Biomedical/Education Update:

Sleep problems: knowing cause can lead to cure

A majority of children with developmental disorders have at least some difficulty sleeping through the night, and many children's sleep problems are severe. These problems can cause stress and fatigue for both parents and children, and can increase disruptive daytime behavior in the classroom. (One study, for instance, showed a strong link between sleep deprivation and self-injurious behavior at school.)

Several behavior modification techniques can be used to reduce or eliminate sleeping problems. However, a new study by Robert Didden and colleagues indicates that the choice of techniques should be based on careful assessment of the causes of children's sleep disorders.

Didden and colleagues conducted a functional analysis of the sleep problems of six developmentally disabled boys ranging in age from two to seven. The researchers interviewed the children's parents about the children's medical histories, the onset of their sleeping problems, the type and duration of problems, what triggered these problems, and what consequences occurred when the children did not sleep. Based on this information, they concluded that three different interventions were required.

In four cases, the children's sleep problems appeared to be reinforced by their parents' attention. In these cases, the researchers told the parents to establish a nighttime routine, put their children to bed, and not reenter their children's rooms until morning unless the children were sick or truly needed help. The children were rewarded when they slept through the night. (For parents who find this procedure too difficult, the researchers recommend gradually decreasing parental attention.)

One child's sleep problems appeared to stem from anxiety, which was handled through a desensitization procedure in which the child's mother's presence was very gradually phased out. The child was rewarded for gradually increasing intervals of problem-free sleeping.

In the sixth case, functional analysis suggested that the child's sleep problems were due to undetected seizures occurring during the night. Medical evaluation confirmed this, and the child was given anticonvulsant medication.

In all six cases, the researchers say, "treatment resulted in a substantial reduction in sleeping problems." In addition, they say, follow-up data showed that the interventions' effects were lasting.

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"Functional assessment and treatment of sleeping problems with developmentally disabled children: six case studies," Robert Didden, Leopold M.G. Curfs, Simone P.E. Sikkema, and Jan de Moor; *Journal of Behavior Therapy and Experimental Psychiatry*, Vol. 29, pp. 85-97, 1998. Address: Robert Didden, Department of Social Sciences, University of Nijmegen, Room A.06.33, P.O. Box 9104, 6500 HE Nijmegen, Netherlands.

Giving disabled workers a choice: repetition or variation

Research suggests that developmentally delayed individuals prefer varying tasks rather than working at one job for long periods (see ARRI 1/3). However, a new study by Giulio Lancioni and colleagues indicates that while most workers with developmental disabilities enjoy task variation, some strongly prefer repetition.

The researchers studied four adult workers with profound developmental disabilities. The workers used computer prompts to guide them through tasks at their jobs. The researchers set up two computer systems—one which varied tasks, and one which repeated the same task. (They also included a control condition, which offered prompts to obtain food or other reinforcers. This condition, because it was clearly reinforcing, was used to ensure that participants could reliably demonstrate preferences.)

"The results," the researchers say, "showed that the four participants had clear preferences; three preferred task variation and one task repetition." Interestingly, job performance did not improve when participants were allowed to choose between variation and repetition. However, Lancioni and colleagues say their findings are important because they "can be taken as additional evidence of the possibility of enabling people with severe and profound developmental disabilities to express preferences about important daily events."

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"Task variation versus task repetition for people with profound developmental disabilities: an assessment of preferences," Giulio E. Lancioni, Mark F. O'Reilly, Francesca Campodonico, and Margherita Mantini; *Research in Developmental Disabilities*, Vol. 19, No 2, 1998, pp. 189-199. Address: Giulio E. Lancioni, Department of Psychology, University of Leiden, Wassenaarseweg 52, 2333 AK Leiden, The Netherlands. Email: Lancioni@RULFSW.LeidenUniv.NL.

Lead toxicity linked to fluoridation method

Millions of children have lead levels high enough to put them at risk for learning disabilities and behavior problems (possibly including autistic symptoms—see ARRI 11/3, 8/1). New research strongly indicates that one contributor to America's lead problem is fluoridated water.

Roger Masters and Myron Coplan analyzed data from more than 200 communities in Massachusetts, controlling for socioeconomic and demographic factors including population density, income, housing age, and race. The researchers studied the blood lead levels of children, the lead levels in public water supplies, and the methods of fluoridation used by each community.

Surprisingly, the researchers found that the average lead level of children was only weakly associated with water lead levels. However, they say, "the fluoridation agents used in water treatment have a major effect on lead levels in children's blood." Children's average lead levels were higher in communities using fluosilicic acid or sodium silicofluoride than in communities that used sodium fluoride or no fluoridation. Furthermore, the percentage of children with dangerously high lead levels was significantly higher in communities using silicofluoride compounds than in the other communities.

The researchers also compared high-risk communities (with high water lead levels and older housing) that use silicofluorides to similar communities not using these compounds, and found that children in the silicofluride-using communities had significantly higher lead levels than children in the other communities. This suggests, they say, that silicofluorides enhance the uptake of lead by the body.

The researchers conclude, "Wherever there is lead pollution in the environment, the use of silicofluorides in water treatment increases lead uptake in the body and brain." They note that safety data for fluoridation were based on the use of sodium fluoride, which has been replaced in many communities with silicofluorides—a change that the researchers say "occurred without adequate human or animal studies assessing their effects under realistic conditions."

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Water treatment with silicofluorides and lead toxicity," Roger D. Masters and Myron Coplan, *International Journal of Environmental Studies*, in press. Also: Fact Sheet: Silicofluorides, Lead Toxicity, and Behavior, Roger D. Masters and Myron Coplan. Address: Roger D. Masters, Gruter Institute for Law and Behavioral Research, Bldg. 50—Hinman Box 6222, Dartmouth College, Hanover, NH 03755. Email: gruter.institute@Dartmouth.edu.