

Autism Research Review

I N T E R N A T I O N A L

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Reviewing biomedical and educational research in the field of autism and related disorders

New studies implicate brainstem abnormalities

Two new studies link autism, particularly when it is associated with reduced IQ, to abnormalities in the brainstem.

The brainstem—often referred to as the “primitive brain”—conducts messages to the brain from the spinal cord and cranial nerves, and controls respiration, heartbeat, and blood pressure. Areas of the brainstem also control alertness and focusing of attention.

Japanese researchers Toshiaki Hashimoto et al. performed MRI scans on 29 autistic children (one group with IQs above 80, and another with IQs below 80) as well as 15 nondisabled controls. The researchers say that “the brainstem size was found to be significantly smaller in the autistic group,” and that “in particular, the reduction in brainstem size tended to be greater in the low IQ group when compared with the high IQ one.” This may indicate, they say, that brainstem damage during early development is more extensive and severe in autistic children with low IQs.

Earlier MRI studies by Eric Courchesne and colleagues found cerebellar defects in autistic individuals. Hashimoto et al. say this is compatible with their own findings; because of the extensive neural connections between the brainstem and cerebellum, they say, “the decrease in size of one area (brainstem) is likely to be associated with loss of cellular material in another area (cerebellum).”

Irish study also implicates brainstem

Using a different research technique, Irish researchers R. J. McClelland et al. also discovered evidence that brainstem functioning is abnormal in autistic individuals.

The researchers conducted “brainstem auditory evoked potential” (BAEP) studies—which measure the brainstem’s reaction to auditory stimuli—of 20 individuals with both autism and retardation, 54 nondisabled controls, and 12 retarded (but not autistic) controls.

The researchers found that autistic children under the age of 14 had normal BAEPs. All but two of the 13 children over age 14, however, had increased central conduction times (CCTs), an indication of brainstem pathology. The BAEPs of the retarded but non-autistic group, by comparison, were within normal ranges.

McClelland and colleagues believe their findings may indicate that autism involves a defect in myelination—the formation around

neurons of fatty myelin sheaths which act like insulation, allowing impulses to move along the nerves faster and more efficiently.

The myelination process, which begins before birth, is mostly complete by about age two (the age in which autism often becomes apparent), although some myelination continues into adolescence. A defect in the myelination process, McClelland et al. say, might account not only for autistic symptoms but also for the frequent development of epilepsy in older autistic children.

McClelland et al. found that autistic

children with abnormal test results were lower functioning than those with normal CCTs. “While this might simply be a reflection of non-specific brain damage,” they say, “it was not a feature of severely mentally handicapped non-autistic children.” Noting that Courchesne found no BAEP abnormalities in non-retarded autistic individuals, they speculate, like Hashimoto, that lower-functioning autistic children may have more extensive brainstem lesions than higher-functioning individuals.

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“Full inclusion:” the right choice?

One of the new catchwords in education for the autistic is “full inclusion:” the position that autistic children—regardless of their behavior problems or level of functioning—should be educated on regular school campuses, and mainstreamed into regular classes and activities. Advocates for full inclusion argue that it is ethically wrong to segregate autistic children; that they will benefit socially and academically from involvement with nondisabled students in a natural setting; and that the nondisabled students, in turn, will benefit from exposure to students with disabilities.

But are these claims valid? Richard Simpson and Gary Sasso argue, in *Focus on Autistic Behavior*, that there is no scientific evidence proving that full inclusion is beneficial either to autistic or to non-disabled students, and that “advocates of full inclusion of all students have apparently chosen to ignore empirically validated procedures in favor of a model that reflects not what we know to be true but, instead, how we would like things to be.”

Simpson and Sasso say that “the full inclusion debate has too often been reduced to superficial arguments over who is right, who is moral and ethical, and who is a true advocate for children,” and ignores the question of what is actually best for the children involved. They believe that until there are scientific data showing that full inclusion is superior to other approaches, the concept should be considered experimental, and should only be considered as one of a variety of placement options.

The authors stress the need to weigh the claimed benefits of integration against the

known benefits of intensive skills training when placing autistic children. “We cannot allow our concern about contact with nondisabled peers to overshadow the need for functional skills that are necessary for independent adult life,” they say. “.... Young men and women with autism who leave school without job, self-care, and independent-living skills spend their lives in segregated settings more often than individuals who have acquired functional skills.”

Full-inclusion placements should be made on a case-by-case basis, they say, noting that “a willingness to tailor programs to the needs of individual students has historically been a salient characteristic of special education and has led to maximally effective services.” Full inclusion, they argue, “violates the concept of individualized education.”

Simpson and Sasso add that the needs of non-disabled students and regular education teachers must also be taken into account, and note that “parents of nondisabled students have begun to question special educators’ ‘use’ of their children to [purportedly] benefit students with disabilities.” They argue that “it is unrealistic to expect nondisabled students and regular education teachers and staff to independently and exclusively make all necessary adjustments to accommodate students with autism in full-time general education settings.”

“Full inclusion of students with autism in general education settings: values versus science,” Richard L. Simpson and Gary M. Sasso, *Focus on Autistic Behavior*, Vol. 7, No. 3, August 1992, pp. 1-13.