of Psychology*, 1967, 58, 213-218.
- Hermelin, B., & O'Connor, N. *Psychological experiments with autistic children*. Oxford: Pergamon Press, 1970.
- Hollingshed, A. B., & Redlich, F. C. *Social class and mental illness*. New York: Wiley, 1958.
- Kanner, L. Autistic disturbances of affective contact. *Nervous Child*, 1943, 2, 217-250.
- Kanner, L. *Child psychiatry*. Springfield, Illinois: Charles C Thomas, 1948.
- Lovell, K., & Bradbury, B. The learning of English morphology in educationally subnormal special school children. *American Journal of Mental Deficiency*, 1967, 71, 609-615.
- Lyons, J. *Introduction to theoretical linguistics*. Cambridge: Cambridge University Press, 1968.
- Menyuk, P. *Sentences children use*. Cambridge, Massachusetts: MIT Press, 1969.
- Provonost, W., Wakstein, M. P., & Wakstein, D. J. A longitudinal study of the speech behaviour and language comprehension of fourteen children diagnosed atypical or autistic. *Exceptional Children*, 1966, 33, 19-26.
- Rutter, M. The influence of organic and emotional factors on the origins, nature and outcome of childhood psychosis. *Developmental Medicine and Child Neurology*, 1965, 7, 518-528.
- Rutter, M., Bartak, L., & Newman, S. Autism — a central disorder of cognition and language? In M. Rutter (Ed.), *Infantile autism: Concepts, characteristics, and treatment*. London: Churchill, 1971.
- Rutter, M., Greenfeld, D., & Lockyer, L. A five to fifteen year follow-up study of infantile psychosis. II. Social and behavioural outcome. *British Journal of Psychiatry*, 1967, 113, 1183-1199.
- Shapiro, T., Roberts, A., & Fish, B. Imitation and echoing in young schizophrenic children. *Journal of the American Academy of Child Psychiatry*, 1970, 9, 548-567.
- Spradlin, J. E., & McLean, J. E. Linguistics and retardation. Paper presented at the American Speech and Hearing Association Convention, Chicago, November, 1967.
- Tubbs, V. Types of linguistic disability in psychotic children. *Journal of Mental Deficiency Research*, 1966, 10, 230-240.
- Wing, J. F. Diagnosis, epidemiology, etiology. In J. K. Wing (Ed.), *Early childhood autism: Clinical, educational, and social aspects*. London: Pergamon Press, 1966.
- Wolff, S., & Chess, S. An analysis of the language of fourteen schizophrenic children. *Journal of Child Psychology and Psychiatry*, 1965, 6, 29-41.