The Wechsler Intelligence Scale for Children--Revised (WISC-R) Freedom from Distractibility (FFD) factor and other neurocognitive measures were examined as to their discriminative validity in diagnosing children with Attention Deficit Disorder/Hyperactivity (ADD/H), ADD/H children with concurrent Conduct Disorder, and children comprising a clinic control population. While the Verbal-Comprehension and Perceptual-Organizational factors significantly distinguished between clinic groups, the FFD factor did not. A predictive discriminate analysis revealed very low hit rates using the WISC-R factors, but, using a battery of selected neurocognitive measures of attention, memory, self-regulation, and speed of cognitive processing, good group discrimination was achieved. These results argue against using the WISC-R FFD factor in differential diagnosis of neuropsychiatric disorders and suggests that other combinations of neuropsychological measures provide better indices for distinguishing clinic groups of ADD/H children. (Author)
Discriminate Validity of Neurocognitive Measures in Diagnosing Children with Attention Deficit Disorder/Hyperactivity*

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Abstract - The WISC-R Freedom from Distractibility (FFD) factor and other neurocognitive measures were examined as to their discriminative validity in diagnosing children with Attention Deficit Disorder/Hyperactivity (ADD/H), ADD/H with concurrent Conduct Disorder, and those comprising a clinic control population. While the Verbal-Comprehension and Perceptual-Organizational factors significantly distinguished between clinic groups, the FFD factor did not. A predictive discriminate analysis revealed very low hit rates using the WISC-R factors, but a battery of selected neurocognitive measures of attention, memory, self-regulation, and speed of cognitive processing, good group discrimination was achieved. These results argue against using the WISC-R FFD factor in differential diagnosis of neuropsychiatric disorders and suggest other combinations of neuropsychological measures provide best indices for distinguishing clinic groups of ADD/H children.

Subjects were 53 children referred to a university-based outpatient diagnostic and referral center which serves children aged 6-13 years in a southeastern state of the United States. The 51 children in the present study were taken from 112 referrals to the center over a three-year period (1984-87) and fell into three DSM III diagnostic groups: depressive disorder, conduct disorder co-occurring with ADD/H, and ADD/H.

METHOD

Subjects were 53 children referred to a university-based outpatient diagnostic and referral center which serves children aged 6-13 years in a southeastern state of the United States. The 51 children in the present study were taken from 112 referrals to the center over a three-year period (1984-87) and fell into three DSM III diagnostic groups: depressive disorder, conduct disorder co-occurring with ADD/H, and ADD/H.


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Measures

In addition to the WISC-R, all children received a comprehensive neuropsychological examination which included the Luria-Nebraska Neuropsychological Battery-Children's Revision (LNNB-CR), simple and complex (same/different discrimination between nonsense trigram pairs) reaction time, and other measures of achievement. For the second part of the analysis, the three subtests of the WISC-R factor, simple and complex reaction time measures (time), and the rhythm and memory scales of the LNNB-CR were included in a predictive discriminate analysis.

RESULTS AND DISCUSSION

Analysis of variance revealed that significant differences existed between the groups on the Verbal Comprehension factor (F = 6.32, p < .004), Perceptual Organizational factor (F = 1.66, p < .04), but not on the FFD factor (F = 1.14, p > .05). Of interest and consistent with those who argue that ADD/H with co-occurring conduct disorder represents a more severe manifestation of this disorder (Malley et al., 1980; Quay, 1987), it was this group that performed significantly poorer on the Verbal Comprehension and Perceptual Organization factors. Their performance was, on the average, one standard deviation below that of the children diagnosed as having an internalizing disorder (clinic control) or ADD/H as a sole diagnosis. This analysis reveals that the FFD factor does not distinguish between children with diagnosed attentional problems and other clinic referred children. This supports the conclusions of Stewart and Moely (1983), and Ownby and Matthews (1985) who suggest that this third factor is a complex one assessing very divergent components of cognitive and executive processes but also argues that it cannot be used diagnostically in differentiating between clinic groups such as the ones used in this study. In fact, a follow-up discriminate analysis using all three of these factors revealed poor classification rates when all three factors were employed (hit rates of 50%, 35.7%, and 61.9% for the clinic control, ADD/H, and ADD/H with co-occurring conduct disorder, respectively).

However, when the three subtests comprising the third factor (presumably assessing more discrete memory and attentional processes than provided by the factor score) were employed with the LNNB-CR memory and rhythm scales, and simple and complex reaction time measures were employed in the predictive discriminate analysis, much better results were found. Since these variables may assess deficient attentional/regulatory and memory processes better than the third factor in isolation, it is noteworthy that the hit rates in group discrimination improved significantly. This discriminate analysis resulted in correct classification rates of 75%, 63.6%, and 69.2% for the clinic control, ADD/H, and ADD/H children with co-occurring conduct disorder.

The results of this study suggest several conclusions. First, it is apparent that significant cognitive deficits characterize those children who are diagnosed as having ADD/H in the presence of conduct disorder. This may argue that ADD/H in isolation is a less severe form of this disorder since it is known that conduct disordered children with ADD/H have a significantly greater incidence of delinquency (Quay, 1987; Walker, 1987). Second, while deficits in Verbal Comprehension and Perceptual Organization characterize this latter group, the FFD factor does not, thus arguing that the third factor is not useful in isolation in differentiating among these groups. Third, a predictive discriminate analysis using the factor scores reveals poor discrimination among these groups with only half of the ADD/H children being correctly identified. Fourth, and the major finding of this study, is that when a battery of measures which assess attentional/regulatory processes, memory, and speed of cognitive processing are employed, significantly greater hit rates are obtained. This suggests that such measures as employed here have clinical-diagnostic utility in assisting in the differential diagnosis of children with ADD/H, ADD/H with co-occurring conduct disorder and a sample of clinic control children with internalizing disorders. Finally, these results suggest that the neuropsychological test battery, when employed in the differential diagnosis of children with psychiatric disorders should include a wide range of measures assessing memory, speed of cognitive processing, attention and self-regulation if differential diagnosis is to be achieved. This is consistent with Luria's (1980) conceptualization and argues against using standardized neuropsychological test batteries for children that assess poorly the constructs of attention and self-regulation important in the neuropsychiatric diagnosis with children (Hynd, Snow, & Becker, 1986).

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