

disturbance, 9) liver dysfunction (pemoline), 10) treatment with other medications eg. clonidine, MAO inhibitors.

### **OPPOSITIONAL DEFIANT DISORDER, CONDUCT, AND ADHD**

The link between oppositional defiant disorder (ODD) and conduct disorder (CD) was evaluated in 140 children with attention-deficit hyperactivity disorder (ADHD) and 120 normal controls examined at baseline and 4 years later, in midadolescence, at the Pediatric Psychopharmacology Unit, Psychiatric Service, Massachusetts General Hospital, Boston, MA. Of ADHD children, 65% had comorbid ODD and 22% had CD at baseline. Of ODD children, 32% had comorbid CD. Children with CD also had ODD that preceded CD by several years. Children with both ODD and CD had more severe symptoms of ODD, more psychiatric disorders, more bipolar disorder, and more abnormal behavior scores compared to ADHD children without comorbidity. Risk of CD at 4-year follow-up was not increased in children with ODD without CD at baseline. Two subtypes of ODD associated with ADHD were evident: one prodromal to CD and one that is not. (Biederman J et al. Is childhood oppositional defiant disorder a precursor to adolescent conduct disorder? Findings from a four-year follow-up study of children with ADHD. J Am Acad Child Adolesc Psychiatry Sept 1996;35:1193-1204). (Reprints: Dr Biederman, Pediatric Psychopharmacology Unit (ACC 725), Massachusetts General Hospital, Fruit Street, Boston, MA 02114).

COMMENT. The majority of ODD children with ADHD do not have comorbid CD, whereas CD is almost always comorbid with ODD which precedes the onset of CD by several years. The majority of children with ADHD and CD had developed CD before age 12 years. Adolescent onset CD is rare. CD with ADHD is associated with higher frequency of substance abuse in adolescence, and higher levels of anxiety disorders and mood disorders. Two ODD subtypes, one prodromal to CD and one without, have different outcomes.

### **LEARNING AND BEHAVIOR DISORDERS**

#### **NEURAL BASIS OF DYSLEXIA**

Whole-head magnetoencephalography (MEG) was employed to track noninvasively the cortical activation sequences during visual word recognition in 6 adult dyslexic and 8 control subjects examined at the Brain Research Unit, Helsinki University of Technology, Espoo; and the Departments of Psychology and Radiology, University of Helsinki, Helsinki, Finland. Significant differences between the two groups were found for the time window 0 to 200 msec after single word presentation in the left inferior temporo-occipital cortex, for 200 to 400 msec in the left temporal lobe, and for 0 to 400 msec in the left inferior frontal lobe. Considerable interindividual variability was shown for spatiotemporal activation patterns. Dyslexics failed to activate the left inferior temporo-occipital cortex within 200 msec after word presentation. The left temporal lobe, including Wernicke's area, a region associated with phonological aspects of language, was strongly involved in controls but not in dyslexics. Dyslexics activated, instead, the left inferior frontal lobe, involving Broca's area, whereas activation of the right motor/premotor cortex, present in controls, was absent in dyslexics. Perception of words as specific units was impaired in dyslexics. (Salmelin R et al. Impaired visual word processing in dyslexia revealed with

magnetoencephalography. Ann Neurol Aug 1996;40:157-162). (Respond: Dr Salmelin, Low Temperature Laboratory, Helsinki University of Technology, Rakentajanaukio 2, 02150 Espoo, Finland).

COMMENT. An impaired perception of visual word processing of written words, resulting from dysfunction of auditory language areas in the left inferior temporoparietal area, appears to be a factor in the causation of dyslexia in some subjects. Early training in auditory language might help in the prevention of dyslexia.

Poeppel D and Rowley HA, Biomagnetic Imaging Laboratory, University of California, San Francisco, comment that the utility of magnetic source imaging (MSI) lies in the combination of MEG with the anatomic images supplied by MRI, providing anatomic location of activity at a given time-sampling point. MSI may be used clinically for presurgical mapping in evaluation of patients with epilepsy and determination of hemispheric dominance. The cost of MEG installations and MSI systems limits their practical use at present. (Magnetic source imaging and the neural basis of dyslexia. Ann Neurol Aug 1996;40:137-138).

## READING DISABILITY AND BEHAVIOR PROBLEMS

The early characteristics of groups of children, aged 7 to 8 years, identified with reading disability (RD) only, behavior problem (BP) only, RD and BP, and neither RD nor BP, were compared by temperament and behavior indices, gathered in 5 periods between infancy and 6 years of age, at the Department of Psychology, University of Melbourne, Australia. The RD children with and without BP were different from each other from early childhood. BPs of both the BP-only and the comorbid group distinguished them from the non-BP groups at an early age. In contrast, the RD-only children were similar to the normal comparison group up to school age, except for lower maternal education and more difficult temperament. The early detection of RD could not rely on behavioral measures. Children at risk for developing pure RD were predominantly girls, and low educational stimulation from low maternal education was the only risk factor. The gender composition of the two RD groups differed, the RD-BP boys showing the most problems. Boys with difficult temperament, poor mother-child relationship, lower educational stimulation and relative social disadvantage were at risk of early development of BPs and later diagnosis of RD. (Sanson A, Prior M, Smart D. Reading disabilities with and without behavior problems at 7-8 years: Prediction from longitudinal data from infancy to 6 years. J Child Psychol Psychiatr July 1996;37:529-541). (Reprints: Ann Sanson, Department of Psychology, University of Melbourne, Parkville, Victoria, Australia 3052).

COMMENT. This study suggests different developmental pathways for pure RD children and those with comorbid BPs. Sex differences were also evident, boys showing more behavioral problems and more difficult temperament from 1-3 years, more hostile-aggressive and hyperactive behavior from 3-4 years, and lower school readiness and task orientation.

**Twin-sibling differences in ADHD children with reading and speech problems** were reported from the Prince of Wales Hospital, University of New South Wales, Australia (Levy F et al. J Child Psychol Psychiatr July 1996;37:569-578). Male twins had the highest rate of ADHD, speech and reading problems. The reading deficit in male twins becomes more marked in