

Social Adjustment and Cognitive Performance of High-Risk Children

by **Shaul C. Sohlberg and Shoshanna Yaniv**

Abstract

The study children were given two group-administered tests: the Raven's Matrices and an arithmetic achievement test. In addition they were observed in their classrooms, and also ranked by their classmates in terms of standard sociometric measures. The index children tended to perform somewhat more poorly on the arithmetic and Raven's Matrices tests than the controls. Classroom observations suggested that index cases concentrated more poorly and showed more forms of withdrawal behavior than controls; moreover, they had a lower social status, as viewed by their peers. The relationship of these findings to prior work is discussed, as is the importance of gathering naturalistic observational data.

Our psychological testing program included both a battery of individually administered tests and a number of group tests, sociometric examinations, and classroom observations. Our findings in the latter part of the testing program during the first round of observations are described in this article.

Methods

The group testing program included the following measures: (1) Raven's Matrices; (2) an arithmetic achievement test; (3) structured classroom observations; and (4) sociometric examinations.

Raven's Matrices. Cognitive functioning is one of the most important variables in studies on schizophrenia and high-risk subjects (Weiner 1966; Roff and Ricks 1970; Wynne, Cromwell, and Matthysse 1978; Chapman 1979). Therefore, we

wished to use another measure of nonverbal intelligence in addition to the instruments that we used in our individual test battery.

We chose the Raven's Matrices test because it is a well-known nonverbal intelligence test that has often been characterized as reflecting an individual's general intelligence or *g* (Anastasi 1976; Cronbach 1970).

Arithmetic. High-risk subjects have been reported to do less well on standard arithmetic tests than control subjects (Mednick and Schulsinger 1965; Landau et al. 1972). Because of the theoretical and practical implications of this specific aspect of cognitive performance—for instance, in classroom standing and overall academic achievement—we decided to evaluate the subjects' arithmetic ability with the Arithmetic Subtest of the Verbal Scale of the Wechsler Intelligence Scale for Children (WISC), and also to construct an arithmetic achievement test that could be administered as part of our group testing session in the classroom. The arithmetic test consisted of 24 items, arranged according to difficulty and yielding a maximum score of 24.

Classroom Observations. When we devised our testing program, we assumed that it would be worthwhile to evaluate subjects' classroom behavior, both as reflected in academic performance and in social adjustment. Classroom observations were carried out during a 30-minute period by a trained observer who was unaware of the identity of the children and who had been instructed

Reprint requests should be sent to Dr. A.F. Mirsky, Chief, Laboratory of Psychology and Psychopathology, NIMH, Bldg. 10, Rm. 4C-110, Bethesda, MD 20205.

to observe the behavior of two children by a time-sampling procedure. Our observations of the children's classroom behavior were based on a standard procedure as described by Wright (1960). Use was made of precoded observation guides, including a number of well-defined behavioral patterns, which were related to the following four main categories of a child's classroom behavior: (1) posture, (2) direction, (3) communication, and (4) movements. Care was taken to ensure that the observations were carried out without interfering with ongoing classroom events and that both the observation process, as such, and the observer not attract any undue attention.

Sociometric Choices. The last part of our group testing program consisted of a sociometric questionnaire of the partial-rank-order type, by use of which all children in a certain classroom were asked to identify their first, second, and third choice of children with whom they would or would not like to go on a trip. To overcome the problem of varying class sizes, we asked the children for one positive and negative choice in classrooms of up to 10 pupils, and asked for two choices in classrooms of up to 20 pupils; in larger classrooms, each child was asked to make three positive and negative choices (Bar Netser, personal communication, 1963; Bar Netser 1969). Because matched pairs of index and control children were always selected from the same classroom, this procedure provided us with a psychologically meaningful indication of a certain child's status in his peer group as compared to the status of his control counterpart. To estimate a subject's overall sociometric status, the total number of negative choices was subtracted from

Table 1. Raven's Matrices scores of Index and control children

	IK	CK	IT	CT	T ₁ Index vs. control	T ₂ Kibbutz vs. town	T ₃ Interaction
Mean	31.35	35.65	31.56	32.65	- 2.01 ¹	.88	- .36
SD	12.81	11.99	13.07	11.24			

IK = Index Kibbutz; CK = Control-Kibbutz; IT = Index-Town; CT = Control-Town. Same abbreviations used in tables 2-4.

¹ $p < .10$, two-tailed.

Table 2. Arithmetic achievement scores of Index and control children

	IK	CK	IT	CT	T ₁ Index vs. control	T ₂ Kibbutz vs. town	T ₃ Interaction
Mean	10.84	12.20	13.80	14.56	- 1.84 ¹	- 2.46 ²	- .61
SD	5.81	6.06	5.80	4.87			

¹ $p < .10$, two-tailed.

² $p < .05$, two-tailed.

the total of positive choices, leaving a "net sociometric status" score.

Results

As table 1 indicates, we failed to find any statistically significant intergroup differences for Raven's Matrices scores. Each one of the four subgroups had a normal average score level, and no group differences or interactions were found. However, there was a trend for index subjects to perform more poorly than control subjects.

As expected, the findings in table 2 show that our index subjects tended to do less well on the arithmetic test than their controls ($p < .10$, two-tailed). This result supports our finding of significant intergroup differences on the arithmetic subtest of the WISC, as described elsewhere in this issue (p. 49). The finding of poorer performance among kibbutz

children was unexpected, however, and is not consistent with results on the WISC arithmetic test.

Classroom observations (see table 3) revealed that index subjects looked significantly more at the observer and less at the teacher than their control counterparts. They also were significantly more often characterized as appearing uninterested and "vacant" in their classroom behavior, and as manifesting various signs of absent-minded behavior (e.g., sucking or biting their pens and pencils). Although only a relatively small number of behavioral patterns in table 3 show statistically significant intergroup differences, it is of interest to note that all differences are clearly related to a common dimension of level of participation in ongoing classroom activities. Our findings show that index subjects tended to preoccupy themselves in the classroom with all kinds of activ-

Table 3. Frequency of some major aspects of classroom behavior in index and control children based on observations

		IK	CK	IT	CT	T ₁ Index vs. control	T ₂ Kibbutz vs. town	T ₃ Interaction
Posture								
Erect	Mean	27.92	28.76	28.68	31.52	-.93	-.67	.54
	SD	9.56	11.52	11.93	12.63			
Restless	Mean	12.68	13.20	179.96	16.36	-.19	-1.98 ¹	-.58
	SD	11.41	9.88	13.82	11.23			
Direction								
To teacher	Mean	28.32	32.04	35.84	35.84	-2.07 ²	-1.54	-1.19
	SD	11.77	12.31	13.76	12.89			
To learning material	Mean	23.36	22.68	17.52	20.00	.82	1.47	1.11
	SD	13.14	13.50	10.26	10.74			
To observer	Mean	1.84	1.12	3.84	2.08	2.89 ³	-2.88 ³	-.83
	SD	1.90	1.24	2.77	1.80			
To neighbor	Mean	15.04	17.36	19.72	18.92	-.41	-1.54	-1.24
	SD	7.24	8.88	10.32	8.86			
To speaker	Mean	5.20	5.40	6.52	6.56	-.13	-1.23	-.11
	SD	3.63	4.92	4.02	5.39			
Vacancy	Mean	11.48	9.32	10.96	7.72	2.36 ²	.35	-.12
	SD	8.72	8.22	8.15	6.34			
Communication								
Raises hand	Mean	3.20	3.56	7.88	10.28	-1.11	-2.93 ³	1.05
	SD	4.88	5.33	9.88	9.16			
Answers without raising hand	Mean	5.16	5.28	3.88	3.84	-.06	1.57	-.33
	SD	4.71	4.24	3.55	2.76			
Asks or speaks without being asked	Mean	6.00	5.56	3.20	2.64	.60	2.23 ²	-.36
	SD	6.23	5.25	3.88	3.35			
Demands from teacher	Mean	1.40	1.56	1.48	2.04	-.95	-.47	.44
	SD	2.25	2.14	2.68	2.09			
Jokes	Mean	.92	.44	1.08	1.04	.76	-1.00	.73
	SD	1.16	.65	2.18	1.62			
Yawns	Mean	1.00	.12	.04	.04	1.62	1.46	1.56
	SD	2.68	.33	.20	.20			
Movements								
Sucks (10.11)	Mean	7.04	4.44	4.20	2.88	1.74 ¹	1.38	.49
	SD	6.12	7.45	4.44				
Sucks, bites nails	Mean	4.68	6.64	9.32	6.24	.37	-1.09	-1.96
	SD	6.04	7.27	10.33	9.26			
Writes in an absent- minded way	Mean	3.48	2.68	2.52	2.24	.78	1.05	.30
	SD	5.07	3.20	4.25	3.93			

¹ $p < .10$, two-tailed.² $p < .05$, two-tailed.³ $p < .01$, two-tailed.

ities that were apparently unrelated to learning, like yawning ($p < .20$), gazing around, staring at the observer ($p < .01$), sucking or biting their pens and pencils ($p < .10$), and similar reactions; at the same time, the control children appeared to concentrate more on the teacher and their lessons. To a large degree, most of the observed classroom reactions of the index children appeared to be characterized by a distinct pattern of distractibility and withdrawal behavior.

Findings in table 4 show that the index children tended to obtain a lower level of overall sociometric status than the control subjects. Although a number of intergroup comparisons failed to reach a level of statistical significance, all sociometric rankings were in the expected direction and are, therefore,

consistent with the overall sociometric scores.

Discussion

Results of our group tests and classroom observations can be summarized as follows: (1) On an achievement test in arithmetic, index children tended to obtain a lower level than control subjects. (2) Nonverbal intelligence level showed a trend toward lower index performance. (3) Observations of ongoing classroom behavior indicated that index children concentrated much less than control subjects and tended to show various forms of withdrawal behavior. (4) Sociometric rankings showed that index children tended to obtain a lower social status with their peers than control subjects from the same classroom.

The present findings on intergroup differences on an achievement test in arithmetic support our findings that index children obtained a significantly lower score on the Arithmetic Subtest of the WISC. It appears again that although the index children's formal intelligence level is not lower than that of their control counterparts, they tend to perform less well on tasks that require a high level of concentration and an ability to integrate different aspects of a certain problem.

Our findings in this respect are quite consistent with those of Mednick and Schulsinger (1968) and Landau et al. (1972). They also correspond to data from various recent studies indicating a typical state of attentional dysfunction in high-risk subjects (Garmezy 1978; Wynne, Cromwell, and Matthysse

Table 4. Sociometric status of index and control children in their classrooms

		IK	CK	IT	CT	T ₁ Index vs. control	T ₂ Kibbutz vs. town	T ₃ Interaction
First positive choice	Mean	.88	1.56	1.16	1.24	-.94	.18	-1.19
	SD	4.18	1.35	1.75	1.54			
Second positive choice	Mean	.68	.88	.88	1.80	-1.86 ¹	-1.68	1.36
	SD	1.16	1.05	1.05	2.18			
Third positive choice	Mean	.44	.40	.88	1.44	-1.41	-2.95 ²	1.55
	SD	.83	.92	.92	1.59			
First negative choice	Mean	.68	.68	2.36	.72	1.50	-1.73 ¹	-1.55
	SD	1.08	1.08	4.55	1.20			
Second negative choice	Mean	.92	.52	1.56	1.00	1.25	-1.42	-.09
	SD	2.31	1.25	2.10	2.29			
Third negative choice	Mean	.20	.20	.92	.64	.72	-2.75 ²	-.62
	SD	.66	.83	1.12	1.11			
Overall sociometric status	Mean	.20	1.44	-1.92	2.12	-1.83 ¹	.62	1.05
	SD	4.29	4.29	8.16	6.83			

All tests are two-tailed.

¹ $p < .10$.

² $p < .01$.

1978; Chapman 1979; Kestenbaum 1980).

The second major finding of this part of our study is that high-risk children in the classroom showed various patterns of withdrawal behavior. In addition, we found that they were not very popular with their peers. These results are very similar to reports from other high-risk studies (Garnezy 1974, 1978; Garnezy and Streitman 1974; Erlenmeyer-Kimling et al. 1980; Kestenbaum 1980; MacCrimmon et al. 1980). Very probably, these symptoms reflect a more or less typical pattern that can be found in various high-risk populations.

Furthermore, it is important to note that these findings of withdrawal and social isolation are very similar to the "classic" symptoms of aloofness and impaired patterns of interpersonal communication that are generally considered as typical characteristics of schizophrenic reactions in childhood and adolescence. These and similar behavioral patterns may reflect some of the primary symptoms in schizophrenia that were described in 1911 by Eugen Bleuler (1950).

Finally, in index-control comparisons, it should be noted that our classroom observations suggested a relatively higher level of maladjustment in our index sample than that suggested by the individual test battery. This finding demonstrates the importance of naturalistic observational data in addition to data derived from psychological tests.

References

- Anastasi, A. *Psychological Testing*. 4th ed. New York: MacMillan, 1976.
- Bar Netser, H. *Sociometry*. (Hebrew) Jerusalem: Mass Publishing Co., 1969.
- Bleuler, E. *Dementia Praecox, or the Group of Schizophrenias*. (1911) Translated by J. Zinken. New York: International Universities Press, 1950.
- Chapman, L.J. Recent advances in the study of schizophrenic cognition. *Schizophrenia Bulletin*, 5:568-580, 1979.
- Cronbach, L. *Essentials of Psychological Testing*. 3rd ed. New York: Harper & Row, 1970.
- Erlenmeyer-Kimling, L.; Cornblatt, B.; Friedman, D.; Marcuse, Y.; Rainer, J.D.; and Rutschmann, J. A prospective study of children of schizophrenic parents. *International Journal of Rehabilitation Research*, 3:90-91, 1980.
- Garnezy, N. Children at risk: The search for the antecedents of schizophrenia. Part II: Ongoing research programs, issues, and interventions. *Schizophrenia Bulletin*, 1 (Experimental Issue No. 9):55-126, 1974.
- Garnezy, N. Current status of a sample of other high risk research studies. In: Wynne, L.C.; Cromwell, R.L.; and Matthyse, S., eds. *The Nature of Schizophrenia: New Approaches to Research and Treatment*. New York: John Wiley & Sons, 1978. pp. 473-483.
- Garnezy, N., and Streitman, S. Children at risk: The search for the antecedents of schizophrenia. Part I: Conceptual models and research methods. *Schizophrenia Bulletin*, 1 (Experimental Issue No. 8):14-90, 1974.
- Kestenbaum, C.J. Children at risk for schizophrenia. *American Journal of Psychotherapy*, 34:164-177, 1980.
- Landau, R.; Harth, P.; Othnay, N.; and Sharfhertz, C. The influence of psychotic parents on their children's development. *American Journal of Psychiatry*, 129:70-75, 1972.
- MacCrimmon, D.J.; Cleghorn, J.M.; Asarnow, R.F.; and Steffy, R.A. Children at risk for schizophrenia. *Archives of General Psychiatry*, 37:671-674, 1980.
- Mednick, S.A., and Schulsinger, F. A longitudinal study of children with a high risk for schizophrenia: A preliminary report. In: Vandenberg, S.G., ed. *Methods and Goals in Human Genetics*. New York: Academic Press, 1965. pp. 255-295.
- Mednick, S.A., and Schulsinger, F. Some premorbid characteristics related to breakdown in children with schizophrenic mothers. In: Rosenthal, D., and Kety, S.S., eds. *Transmission of Schizophrenia*. Oxford: Pergamon Press, 1968. pp. 257-292.
- Roff, M., and Ricks, D.F., eds. *Life History Research in Psychopathology*. Minneapolis: University of Minnesota Press, 1970.
- Weiner, I.B. *Psychodiagnosis in Schizophrenia*. New York: John Wiley & Sons, 1966.
- Wright, H.F. Observational child study. In: Mussen, P.H., ed. *Handbook of Research Methods in Child Development*. New York: John Wiley & Sons, 1960. pp. 71-139.
- Wynne, L.C.; Cromwell, R.L.; and Matthyse, S., eds. *The Nature of Schizophrenia: New Approaches to Research and Treatment*. New York: John Wiley & Sons, 1978.

The Authors

Shaul Sohlberg, Ph.D., is Clinical Psychologist, Department of Psychology, Bar Ilan University, Ramat Gan, Israel. Shoshanna Yaniv, B.S., was a student in the Department of Education at the University of Haifa.