

A Comparison of Five Diagnostic Systems for Childhood Schizophrenia and Infantile Autism¹

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Five diagnostic systems designed to differentiate infantile autism and early childhood schizophrenia were compared by deriving scores on 44 children referred consecutively to the same clinical center. While the autistic scales devised by Rimland, Polan and Spencer, Lotter, and the British Working Party correlated significantly, the degree of correspondence (35%) indicated that several children obtained high autistic scores in one system but low scores in another. The BWP's term "schizophrenia" has more correspondence with the term "autism" used by others than with Rimland's "schizophrenia." In the DeMyer-Churchill categorical system (early schizophrenia, primary autism, secondary autism, and non-psychotic subnormal), "primary autism" most resembles Rimland's concept of infantile autism as measured by his E-1 version. All other systems differentiate psychotic from non-psychotic children but do not distinguish any of the psychotic subgroups.

While studies of infantile autism and childhood schizophrenia are increasingly frequent, the diagnostic problems of these conditions have not been resolved. Disagreements focus on definitions of diagnostic terms, relative importance of various criteria, and cutoff points of severity. If autism and childhood schizophrenia are separate conditions, diagnostic accuracy is important both for clinical management and research. A reading of current studies reveals that investigators concerned with diagnostic criteria of infantile autism rely on the

¹This study was supported in part by Public Health Service Grant No. MH05154 and also by LaRue D. Carter Memorial Hospital, State of Indiana, Indianapolis, Ind.

²The authors wish to thank Dr. Bernard Rimland for providing his scoring key.

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original descriptions by Kanner (1944, 1959) or on one of the four checklist systems described by Polan and Spencer (1959), Rimland (1964), Lotter (1966), and Rendle-Short and Clancy (1968). Also widely used are the descriptive statements by a British Working Party (BWP) headed by Mildred Creak (1964). The BWP considers that the characteristics of infantile autism are imbedded in their concept of the "schizophrenic syndrome of childhood."

Although Douglas and Sanders (1968) used Rimland's checklist to compare the scores of children with clinical diagnoses of infantile autism with those of retardates, no study is known to have compared the results of using several checklist instruments on the same population of children. This paper reports the methods and results of simultaneously applying four widely used checklists (together with criteria delineated by DeMyer and Churchill) to the same group of children. Under consideration is the extent to which the diagnostic groups established by any one investigator coincide with those established by others, and also the correspondence between our diagnostic criteria and those devised by Polan and Spencer (POS), Rimland (RIM), Lotter (LOT), and BWP.⁴

SUBJECTS

The children in this study represent 44 patients referred consecutively over a 3-year period to the Clinical Research Center for Early Childhood Schizophrenia. Table 1 shows the number and age of these children in each of the four diagnostic categories delineated by DeMyer and Churchill. The 15 non-psychotic, brain-damaged, or mentally retarded children had various types of

Table 1
DeMyer-Churchill Diagnostic Categories

Group	Category	N	Mean Age
1	Non-psychotic (brain-damaged or retarded emotionally disturbed)	15	5-1
2	Early schizophrenic	8	6-0
3	Primary autistic (higher functioning)	10	4-7
4	Secondary autistic (lower functioning)	11	5-0

⁴The 14-point system by Rendle-Short and Clancy was not available at the time of this study. Also not available was Rimland's most recent version (E-3) designed primarily to obtain information that may be relevant to etiology.

learning and interpersonal difficulties but were not emotionally withdrawn from people. Some had aphasic language patterns. Those with speech used it communicatively.

METHODS

Diagnostic Procedures

The diagnostic procedures pertinent to this investigation included a series of interviews designed to elicit comprehensive information about the child's entire life. Each child had two psychiatric examinations, one structured (DeMyer, Norton, & Barton, 1971) and the other less structured. Scoring involved the RIM, POS, BWP, and LOT checklists. Other diagnostic procedures were language evaluation, psychological testing, physical and neurological examinations. Laboratory studies included, as a minimum, an EEG, skull X-ray, bone age, urinalysis, and blood counts. Positive neurological signs and symptoms in anamnesis and/or examination, and also patterns of performance on adaptive tasks were used to judge whether a child was brain damaged. Each child was then considered as presenting no evidence, equivocal evidence, or good evidence of brain damage. The children's intellectual levels were estimated on the basis of adaptive task performances with the psychologist and psychiatrist. Thus each child received a total of three diagnoses—intellectual, neurological, and psychiatric. Psychiatric diagnoses were made independently by two psychiatrists without reference to the aforementioned checklists.

Description and Use of the Five Diagnostic Systems

The DeMyer and Churchill system. At the Clinical Research Center for Early Childhood Schizophrenia, a set of criteria evolved over the past 10 years for distinguishing between infantile autism, early childhood schizophrenia, and non-psychotic brain-damaged or retarded children. The criteria for infantile autism are (a) emotional withdrawal from people before the age of three; (b) lack of speech for communication; (c) nonfunctional, repetitive use of objects (Tilton & Ottinger, 1964); and (d) failure to engage in role play alone or with other children (DeMyer, Mann, Tilton, & Loew, 1967). In order to be diagnosed as autistic, a child must manifest all of these four criteria. If such a child has perceptual-motor performances that approximate his chronological age or some that are markedly above other aspects of his performance, we classify his disorder as primary or "higher functioning" autism. If the child has a flat, low perceptual-motor performance curve, his disorder is given a label of secondary or

“lower functioning” autism. To be classified as I° autism, the child must exhibit all the primary features delineated by Kanner.

The criteria for diagnosing early childhood schizophrenia are (a) islands of more normal relatedness or emotional dependency in a background of emotional withdrawal and flat affect; and (b) some speech for communication with speech abnormalities such as echolalia, stereotypy, dysempathy, bizarre fantasies, and failure to answer questions. This clinical picture can originate in a background of more normal behavior or evolve from a typical infantile autistic symptom pattern. Likewise, a child can regress from a childhood schizophrenic to an autistic pattern of symptoms. As with autistic children, the symptoms must appear before the age of three.

In this series of 44 cases, independent diagnoses by two psychiatrists of 42 were based on clinical criteria given in Table 2. The diagnosticians who did not know the children’s checklist scores disagreed about autism (primary or secondary) in two cases, and about psychosis (psychotic or non-psychotic) in one. Except for one case which was not included in this study, an agreement was reached with respect to each final diagnosis.

The available diagnostic delineations by other investigators (RIM, POS, LOT, and BWP) are presented in Table 3, which groups comparable criteria pertaining to social interaction and affect, speech, use of body and objects, and intelligence and reaction to sensory stimuli. Rimland’s checklists provide rather extensive additional information for both autism and schizophrenia, pertaining to family characteristics and illness development, and also physiological and other biological data. In contrast, such additional criteria are barely noted in POS and altogether excluded from LOT and BWP.⁵

RIM checklists. The POS checklist and Kanner’s description of infantile autism were the points of departure for the RIM checklists. Rimland hoped to distinguish the autistic from the schizophrenic child by devising a checklist with the important and unique feature of its being completed by the child’s mother. In this study, the RIM checklists were completed by mothers and then scored (using Rimland’s scoring key) to indicate that certain responses should be regarded as traits of autism and others as those of schizophrenia (Rimland, 1964, 1968). A raw schizophrenic score and a raw autistic score were derived by summing the number of traits so designated by Rimland. A final autistic score

⁵In POS, family characteristics and illness development is limited to: sibs normal except identical twin; parents professionals or high IQ; parents obsessive-compulsive; parents objective about child. The 4-to-1 boy-to-girl ratio is the only item for physiological and other biological data. Rimland’s criteria for family characteristics and illness development include 7 items for autism and 6 for schizophrenia, while those for physiological and biological data contain 15 items for autism and 12 for schizophrenia.

Table 2
Criteria for DeMyer-Churchill Diagnostic Category Groups.

Group	Relations with adults	Relations with other children	Affect and emotional expression	Speech and non-verbal communication	Use of toys and body	Intelligence test performance
1	Overly dependent or negative but not consistently withdrawn. Like younger child.	Like younger child.	Poorly controlled but full range of expression and appropriate.	May be absent; if present, used for communication; if not aphasic, speech level is commensurate with overall mental age; can pantomime.	Commensurate with mental age. Repetitive uses minimal.	Variable.
2	Withdrawn. Islets of response to affectionate gestures; can give affection at times.	Generally ignores. Some attempt play with others but even though they may pretend play by themselves, they cannot use other children in their fantasy play.	Inappropriate laughter and crying punctuates generally flat background. Some children overly fearful.	Some communicative speech; has abnormal speech such as echolalia, disordered rhythm, emphasis, tone, pronominal reversal, repeats a question to ask a question. Only simple signalling for nonverbal communication.	Repetitive, nonfunctional toy use; or repetitive ritualistic body use. Pretend play minimal.	Various peaks and valleys on performance and verbal curves but generally does best with fitting and assembly tasks. May have a splinter skill such as reading. Abstraction low.
3	Withdrawn most of time. May cling physically to mother or laugh when chased. Little response to affection. Does not initiate affectionate gestures.	Ignores.	As in childhood schizophrenia, except often ignores common dangers but may fear nonhurtful events that change routine.	No speech for communication beyond an occasional word. May have echolalia, imitate or delayed. Only simple nonverbal signalling present.	As in childhood schizophrenia, except no pretend play.	As in childhood schizophrenia, except performance mental age above verbal mental age which is quite low. Has at least one splinter skill.
4	As in primary autistic.	As in primary autistic.	As in primary autistic.	As in primary autistic.	As in primary autistic.	Verbal and performance low. No splinter skills. Gross motor of lower ext. often only peak on performance curve.

Table 3
Comparison of Diagnostic Systems

RIM-Autism	POS	LOT	BWP-Schizophrenia	RIM-Schizophrenia
SOCIAL INTERACTION AND AFFECT				
<ul style="list-style-type: none"> •Stiff, hard to hold first 2 yrs; 2-6 yrs •Banged head •Didn't reach out; fearful, disinterested in strangers •Treats people impersonally •Hard to get child's attention •Aloof, disinterested, self-sufficient •Disturbed by changes •"Looks or walks through" people •Not concerned with criticism •No hallucinations or delusions •Not self-concerned •Indifferent, happiest when left alone •Unpliable when held 	<ul style="list-style-type: none"> •Detached, preoccupied; disinterested •Unresponsive to affection •More interested in objects than people •Contact with others painful •Conformity an effort; tactless; inappropriate •No anticipatory posture •Angered by interference •Reacts to pin rather than to person pricking him 	<ul style="list-style-type: none"> •Visual avoidance •Solitary •Ignores children •Aloof and disinterested •Walks through people 	<ul style="list-style-type: none"> •Failure to form normal relationships with people; withdrawal from reality •Anger, terror, excitement or withdrawal with environmental change •Ritualistic 	<ul style="list-style-type: none"> •Clinging first 2 yrs; 2-6 yrs •Didn't bang head against person •Reached out to be held 4-5 mos •Confused frightened, perplexed, dependent •Sensitive to criticism •Hears or sees things not there •Concerned about himself •Wants to be liked •"Melts into arms" of person
SPEECH				
<ul style="list-style-type: none"> •Words used 8-15 mos •Sudden switch to sentences before 24 mos •Seldom used yes before 6 yrs •Never used "I" •Affirms by repeating question •Used question or phrase for no •Subs a word for another •Echolalia, hollow tone often •Pronouns reversed •Whispers instead of talks •Became silent after talking •Doesn't understand speech 	<ul style="list-style-type: none"> •Mute past age of usual speech development; considered deaf before 6 yrs •Slow to use pronouns; pronoun reversal; uses preps and pronouns as nouns •Echolalia •Speech not communicative •Speech unrelated to actions •Unresponsive to speech; uncomprehensive •Affirms by repeating quest •Does not answer quest 	<ul style="list-style-type: none"> •Speech not used for communication •Pronoun reversal •Echolalia •Repetition of phrases 	<ul style="list-style-type: none"> •Failure to acquire speech or to maintain speech acquired or to use speech for communication 	<ul style="list-style-type: none"> •First words used 2-4 yrs •Gradual change to sentences •Used word yes fairly well before 6 yrs •Uses "I" fairly regularly •"Possibly" uses echolalia in hollow tone •Understands speech
USE OF BODY AND OBJECTS				
<ul style="list-style-type: none"> •Stares into space for long periods •No use of hands for extended periods •Physically well coordinated •Skillful in doing fine motor tasks •Typically uses objects repetitively •Not destructive of objects •Rocked in crib much as baby •Fascinated by certain mechanical things •Will not readily accept new clothing 	<ul style="list-style-type: none"> •Rhythmic movements of body •Repeats play patterns mechanically •Rituals •Facial grimaces and twisting •Activities lack purpose; behavior not integrated •Disturbed by slight environmental changes 	<ul style="list-style-type: none"> •Self spinning •Jumping •Flapping •Toe walking •Other mannerisms •Lines and patterns objects •Spins objects •Ritual play •Carries, bangs, twirls objects •Insists on sameness of objects •Insists on sameness of events 	<ul style="list-style-type: none"> •Gross and sustained mannerisms, immobility or hyperkinesia (not ties) •Excessive preoccupation with particular objects without regard to accepted function •Pathological attachment to "same surroundings" 	<ul style="list-style-type: none"> •Toe walks •Spins or whirls •Not well coordinated physically •A little awkward, doing fine work •Occasionally uses objects repetitively •Destructive of objects
INTELLIGENCE AND REACTION TO SENSORY STIMULI				
<ul style="list-style-type: none"> •Unusually alert to sound and color 3-4 mos, or •Very disinterested in sounds and colors first 3-4 mos •Parents suspect at least above average intelligence first yr •Unusually strong interest in music •Parents have suspected child nearly deaf •IQ less than 70, 4-7 yrs •Extremely good verbal memory for words repeated often 	<ul style="list-style-type: none"> •Preoccupied with isolated sensory impression. Cannot ignore extraneous stimuli •May solve difficult abstract problems; cannot grasp use of objects •Can classify objects 	<ul style="list-style-type: none"> •Serious intelligence retardation with islets of normal or near normal intelligence function of skills •Abnormal response to one or more type of sensation 	<ul style="list-style-type: none"> •Behaves as if deaf •Covers ears •Distress at noise 	<ul style="list-style-type: none"> •IQ between 70 and 100, 4-7 yrs

(A-S) was derived by subtracting the schizophrenic score from the autistic. A top raw autistic score of 69 and a top raw schizophrenic score of 48 are possible in Rimland's first version (E-1). In addition, his E-1 version was used to assess 25 cases.

POS. The Polan and Spencer checklist is divided into five categories: (a) language distortion, (b) social withdrawal, (c) lack of integration in activities, (d) obsessiveness and nervousness, and (e) family history. The authors stated that it should distinguish autistic children from retarded, schizophrenic, and brain damaged. A 2-1-0 point-scoring system was devised to provide an instrument that could be compared with RIM and LOT. Two points were allowed if a behavior was seen at least several times a week by the parents, 1 point if seen less frequently, and no points if the behavior was never seen. This weighting brought the top score of 60 more in line with Rimland's top raw autistic score and also achieved a wider spread, thus reducing the number of tie scores. The weighted individual scores were then summed, yielding the total autistic score for each child.

LOT. Lotter designed his own checklist in order to find the incidence of autism in Middlesex, England. He divided the behavior to be rated as follows: speech, social behavior, movement peculiarity, auditory, and repetitive ritualistic. Lotter also provided a 3-point weighting system whereby 0 = absent, 1 = present but not marked, and 2 = markedly present. A maximum score of 48 was possible for a speaking and 40 for a nonspeaking child.

BWP system, as discussed by O'Gorman (1967). In order to achieve a behavioral checklist that would assess the behavior of subjects corresponding to BWP's concept of the essential features of the "schizophrenic syndrome of childhood," each subject was rated with respect to six aspects of behavior: (a) withdrawal from, or failure to become involved with, reality—in particular, failure to form normal relationships with people; (b) serious intellectual retardation with islets of normal, near normal, or exceptional intellectual function or skills; (c) failure to acquire speech, to maintain or expand speech already learned, or to use what speech has been acquired for communication; (d) abnormal response to one or more types of sensory stimuli (usually sound); (e) gross and sustained mannerisms or peculiarities of movement, including immobility and hyperkinesia, excluding ties; and (f) pathological resistance to change as shown by ritualizing; pathological attachment to the same surroundings, equipment, and people; nonfunctional preoccupation with particular objects or certain characteristics of such objects; and catastrophic reaction or increased withdrawal when the sameness of the environment is threatened.

A scoring system on a 3-point scale was devised with 3 points allowed if a

behavior or pattern was exhibited daily to several times weekly, 2 points for several times monthly, and 1 point for less frequent exhibitions. Again, a weighting system was necessary to provide a sufficient spread of scores. However, a weighted and an unweighted BWP score was derived for each child, and each was used in the analysis of data.

In the behavior category with five specific subcategories which O'Gorman calls "resistance to change," a maximum of 3 points was allowed if the subject accumulated at least that many in that broad category. However, no more points (above 3) were allowed even if a child scored a "3" in each specific subcategory, since such a method would have weighted the "resistance to change" category unfairly in comparison with the others. All points so derived were summed and a total "schizophrenic" score obtained for each child. A top weighted score of 18 was possible. This top schizophrenic score is considerably below the POS and RIM top autistic scores, but finer distinctions about the severity of symptoms could not be reliably delineated.

Reliability of Ratings

The raters read the descriptive systems and used the descriptive terminology of each author to rate the children's behaviors from parental descriptions. To check reliability, eight children were chosen at random and each was rated by two raters, except for the RIM checklist which is a parental instrument. The overall percentage of inter-rater reliability was 79.6 for POS, 81.8 for BWP, and 82.8 for LOT. The ranges, 68% to 95%, were similar for each system. DeMyer and Churchill attained a 92.8% agreement.

RESULTS

Data were analyzed in two ways. First, the diagnostic scales for which continuum scores were available were compared through intercorrelations using the 7040 BMDO3D program (Dixon, 1965). Then, the diagnostic groups derived by using the DeMyer and Churchill criteria were compared across all diagnostic scales, using a one-way analysis of variance procedure in accordance with ANAVAR (1971).⁶

⁶Using a significance level of .05, F and F' tests were performed as indicated, depending on the homogeneity of variance assumption at the .20 level. Individual comparisons of group means were tested at the .05 level using the Student-Newman-Kuhls method.

Intercorrelation of RIM, BWP, POS, and LOT Scales

The correlation matrix presented in Table 4 indicates the degree of relatedness between various diagnostic scales when each was used to derive a score for the children studied. Only correlations significant beyond the .02 level are included.

The highest correlations, as might be expected, are among the different RIM scales. Outside of the Rimland "system" only moderate correlations exist, generally in the .4 to .6 range. Of interest is the fact that Rimland's original raw schizophrenic scores (E-1) do not correlate significantly with any scales except with those in his own system. However, the new raw schizophrenic scale (E-2) displays significant negative correlations with three scales of others. The only other negative correlations are those between schizophrenic and autistic scales within the Rimland system. The POS, BWP-weighted, and LOT total scales have significant positive correlations with each other. Two of the Rimland scales, the E-1 raw autistic and the E-2 A-S, also correlate significantly with each of the former.

Comparison of the DeMyer-Churchill Groups with Other Diagnostic Scales

A one-way analysis of variance was performed using various groupings of the four diagnostic categories. In a second analysis, primary and secondary autistic groups were collapsed, yielding a three-category comparison. In a third analysis, groups were collapsed into simply psychotic and non-psychotic categories. Aside from some loss of information, these groups yielded results similar to the four-group analysis. Table 5 shows the comparison of group means comparing all four diagnostic categories across each of the rating scales.⁷

DISCUSSION

Comparisons among RIM, POS, LOT, and BWP Scales

While there are many statistically significant correlations (shown in Table 3) among these five different systems, they show an overlap of no more than 35%. This means that a large proportion of children receiving high scores on one scale would achieve low scores on another and thus be classified as autistic by one system and nonautistic by another.

This situation may have been due to an error introduced in our efforts to make the systems comparable by weighting symptom severity, although without

⁷The analysis of variance tables and comparison of group means using collapsed categories can be supplied by the authors upon request.

Table 4
Correlation Matrix

	Rimland's System						POS	BWP-Schizophrenic		LOT-Autistic		
	E-1 Autistic	E-1 Schizophrenic	E-1 A-S*	E-2 Autistic	E-2 Schizophrenic	E-2 A-S*		Un-weighted	Weighted	Total	Social	Repetitive
<i>RIM</i>												
E-1 Autistic	~	-.433	.913	.710	-.631	.788	.614	.489	.472	.598	.537	
E-1 Schizophrenia		~	-.740	-.494	.604	-.630						
E-1 A-S*			~	.679	-.667	.784	.513			.476	.558	
E-2 Autistic				~	-.533	.827				.475		
E-2 Schizophrenic					~	-.898	-.482		-.498		-.566	
E-2 A-S*						~	.523		.430	.424	.521	
<i>POS</i>							~	.497	.678	.551		.445
<i>BWP-Schizophrenic</i>												
Unweighted								~	.683	.538		.501
Weighted									~	.414	.427	
<i>LOT-Autistic</i>												
Total										~	.727	.660
Social											~	
Repetitive												~

Note.—All correlation coefficients are significant beyond the .02 level. Italicized values indicate diagnostic scales which have more than 50% overlap.
*Derived by subtracting the schizophrenic score from the autistic.

Table 5
Comparison of the Four DeMyer-Churchill Diagnostic Groups with Other Systems

		Rimland's System				POS	BWP		LOT		
E-1 Raw Autism	E-1 Raw Schizophrenia	E-1 A-S	E-2 Raw Autism	E-2 Raw Schizophrenia	E-2 A-S		Unweighted	Weighted	Total	Social	Repetitive
I° A 32.60	Schiz 13.38	I° A 23.60	I° A 21.63	Non-P 28.00	I° A 1.63	Schiz 28.14	Schiz 6.50	II° A 12.81	Schiz 16.50	II° A 5.36	Schiz 4.75
Schiz 28.88	Non-P 13.00		Schiz 17.60	Schiz 27.20	II° A -5.00	I° A 27.70	II° A 6.36	I° A 12.40	II° A 14.73	I° A 4.80	II° A 4.09
	II° A 11.09		Non-P 16.33	II° A 20.83	Schiz -9.60	II° A 26.36	I° A 6.10	Schiz 10.88	I° A 13.40	Schiz 4.63	I° A 3.00
			II° A 14.17	I° A 20.00	Non-P -11.67					Non-P 3.47	Non-P 2.27
II° A 26.73	I° A 9.00	II° A 15.64				Non-P 18.33	Non-P 4.60	Non-P 8.40	Non-P -10.33		
Non-P 3.00		Schiz 14.25									
		Non-P 10.00									

Note.—Under each diagnostic scale, the DeMyer-Churchill diagnostic group means are rank ordered. The horizontal line generally separates means which are significantly different ($p < .05$). These exceptional pairs of means are connected by a vertical line, indicating nonsignificance. I° A = next to most social pathology. II° A = most social pathology. Schiz = Schizophrenia. Non-P = non-psychotic. A-S = autistic minus schizophrenic score.

such weightings the BWP generated much lower correlations with the other systems. Also, some scales may have been misrated due to a failure to fully appreciate the authors' intentions. The inter-rater reliability was somewhat varied among the children, though quite consistent among the scales themselves.

Despite these shortcomings, it is possible to make some observations about the correspondence of points of agreement to any diagnostic subcategories. Rimland's "new schizophrenic" scale (E-2) correlates negatively, not only with his own autistic scales but with all other autistic scales and even the BWP "schizophrenic" scale. This observation allows us to infer that the BWP term "schizophrenia" means something quite different than Rimland's idea of schizophrenia. In fact, the BWP term "schizophrenia" has much in common with the ideas of all others concerning autism as shown by its significant positive correlations with all autistic scales. Only the names are different.

Considering their common origin, it is not surprising that the highest correlations exist among the various Rimland scales. The consistent negative correlation between autistic and schizophrenic scales is also to be expected. Since so many scales are cumbersome, it would be desirable to find out which of the Rimland scales is the best instrument to distinguish autistic from schizophrenic children and also best coincides with others' definitions of the same categories. Rimland's earlier version, the E-1, generates somewhat higher correlations with all other systems; his raw autistic E-1 score correlated most highly with the POS autistic score. However, the later version of the raw schizophrenic score generates higher negative correlations than the earlier version. Thus an attempt to select a single Rimland scale that best coincides with others' ideas of autism appears to yield a somewhat confusing result.

Comparison of the DeMyer and Churchill Diagnoses with Other Systems

The POS, BWP (both weighted and unweighted), and LOT (total, only) significantly differentiate the psychotic from the non-psychotic children diagnosed in accordance with the DeMyer and Churchill criteria. However, no distinction is found between the respective subgroupings of the psychotic children. While the BWP did not intend to establish such distinctions, the POS and LOT scales were devised with the express purpose of identifying such subgroupings. Rimland also hoped that his scales would identify autism as well as distinguish it from schizophrenia. The RIM scales show a significant relation to the DeMyer and Churchill categories only when used in their original form (E-1). The E-2 revisions show no significant differences among the four DeMyer and Churchill diagnostic subgroups. The first three columns of Table 5 suggest that the DeMyer and Churchill category of primary, higher functioning autism

coincides rather closely with Rimland's earliest definition of infantile autism. This is most clearly seen in the E-1 A-S scores. The E-1 raw schizophrenic score, which is in one sense a mirror image of the final autistic score, is also congruent with this. We must note, however, that none of the Rimland scales clearly distinguish the DeMyer and Churchill schizophrenic category. The rank order of the LOT social scale scores coincides with our observation about the relative social pathology in the four groups: II°A—most social pathology, I°A—next to most, schizophrenic next, and non-psychotic least (DeMyer et al., 1971).

In a comparison with the DeMyer-Churchill categories, the RIM E-1 A-S score appears to be strongly related to the authors' "primary autism." However, despite the differences in group means, we find that several children would be misclassified by Rimland's system if his cutoff point of +30 (E-1) were used for a diagnosis of autism. Only 4 of 10 primary autistic children achieved this score, and one was a borderline. On the other hand, 9 children from other diagnostic categories (including non-psychotic) achieved borderline A-S scores. Reasoning from the data at hand and also from the evolution of the Rimland scales, they appear to us to be useful adjuncts in diagnosing autism, but also quite restrictive. Using only Rimland's suggested A-S cutoff scores, we may be left with an extraordinarily exclusive group. If it were clearer that such a group really constituted a discrete entity, such a restriction might still be profitable. However, in our experience it seems unlikely that the high scoring group of children constitutes a discrete entity, particularly when classifying is based on *behavioral* observations that are continuously distributed. Moreover, if investigators limit their samples to just the +30 (E-1) and +20 (E-1), there remains a much larger group of children with unmistakable autistic features who would still require classification and study. Over-reliance on a high E-2 score as anything but a screening device would produce some real oversights. For example, one patient in our sample with a +25 E-2 score had all features of the Cornelia de Lange syndrome and another, with a +19 score, tuberous sclerosis diagnosed by skin biopsy—both well-defined neurological conditions.

One problem that all of these diagnostic checklists share is the absence of rigorous validity studies. Until such studies are done, all of the checklists can serve as useful screening instruments. No checklist, however, can be looked upon as more useful than another with respect to such variables as etiology, correct treatment, or prognosis of infantile autism.

Rimland's E-2 scores may at this point seem to have an additional use and be "more valid" in proving that high scores relate to the amount of serotonin efflux from red cells (Boullin, Coleman, & O'Brien, 1970; Boullin, Coleman, O'Brien, & Rimland, 1971). However, other experiments must be performed to determine

whether this biological observation can be repeated in other laboratories and then to ascertain if the observation is truly related to etiology. Since the number of subjects used in Boullin's work is quite small, the studies should be repeated using a larger number of "autistic" children with both higher and lower E-2 A-S scores; such studies are now in progress at our Clinical Research Center.

CONCLUSIONS

Good agreement on diagnosis, even concerning subcategories of psychotic conditions in children, is common among people working in close collaboration, as in the case of DeMyer and Churchill. However, this agreement lessens considerably when diagnosticians without constant feedback compare diagnoses, even when relatively structured and standardized diagnostic systems are in use. Nevertheless, this study enables us to infer that any one of the several diagnostic instruments can at least achieve reasonably good agreement in differentiating early schizophrenic and autistic children as a group from non-psychotic children. While more refined definitions of categories are most desirable, it appears that such an achievement may not be possible at present without a significant loss in reliability. Perhaps the course selected by the British Working Party, which simply tried to distinguish schizophrenic and autistic children from other diagnostic groups, is the most prudent one. Finer distinctions may lead to as much confusion as agreement. Nevertheless, the authors believe that the goal of achieving reliable subgroups is of great importance and that efforts in this direction should continue. DeMyer and Churchill's diagnostic subcategories of child psychosis (early childhood schizophrenia, primary autism, and secondary autism) appear similar to other diagnosticians' ideas of "infantile autism." Rimland, who would only accept "primary autism," is the exception. In the absence of a well-proven biological indicator of the kind which identifies Down's syndrome or phenylpyruvic ketonuria, all authors must include careful descriptions of subjects in clinical reports and research.

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