Inhibitory Function in Nonretarded Children with Autism

Sally Ozonoff and David L. Strayer
University of Utah

This study examined inhibitory function in nonretarded children with autism (n = 13) and normally developing controls (n = 13) matched on age and IQ. Tasks measuring motor and cognitive components of inhibition were administered to both groups. On the Stop-Signal paradigm, children with autism were able to inhibit motor responses to neutral and prepotent stimuli as well as control subjects. On the Negative Priming task, the groups were equally capable of inhibiting processing of irrelevant distractor stimuli in a visual display. Results suggest that at least two components of inhibition are spared in individuals with autism, standing in contrast to flexibility and other executive deficits that have been found in previous studies. These findings may help distinguish children with autism from those with other neurodevelopmental conditions that involve executive dysfunction.

INTRODUCTION

A burgeoning literature suggests that dysfunction of the executive system is widespread in individuals with autism, having been documented in children, adolescents, and adults of a variety of functioning levels (Hughes...
Since executive functions, such as planning, organization, flexibility, and inhibition, are integral to normal processing of information in the environment, the impact of executive dysfunction may be great. This has led to the suggestion that executive function deficits may be responsible for a wide range of autistic symptoms (Harris, 1993; Ozonoff, 1995a; Pennington, 1994).

The most widely used test of executive function in studies of autism has been the Wisconsin Card Sorting Test (WCST). Several investigations have documented that the WCST performance of autistic subjects is strikingly deficient relative to matched controls (Ozonoff et al., 1991; Ozonoff & McEvoy, 1994; Ozonoff, in press; Prior & Hoffmann, 1990; Rumsey, 1985; Rumsey & Hamburger, 1988, 1990; Szatmari, Tuff, Finlayson, & Bartolucci, 1990). The interpretation of poor performance is far from clear, however. Although the WCST is generally considered a test of abstraction and flexibility (Grant & Berg, 1948; Heaton, 1981), a number of additional cognitive operations appear to be required for successful performance (Bond & Buchtel, 1984; Dehaene & Changeux, 1991; Perrine, 1993; van der Does & van den Bosch, 1992), including attribute identification, categorization, working memory, inhibition, selective attention, and encoding of verbal feedback (Ozonoff, 1995b). Thus, it is not clear precisely why individuals with autism perform poorly on this executive function measure.

To elaborate, let us contrast the roles that inhibition and flexibility may play in WCST performance. One reason someone might perform poorly on the WCST is a deficit in inhibition. After being reinforced for sorting in one manner, a subject with autism might be unable to inhibit that prepotent, but incorrect, response strategy once it is no longer useful. While the subject might be otherwise capable of adopting a new sorting strategy, he or she cannot implement this new plan due to a basic impairment in suppressing prepotent responses. Conversely, an alternate explanation for poor WCST performance is a deficit in flexibility. It might not be the urge to repeat a previously reinforced response that leads the autistic subject astray, but the inability to shift set, see things in a new manner, or respond in a new way. Thus, although the constructs of inhibition and flexibility are closely related, they are not identical and could affect WCST performance in different ways. Unfortunately, however, scoring procedures for the WCST do not allow differentiation between inhibition, flexibility, and other executive functions. Thus, it is not clear which cognitive deficits are operative in producing the poor WCST performance of autistic indi-