

Current Comments

Autism: Few Answers for a Baffling Disease

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The children are highly unresponsive. Many handle language badly at best; others do not talk at all. They spend their days lost in apparent daydreams, spinning objects and flapping their hands in front of their faces. They do not come when called. They do not cuddle up to their mothers; often they do not seem to even know their mothers. Four or five of every 10,000 children worldwide is one of them.¹⁻³

They have been given a variety of inaccurate labels: retarded, schizophrenic, feeble-minded, idiot, and emotionally disabled. France's Wild Boy of Aveyron was probably one of them. His condition, which was reported in 1807, was thought to be the result of having been raised by wolves.¹ In 1943, Leo Kanner, then at Johns Hopkins University, finally gave these children a name that stuck: autistic.⁴

Kanner's paper on autism, a classic in the field,⁵ was the first to establish that the condition did exist as a disease separate from mental retardation or schizophrenia. Called "Autistic disturbances of affective contact," Kanner's paper described the case histories of 11 children he had seen over a period of five years. They differed from other abnormal children in a variety of ways. These children were unable "to relate themselves in the ordinary way to people and situations from the beginning of life."⁴ The children generally preferred to be alone, did not use language to convey meaning, and did not exhibit any anticipatory behavior when being picked up.

Other features noted by Kanner included excellent rote memory, echolalia (the child repeats, or echoes, things he has heard or that have been said to him), incorrect use of personal pronouns (using "you want" to mean "I want"), literal interpretations of spoken phrases, an obsessive desire for sameness in routine and placement of objects, lack of spontaneous activity, preference for objects over people, and physical normalcy. He also noted that the children often came from upper-class, "highly intelligent families." Kanner concluded that these "children have come into the world with innate inability to form the usual, biologically provided affective [emotional] contact with people."⁴

Kanner's paper sparked a good deal of interest. Over a period of years, other researchers began to report similar cases. Today, nearly 40 years after its publication, the paper is often quoted as the authority in the field. In the past 20 years alone, it has been cited hundreds of times.⁵ And most of Kanner's observations are as true today as they were in 1943. In fact, autism (also known as "early infantile autism") is sometimes referred to as Kanner's syndrome.

The word autism comes from the Greek word for self. Its usage is based on one of the main characteristics of autism: children afflicted with the disease are noncommunicative and aloof; they often seem to be totally self-absorbed. The use of the word has proved confusing, however, as its dictionary defini-

tion—"absorption in fantasy"⁶—has led people to believe that autistics enjoy rich fantasy lives, while the opposite actually appears to be true. In addition, the term can be loosely used to describe a wide variety of behaviors. Children with other disorders may display some "autistic" behaviors, although not fitting the syndrome described by Kanner. Confusion surrounding the term has sometimes hindered research in the field.

Researchers are unable to agree on a definition of autism. Many researchers interpret Kanner's autistic symptoms broadly, while others interpret them more narrowly. The problem is essentially a subjective one, since no physical abnormalities have been positively identified in autistic people to date. The disease must be entirely defined according to behavioral symptoms. Many researchers, for example, have included childhood schizophrenics in their definition of autism, and many also thought that autism was one of the initial manifestations of schizophrenia. Both ideas have been largely rejected in recent years, although proponents of both remain.^{7,8}

Several comprehensive attempts to define autism have appeared in recent years, although the authors of these caution that they are open to change at any time. One of the most definitive is that offered by the National Society for Autistic Children (NSAC), and prepared by Edward Ritvo and B.J. Freeman, University of California, Los Angeles. Their basic definition is stated tersely: "Autism is a behaviorally defined syndrome. The essential features are typically manifested prior to 30 months of age and include disturbances of 1) developmental rates and/or sequences, 2) responses to sensory stimuli, 3) speech, language, and cognitive capacities, and 4) capacities to relate to people, events, and objects."⁹ The definition goes on to detail the particular disturbances associated with each of the four categories. For example, under "disturbances of

responses to sensory stimuli" are listed: "repetitive sniffing, specific food preferences, and licking of inedible objects." Other disturbances in the sensory category include "nonuse of eye contact," "prolonged regarding of hands or objects," "nonresponse or overresponse to varying levels of sound," "whirling without dizziness and preoccupation with spinning objects," and "handflapping, gesticulations, and grimaces." Symptoms in other categories include no speech or delayed speech, no concept of abstract terms, inappropriate use of toys, and unresponsiveness to peers and adults.

The definition goes on to point out that symptoms usually appear within the first few months of life, although they may be overlooked by parents. The majority of autistic children have low IQs and the disease occurs four to five times more often in males. NSAC considers autism a "physical dysfunction within the central nervous system (CNS), the exact nature and type of which has yet to be determined." Finally, they differentiate between autism and such other disorders as mental retardation, deafness and blindness, language disorders, psychological disorders, schizophrenia, and brain disorders.⁹ For example, mentally retarded children experience developmental delays in all areas, much like autistics. Unlike autistics, however, they respond to people and objects in normal, appropriate ways.

Most definitions offered by other researchers generally agree with the one given by NSAC. They frequently disagree, however, on the degree of emphasis that should be given to the various characteristics of the disease. For example, Michael Rutter, Institute of Psychiatry, London, defines autism with four "essential" criteria. While the first three of his criteria are quite similar to the NSAC criteria, his fourth differs significantly. According to Rutter, the fourth feature of autism is an "insistence on sameness, as shown by stereotyped play patterns, abnormal preoccupa-

tions, or resistance to change."¹⁰ Although NSAC includes this feature in its definition, it is only one part under their category "disturbances of capacities to relate to people, events, and objects."

Such differences, while they may appear slight to the casual observer, can have major repercussions in the actual diagnosis and treatment of autistic children. A researcher following Rutter's definition may rely heavily on the criterion that children considered autistic show an insistence on sameness, while one following the NSAC definition may consider that feature "optional." For example, Bernard Rimland, Institute for Child Behavior Research, San Diego, California, considers insistence on sameness an integral symptom of the autistic syndrome.¹¹ All autistic children, of course, do not exhibit all the symptoms associated with the syndrome. And since children with other problems may often show some behaviors associated with autism, in-the-field diagnosis and research are difficult. In spite of their differences, however, most researchers generally agree that autism follows the lines of the two definitions outlined here.

Other definitions have been proposed for use in actual diagnosis. Perhaps the best known is one offered by Rimland in his 1964 book *Infantile Autism*.¹² Rimland's book, which was one of the first attempts to organize the widely diverse autism literature into a coherent whole, is another classic in the autism field.¹³ But it is best known for the "diagnostic checklist for behavior-disturbed children," or the E-2 scale, that Rimland proposed. This scale consists of 80 questions, which parents or diagnosticians are asked to fill out. Questions deal with abnormal behaviors, asking whether or not such behaviors are exhibited by the child, and to what degree. For example, parents are asked, "Does the child ever 'look through' or 'walk through' people as though they weren't there?" and "Does the child have any unusual cravings for things to eat or chew on?"^{12,14}

Rimland believes that many children diagnosed as autistic are not truly autistic. He designed his scale for the purpose of identifying "classically" autistic children. Other researchers, however, claim that although the scale has proved useful for differentiating between autistic and retarded children, it does not differentiate within the child psychoses. (For example, it does not differentiate between schizophrenia and autism.)¹⁰ Related diagnostic checklists have been proposed by other researchers as well.^{15,16}

Beyond the difficulty of defining the behavioral characteristics of autism, however, there is the even stickier problem of discovering what causes autism. Kanner's paper noted that the parents of many autistic children appeared to be detail-oriented and emotionally cold. Later researchers seized upon this idea. They declared that autism was an emotional problem, the result of the child's withdrawal from unfeeling and unloving parents. This attitude prevailed for many years, and the parents of autistic children suffered the blame for their children's illnesses.

Happily, this attitude is now largely a thing of the past.¹⁷ Researchers today generally agree that autism is a physiological disorder, rather than an emotional one.¹⁸ They have taken a variety of directions in the search for an answer to the autism puzzle, and while there are still no definite results, much interesting data have come to light. As a consequence of this work, many researchers now believe that autism is a single syndrome with a variety of causes. Most concur with the NSAC definition, which calls autism a disease of the CNS, which includes the brain and spinal cord.

Electroencephalograph (EEG) studies of the brain were a major tool in early autism research. In an EEG reading, the electric currents produced by the brain are recorded. In healthy persons, the waves follow a fairly set pattern. In people with brain disorders, however, the waves deviate from the normal pat-

terns. EEG studies of both psychotic and autistic children (the two groups are frequently lumped together) often show EEG abnormalities. One study, for example, done by M.K. DeMyer, S. Barton, W.E. DeMyer, J.A. Norton, J. Allen, and R. Steele, Indiana University and Purdue University, found EEG abnormalities in over half of the disturbed children tested. The study included 146 children, of whom 120 were considered autistic.¹⁹ Other studies have also reported EEG abnormalities, although so far no one has found an EEG pattern that is unique to autism.¹⁸

In another study, Stephen L. Hauser, G. Robert DeLong, and N. Paul Rosman, Harvard Medical School and Boston University School of Medicine, studied pneumoencephalograms (X rays of the brain) taken of 17 autistic children. They reported abnormalities in 15 of the 17 children. In particular, they found a dilation of the left temporal horn of the left lateral ventricle.²⁰ But these results were challenged in a 1976 *Lancet* article, which asserted that the Hauser study dealt with a highly selective group of autistics that is not representative of autistics in general.²¹

In yet another study, DeLong, one of the coauthors of the Hauser study, postulated that there exists a group of autistic children that can be considered "the neurologically impaired group." DeLong reports results similar to the Hauser study, and comments that this abnormality closely resembles two syndromes in adults that result from brain lesions. In the first, the Klüver-Bucy syndrome, afflicted persons seem to have an "incapacity for adaptive social behavior, and a loss of recognition of the significance of persons and events." He adds, "For one seeing such patients, the analogy to infantile autism is striking and compelling." Patients with the second syndrome, Korsakoff's psychosis, display learning deficits in language and social areas. DeLong feels a comparison of these syndromes with autism may lead to some important understanding of autism.²² In another study, Hanna

Damasio and colleagues, University of Iowa Hospitals and Clinics, Iowa City, also reported finding brain abnormalities in 17 autistic patients. Although they were unable to find any abnormal pattern that was common to all the children tested, they concluded that their study nevertheless supported the studies of Hauser and DeLong.²³

The idea that autism is the result of left hemisphere brain underdevelopment or damage has been reported by other researchers as well. Edward Blackstock, York University, Ontario, argues that the difficulties exhibited by autistic children—language and logical thinking—are primarily left-brain skills. Blackstock's studies found that autistic children are primarily left-oriented. They are, for example, frequently left-handed (as opposed to only 12 percent of normal children), prefer to listen to music with their left ear, and prefer music to speech. All of these functions, according to Blackstock, are primarily controlled by the right brain.²⁴ Margaret Prior, La Trobe University, Australia, and John L. Bradshaw, Monash University, Australia, have also reported right-brain dominance in autistic children.²⁵

Rimland also supports the left-brain dysfunction theory. Using his E-2 form mentioned earlier, Rimland has collected data on over 7,500 autistic children worldwide. He reports that almost ten percent of those children display abilities commonly referred to as "idiot savant" (literally, "wise fool"). Typically, the idiot savant is retarded in most respects, yet has some abilities that fall into the genius range. For example, an idiot savant may be able to multiply large numbers in his or her head instantly, or tell, almost without pause, what day of the week a certain date will fall on in any given year. Although idiots savants occur within all forms of retardation, Rimland believes that a large number of autistic children fit into this category.²⁶

One such child, an autistic girl named Nadia, was featured on the CBS science

program, *Universe*, hosted by Walter Cronkite. Nadia is exceptional for her drawing abilities, which far surpass the normal abilities of a child her age. At age three, Nadia began drawing from memory illustrations she had seen in books, usually pictures of a rooster, or a horse and rider. She produced skillful works that involved complicated perspectives and intricate details. Many of her works were as well done as works by accomplished artists. Now almost 14, Nadia no longer draws much, and the work she produces is no longer as skillful, although it is still above average ability for her age group.²⁷ I was present when Cronkite received an award for his contribution to the public understanding of science. He used the occasion to rerun Nadia's story. He was deeply and genuinely impressed with her genius and saddened by the loss of her artistic talent.

What Rimland finds particularly interesting, however, is the sort of idiot savant behaviors that are displayed by autistic children. According to him, mathematical, musical (for example, the ability to play perfectly a song heard only once), memory, and mechanical skills are among the most frequently cited. He says that these largely right-brain skills may argue for left-brain dysfunction, and that the children have compensated by overdeveloping right-brain skills.²⁶

Recent work by Peter Tanguay and colleagues, University of California, Los Angeles, found that the auditory brain responses of autistic children differ from those of normal children.²⁸ As Tanguay explains, sound is transmitted from the ear to the brain as a series of electrical impulses that jump from nerve cell to nerve cell. These impulses, or auditory brain responses, are detected with the use of electrodes, then amplified 200 times, and recorded as waves. The final recording is actually very similar to an EEG, but more useful because its amplification is far greater and thus more specific than that of an EEG.²⁹

Tanguay and his colleagues believe that their findings suggest some sort of auditory processing defects "peripheral to or within the brain stem auditory pathway" in autistic children.²⁸ While they admit that their findings may have no causal relationship to the child's autistic handicaps, they believe that the findings strongly suggest two other possibilities. The first of these, they argue, is that such defects may represent distortions in what the autistic child actually hears, thus impairing his or her ability to understand and process language correctly. A second possibility, they believe, is that the distorted auditory input itself results in some sort of brain damage, which in turn produces autism. They believe their data also provide support for the idea that autism has a variety of causes, and perhaps a basis for differentiating among those causes.²⁸

Another major area of autism research has examined the possibility of a biochemical cause. Researchers have studied the levels of a number of body chemicals in autistic children. Much of this research has centered around serotonin, a constituent of blood platelets that is thought to be a neurotransmitter within the CNS. Elevated serotonin levels have been reported in a number of studies.^{18,30} For example, Saburo Takahashi, Hideko Kanai, and Yoshihiro Miyamoto, Kyoto Prefectural University of Medicine, Kyoto, Japan, studied 30 autistic children, 30 normal children, and 45 children with various neurological and psychiatric disorders. They found significantly higher serotonin levels in the autistic children, as compared to the normal children. Some of the children in the third group also showed higher levels.³¹

Henry Hanley, Veterans Administration Hospital, Lexington, Kentucky, Stephen M. Stahl, and Daniel X. Freedman, University of Chicago, also reported elevated serotonin levels in both autistic and severely retarded children. In their study, eight of 27 autistic children, 13 of 25 severely retarded children, and two of 23 mildly retarded

children showed elevated levels. None of a group of normal children had elevated levels.³² Researchers studying other biochemical substances also reported abnormal levels in autistic children.^{18,30,33-36} In a review article on the subject, L.R. Piggott, Lafayette Clinic, Detroit, concludes, "There may be differences in urinary, blood, and spinal fluid levels or components of the serotonin metabolic chain in autistic as compared to other children."¹⁸ The results are both suggestive and promising. It may be, for example, that such differences indicate that the information-processing systems of autistic children have gone awry. Ritvo cautions, however, that "as yet no specific biological markers or biochemical abnormalities have been identified" for autism.³⁰

Some researchers have taken a different tack with autism research, trying to establish some common factors in family, pregnancy, birth, or early childhood experiences that might lead to a specific cause of autism. A hereditary connection, while tempting, has proved elusive so far. The incidence of autism within a family (for example, among aunts, uncles, and siblings) is relatively low, with the exception of monozygotic (identical) twins, who frequently both exhibit autism. Consequently, the possibility that autism may be a genetic disorder has traditionally been rejected by researchers. In 1964, however, Rimland challenged this view, arguing that autism may well be genetic.¹² More recently, Susan Folstein and Rutter have also argued for a genetic connection. They point out, for example, that since the incidence of autism in the general population is low, the incidence of autism within a family would also be quite low. Furthermore, they report, the incidence of autism among siblings is actually about two percent, or 50 times that of the general population. They also note that a family history of speech delay is quite common among families of autistics.³⁷

In their study of 21 pairs of twins, Folstein and Rutter found 25 autistics and six children with cognitive disabilities, usually related to language. They concluded that autism is "genetically linked with a broader range of cognitive disorders."³⁷ Similar results have been reported by Ritvo and colleagues, who state that "some cases of autism are probably inherited through flawed genes,"³⁸ and others.^{39,40}

Frequently discussed among autism researchers is Kanner's observation that most of his autistic patients came from upper-class, well-educated families. The significance of such a phenomenon remains unclear, although many researchers have speculated that it may indicate a genetic cause. Still others argue, quite simply, that perhaps better-educated families know when to seek treatment for their children, and are also better able to pay for it.⁴¹ Equally intriguing, and equally unexplainable, is the finding that autism occurs in a preponderance of firstborn children.^{42,43}

Some studies have attempted to link pregnancy complications with autism. Many case studies, such as Kanner's, have indicated that pregnancy was normal for most of the patients discussed. Still other studies, however, have indicated that pregnancy difficulties or unfavorable obstetrical factors occur in a large number of cases. Such factors include low birth weight, long labor, breech birth, delivery aided by forceps, and hemorrhage during delivery.^{42,43} Despite the significant number of complications found by these researchers, "there was no single event or combination of biologically related complications that could reasonably account for any large number of cases of autism."⁴² Still other studies reported a high level of anxiety and emotional disturbance among mothers-to-be of autistic children, as compared to a group of mothers-to-be of nonautistic children.^{44,45}

As is undoubtedly clear by now, the state of autism research is characterized by a large amount of work in a large

number of areas. For example, in a quick check of the *ISI/BIO-MED*™ file for 1979-1980, I found 45 papers that used "autism" or "autistic" in their titles. Although there was no research front specifically assigned to autism, many of these papers were assigned to research fronts in other areas. In fact, a total of nine other research fronts were represented. This certainly gives some indication of the diversity of autism research. The research fronts represented are listed in Figure 1.

In future expansions of the *ISI/BIO-MED* system, smaller fields like autism will be represented more directly because we are now able to use variable level clusterings. For example, when I reported on the 100 most-active fields represented in *Social Sciences Citation Index*® (*SSCI*®),⁴⁶ autism was not included. This particular field also highlights the overlap between the literature of the social and biosciences. We expect in the future to develop the neurosciences as an *ISI*® search specialty.

Apart from the question of its cause, the key question surrounding autism is, of course, what to do about it. For the parents of children afflicted with the disease, this is of utmost concern. That it is a difficult and devastating experience to live with an autistic child has been well documented by several parents. Perhaps the best-known works are the books by screenwriter Josh Greenfeld, *A Child Called Noah*⁴⁷ and *A Place*

for Noah,⁴⁸ in which he documents day-to-day life with his autistic son, Noah.

Unfortunately, the outlook for autistics is, so far, not very good. Once thought to be normal children who were "tuned out" from the world, most autistics are now considered severely brain damaged children who have never "tuned in." An estimated 60 percent of all autistics have IQs below 50. Another 20 percent fall within the 50 to 70 range, and only 20 percent score IQs of 70 or above.² One hundred is considered a normal IQ, and 70 or below is considered retarded.⁴⁹

Very few autistics with IQs of less than 70 are able to recover; most of these children end up in institutions for life. Of the others, those who develop fairly good language skills by about age five have a relatively good prognosis.⁵⁰

Many can learn to care for themselves and may even be able to live and work on their own, although they usually need some adult supervision. Nevertheless, reports Lorna Wing, Institute of Psychiatry, London, parents and therapists should not be overly optimistic in their expectations for the autistic child. In a 1981 paper on the management of autism she writes, "It has to be remembered that even the least handicapped and most able autistic people have lifelong cognitive problems. Unless there is a good chance of achieving independence as an adult, or unless the autistic person himself wants to learn,

Figure 1: The nine 1979-1980 *ISI/BIO-MED*™ research fronts in which papers on autism appear.

Research Front Number	Title
80-0902	Monoamine oxidase activity in psychiatric patients
79-0746	Platelet monoamine oxidase in schizophrenia
80-0903	Auditory brain stem evoked potentials in multiple sclerosis and other diseases
79-0747	Electrophysiology of brain stem auditory evoked potentials
80-0599	Adrenergic receptor influence upon hormone-sensitive adenylate cyclase activation
79-0873	Catecholamine-sensitive adenylate cyclase
80-2463	Isolation methods and neurophysiological activity of gangliosides
79-2285	Methods and assays of ganglioside composition from various tissues
80-1541	Epidemiological study of community-based psychiatric disorders

there seems little point in making him acquire more than is practically useful or interesting for him in the sheltered conditions in which he will always live."⁵¹

Some therapists are somewhat more optimistic, however. Laura Schreibman, University of California, Los Angeles, and Robert Koegel, University of California, Santa Barbara, for example, call autism a "defeatable horror," and claim, "Regardless of the degree of difficulty, we have not yet seen an autistic child who did not improve enough to be educated in a school program if his parents and teachers receive proper training."⁵² They report that of 16 children in their program, ten now attend regular or special education schools, and they expect the other six to also be able to attend regular classes one day.⁵²

Schreibman and Koegel's program is largely based on behavior modification strategies. Such treatments have been pioneered by several therapists, particularly Ivar Lovaas, University of California, Los Angeles. In this approach, the children are taught new "appropriate" behaviors, to imitate adult teachers, and to follow commands. The process, it is hoped, will eventually change, or modify, the child's abnormal behavior to normal behavior. In the beginning, for example, the child may be asked to do such simple things as sit on a chair for a minute, or look at the instructor on command. Lovaas explains that initially, it may take 15 to 30 minutes to get the correct response from the child. Rewards of food are often given as motivation.⁵³

Once the child consistently follows these simple commands, he may be asked to perform imitative behavior—such as raising his arms when the instructor does. These visual instructions are gradually replaced with verbal ones. In other words, the child is taught to raise his hands when the teacher asks him to do so. When the child responds well to verbal commands, more difficult

verbal training begins. The child is asked to repeat sounds, words, and, eventually, to respond verbally to phrases. The entire program takes months of work, several hours daily. Lovaas relies heavily on help from parents—from the start at least one parent is trained as a therapist, and as the program continues, the parent takes over a good deal of the training. Training goes on in both a clinic setting and in the home.⁵³

The results of this therapy are mixed. Many of the children do make considerable progress, according to Lovaas, learning to speak and act in generally appropriate, rather than abnormal, ways. For those who remain with their trained parents, he reports, these gains remain, and may even be improved upon. But for those who later end up in institutions, most regress, and eventually become even worse.

Some drug treatments have proved useful in treating autism.^{7,54} Magda Campbell, New York University Medical Center, explains that some drug therapies "can make the autistic child more amenable to other therapies, including special education." However, she adds, "Drugs currently in use treat symptoms, not diseases."⁷

Vitamin therapies have also received some attention. One of the most recent, and controversial, is the use of vitamin B₆ supplements. Rimland has reported significant behavioral changes in children given B₆.⁵⁵ Some studies have substantiated his findings, in particular, several done by G. LeLord, J. Martineau, and colleagues, Tours University, France, and University of California, San Francisco. For example, one study authored by Martineau, B. Garreau, C. Barthelemy, E. Callaway, and LeLord replicated Rimland's findings.⁵⁶ Most other researchers, however, say they have been unable to find any evidence that B₆ helps.⁵⁷

In spite of the currently bleak outlook for autistic children, the future does appear brighter. Research into the causes

Figure 2: Most-cited articles from *Journal of Autism and Developmental Disorders* (formerly *Journal of Autism and Childhood Schizophrenia*), 1971 to date.

Total Citations SCF [®] & SSCF [®] 1971-present	Article
70	Rutter M. Childhood schizophrenia reconsidered. <i>J. Autism Child. Schiz.</i> 2:315-37, 1972.
67	Churchill D W. The relation of infantile autism and early childhood schizophrenia to developmental language disorders of childhood. <i>J. Autism Child. Schiz.</i> 2:182-97, 1972.
66	Rutter M & Bartak L. Causes of infantile autism: some considerations from recent research. <i>J. Autism Child. Schiz.</i> 1:20-32, 1971.
57	Kanner L. Follow-up study of eleven autistic children originally reported in 1943. <i>J. Autism Child. Schiz.</i> 1:119-45, 1971.
56	Rimland B. The differentiation of childhood psychoses: an analysis of checklists for 2,218 psychotic children. <i>J. Autism Child. Schiz.</i> 1:161-74, 1971.
55	Boullin D J, Coleman M, O'Brien R A & Rimland B. Laboratory predictions of infantile autism based on 5-hydroxytryptamine efflux from blood platelets and their correlation with the Rimland E-2 score. <i>J. Autism Child. Schiz.</i> 1:63-71, 1971.

of autism, as demonstrated by this review, have uncovered some fascinating clues, and there is every reason to believe that a major breakthrough could occur soon. For the parents and families of these difficult children, one certainly hopes that it is very soon.

For the time being, there are some organizations set up to further research autism, and to help parents of autistics find appropriate help for their children. The Institute for Child Behavior Research conducts a variety of research programs aimed at helping autistic children. The institute also produces a newsletter to help parents keep informed of current activities in the field. It is located at 4157 Adams Avenue, San Diego, California 92116.

NSAC, which was originally founded by Rimland, also sponsors autistic research. NSAC maintains a referral service for parents and physicians; additionally, it periodically publishes a directory of services and programs for autistic children. NSAC can be reached at Suite 1017, 1234 Massachusetts Avenue, NW, Washington, DC 20005.

The Neuropsychiatric Institute, Child Psychiatry Clinical Research Center (CRC), University of California, Los Angeles, is a major center of autism research. CRC publishes a yearly newsletter, *CRC Outlook*, which details ongoing activities at the center. Interested

parents and professionals can get more information by writing Peter Tanguay, Director, NPI, Child Psychiatry Clinical Research Center, UCLA, Los Angeles, California 90024.

In addition, autism research is covered in several journals that deal specifically with psychiatric disorders in children, including *Journal of Autism and Developmental Disorders* (formerly *Journal of Autism and Childhood Schizophrenia*), *Journal of Child Psychology and Psychiatry*, and *Journal of the American Academy of Child Psychiatry*. Perhaps the most important of these is *Journal of Autism and Developmental Disorders*. Although this journal only began publication in 1971, its articles have already received a high number of citations. Figure 2 lists some of its most-cited articles. Autism is also dealt with in general psychiatric journals, such as *Archives of General Psychiatry*. All of these journals are covered in *Current Contents[®]/Social & Behavioral Sciences (CC[®]/S&BS)*. *Archives of General Psychiatry* and *Journal of Child Psychology and Psychiatry* are also covered in *CC/Life Sciences*.

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