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The Role of Cognitive Distractibility

in Special Education Diagnosis

A Field Project

Presented to the

Department of Psychology

and the

Faculty of the Graduate College

University of Nebraska

In Partial Fulfillment

of the Requirements for the Degree

Educational Specialist

University of Nebraska at Omaha

by

Mavis A. Nigro

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FIELD PROJECT ACCEPTANCE

Acceptance for the faculty of the Graduate College,
University of Nebraska, in partial fulfillment of the
requirements for the degree Education Specialist in School
Psychology, University of Nebraska at Omaha.

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Abstract

The three factor scores that Kaufman (1975) measured on the Weschler Intelligence Scale for Children-Revised (Freedom from Distractibility, Perceptual Organization, and Verbal Comprehension) were compared among students referred and/or placed in special education. Three diagnostic groups were compared: behavioral disordered (BD), learning disabled (LD) and students who were referred but not placed in special education. Results indicated a significant factor structure difference on the WISC-R for the BD and LD diagnostic groups, but not for the referred but not placed students. However, only the LD group manifested a significantly lower distractibility factor score when compared to the referred but not placed group. Hence, they appear to be more distractible than the BD group--a finding opposite of that expected. An imbalance among the factors measured on the WISC-R appears to be a significant factor to consider in the diagnosis of a handicapping condition.

The placement process in special education begins with a teacher referral. As many school psychologists know, many of the descriptions teachers use when referring children involve behaviors that imply classroom impulsivity and distractibility. Such characterizations include expressions like: "off-task," "doesn't pay attention," "difficulty concentrating," "hyperactive," etc. Many of these descriptions are similar to the characteristics of children that score high on the Distractibility Factor of the Weschler Intelligent Scale for Children-Revised (WISC-R).

Freedom from Distractibility is one of the three factors Kaufman (1975) measured on the WISC-R. It is comprised of the Arithmetic, Digit Span and Coding subtests. The other two factors measured on the WISC-R are Verbal Comprehension and Perceptual Organization.

Distractibility is commonly thought to be in the behavioral domain, although there is evidence that this may also reflect a cognitive ability. In measuring a child's freedom from distraction, this factor has been given several additional interpretations by Kaufman (1979). It can measure the ability to manipulate numerical symbols, engage in sequential reasoning, and short-term memory. Children who score low on the third factor may have difficulty attending, be distractible,

have anxiety and/or short-term memory deficits as well as other deficiencies.

Regarding its psychological significance, Kaufman (1979) suggests interpreting the third factor when at least one of the Freedom from Distractibility subtests deviates significantly from its respective scaled score mean. If the other two scores deviate in the same direction, even though not significantly, Kaufman recommends that pure factor scores be calculated, rather than the traditional Verbal and Performance IQ.

Several research studies have investigated the factor structure of the WISC-R in different special education diagnostic groups (Schooler, Beebe & Koepke, 1978; McMayon & Kunce, 1981; Sutter & Bishop, 1986; Naglieri, 1981). These studies have found differences between behavioral disordered (BD) and learning disabled (LD) children; however, little is known about differences in distractibility between LD and BD children. Recommendations and treatment programs can be made more specific to meet individual needs when more is know about the behavioral and cognitive characteristics of special education children.

Children with learning disabilities have been found to score low on the Freedom from Distractibility factor (Lutey, 1977). It was found that difficulty with these

subtests also continued into adulthood (Lewis, 1987). Similarly, children who are labeled BD usually are initially referred by their teachers because of distractible behavior and short attention spans, as well as other types of acting-out behaviors in the classroom.

Literature Review

There are many similarities and differences between LD and BD children in the areas of behavior, intellectual ability and academic achievement. Behavioral, LD children have been described as having short attention spans, poor listening skills, trouble following directions, poor motor coordination, immature behavior, and as being easily distracted (Smith, 1989). Hutton (1985) looked at the most common reasons teachers refer children for behavioral disorders. Among those cited were poor peer relationships, displays frustration, below academic expectations, shy and withdrawn behavior, disruptive behavior, fighting, refusing to work, and short attention spans. Scruggs and Mastropieri (1986) characterize both LD and BD children as exhibiting similar types of behavior, but they observed differences in the level of behaviors displayed. BD children's maladaptive behavior was at a higher level in terms of frequency, intensity, and duration.

Regarding academic achievement, Epstein and Cullinan

(1983) found that BD students performed at higher academic levels than LD students; however, their sample consisted of only white, male students. When a more representative sample of BD and LD students were compared, no significant differences were found in their academic levels (Scruggs & Mastropieri, 1986).

By definition, LD students achievement is significantly below their ability level. Often they are described as not learning in a typical fashion, having poor listening skills and often reversing and rotating letters in written work (Smith, 1989). McKinney (1989) found that LD students who had attention and conduct problems had poorer academic outcomes three years later when compared to those without these problems. Bender (1987) investigated personal attitudes towards educational tasks as a reason for lower academic achievement, rather than some type of perceptual or cognitive deficit. He views LD students not as behavioral and emotionally involved with academic tasks as their non-disabled peers. It was further suggested that the LD child has not developed metacognition strategies that are necessary to accomplish educational tasks.

Typically, BD and LD children are found to be similar in intellectual functioning (Scruggs &

Mastropieri, 1986). BD and LD students were both found to have IQs in the mid 90s. In contrast, Carlson (1987) found BD students to have less than average intellectual abilities as a group, although there were individual cases where IQs fell in the range of mildly mentally handicapped to superior functioning. This study found that intellectual ability of BD students was not found to be predictive of the amount or kind of behavior problem experienced.

Regarding the intelligence tests themselves, Dean (1977) found that BD students show more variability, or more subtest scatter than normal students. Typically, they show lower verbal intelligence. The Information subtest on the WISC-R was the lowest or second lowest in 50% of the students sampled.

In a later study, Dean (1978) replicated his earlier study with essentially the same results: BD students were reported to have a lower verbal ability. Furthermore, he suggested that LD students have more difficulty in perceptual organization than BD students, while BD students display more of a verbal deficit.

Sutter and Bishop (1986) studied differences between BD, LD and normal students. He suggests that motor skills may be a distinguishing factor for LD students, while expressive skills were a problem for BD students.

Both LD and BD students scored lower on short-term memory factors than did normal students.

Hypothesis

The present study will seek to determine the differences between LD, BD and a referred but not placed group of students on the Freedom from Distractibility factor as measured on the WISC-R. The referred but not placed group will consist of children who were initially referred for a psychological assessment, although found not to qualify for special education services. From the research cited above, it is hypothesized that both the BD and LD groups will manifest a significantly different WISC-R factor structure with a higher level of cognitive distractibility than the referred but not placed group. The referred but not placed students should show some levels of distractibility because of their initial referral for services; however, these are not expected to be at the same high level as manifested by the BD and LD students.

The BD group will be significantly more distractible than the LD students. By the nature of their disorder, BD students manifest more behavioral difficulty in their classrooms and frequently cognitive distractibility is involved. However, this is not a necessary condition for a child to be labeled LD.

METHOD

The subjects were all from the Omaha Public School District in Omaha, Nebraska and referred by their teachers for a psychoeducational assessment during the 1988 to 1991 academic years. Since only six of 24 psychologists consistently administered the optional Digit Span task on the WISC-R, the thirty files randomly chosen for each diagnostic category were limited to students who were administered the WISC-R by the six psychologists.

As previously indicated, three special education categories were compared: students who qualified for services as Behavioral Disordered, Learning Disabled and students who were referred for an evaluation but did not meet the state guidelines as eligible for special education services. The mean ages for the BD, LD and referred but not placed group were 8.4, 8.6 and 8.5 years respectively. The BD group consisted of 24 males and 6 females. There were 20 males and 10 females in the LD group and the third group, those referred but not placed was composed of 18 males and 12 females.

RESULTS

The WISC-R subtest scores of the subjects were recorded and factor scores were calculated by applying

Kaufman's (1979) formulas to each protocol. The factor scores were for Verbal Comprehension, Perceptual Organization and Freedom from Distractibility. Verbal Comprehension scores were calculated by taking the sum of the Information, Similarities, Vocabulary and Comprehension subtests, multiplied by 1.47 and adding 41.2. The Perceptual Organization factor score consisted of the sum of the Picture Completion, Picture Arrangement, Block Design and Object Assembly subtests multiplied by 1.60 and adding 36.0. The Freedom from Distractibility factor was calculated by the sums of the Arithmetic, Digit Span and Coding subtests multiplied by 2.2 and then adding 34.0.

These WISC-R factors were then subjected to a 3 (Diagnostic Group) X 3 (WISC-R Factors) within subjects analysis of variance.

Diagnostic Groups

The mean factor score IQ for the BD, LD and referred but not placed groups were 86.9, 88.1, and 88.1, respectively. There were no significant differences between the mean IQ scores of the different diagnostic groups, ($F=.19$, $df=2/87$, $p>.05$). Therefore, the three diagnostic groups did not differ in their overall level of cognitive ability.

Factor Scores

The main effect for the factor scores was significant with an F of 3.968, $df=2/174$, $p<.05$. Subjects referred for an assessment had significantly lower scores on the Freedom from Distractibility factor than the other two factors measured on the WISC-R. The mean for this factor was 82.9. The subjects scored highest on the Perceptual Organization factor with a mean of 92.4. They scored the next highest on the Verbal Comprehension factor with a mean of 87.9. Apparently, subjects referred by their teachers for special education placement and given a WISC-R scored lowest on the FD factor, are strongest in the area of PO, and score at an intermediate level on the VC factor. Because of a significant interaction described below, no additional simple effects analysis was performed on the simple main effect of factor scores.

Diagnostic Categories X Factor Scores

The interaction effect of diagnostic categories and factor scores yielded an F of 3.10, $df=3/174$, $p<.017$. Figure 1 presents the results of the significant interaction of diagnostic category and factor scores. As can be seen, the BD and LD students scored lower on the Freedom from Distractibility factor than did those subjects who were referred but not placed. In other words, the LD subjects performed more poorly on tasks

which measured freedom from distractibility, followed by the BD group and then the referred but not placed subjects.

Insert Figure 1 here

To test the statistical significance of the preceding differences, a simple main effects analysis was performed on each diagnostic category. The simple main effect for the BD subjects was significant with an F of 6.89, $df=2/174$, $p<.001$. The simple main effect for the LD subjects was significant with an F of 20.37, $df=2/174$, $p<.001$. As can be seen in figure 1, both of these diagnostic groups showed the same pattern, with subjects performing better on tasks measuring Perceptual Organization, followed by Verbal Comprehension and then tasks measuring Freedom from Distractibility. The simple main effect for subjects who were referred but not placed also followed the same pattern as the other two groups, although these differences were not found to be statistically significant.

To further explore the differences on the distractibility factor, post-hoc tests were conducted on the BD and LD diagnostic groups using a Tukey A test. The BD diagnostic groups showed a significant difference

between the FD and PO factors at the $p < .01$ level. The LD diagnostic groups showed a significant difference at the $p < .05$ level when comparing the VC and PO factors.

The factors of VC and PO were both significantly different at the $p < .01$ level when compared with the FD factor. In addition, it was found that the LD subjects were significantly lower on the Freedom of Distractibility factor than were those subjects who were referred but not placed. This difference was significant at the .05 level. The BD group was not found to be significantly more distractible than the referred but not placed students. No significant differences were found on the distractibility factor for the BD and LD subjects or between the BD and referred but not placed subjects. The relationships between these three diagnostic groups on the Freedom from Distractibility factor can be seen in Figure 1.

Discussion

The results of this study support the first hypothesis in that significant factor score differences were found for both BD and LD children. Students who are diagnosed with a LD handicapping condition perform lowest on the distractibility factor, followed by those students with a BD handicap. Indeed, only the LD group's lower

distractibility scores were found to be significantly different than the referred but not placed students. Students who were referred but who were found to have no handicapping condition manifested no significant difference in their factor scores on the WISC-R.

The second hypothesis of this study predicted that the BD subjects would perform lower on the Freedom from Distractibility factor than LD subjects. It was hypothesized this would occur because BD students are usually reported by referring teachers as showing characteristics of distractibility at a higher level and to a greater frequency than LD students. In actuality, the reverse appears to be true; the LD students scored lowest on the FD factor, not the BD group, as originally hypothesized. Again, only the LD group had a significantly lower distractibility factor score when compared to the referred but not placed group.

Students with an LD diagnosis also showed the greatest difference between the three factor scores. Apparently, LD students have more significant strengths and weaknesses in their intellectual ability than the other two groups. An LD disorder is thought to be the result of a neurological impairment which causes difficulties in processing of information and therefore lower achievement in the classroom. An LD disorder may

have the greatest impact on a student's ability to perform tasks which involve Freedom from Distractibility. Therefore, skills which require freedom from distractibility may require the most compensation for these students to be successful in the classroom.

Students with a BD diagnosis also show the same differences between the factor scores, although the only statistically significant difference was between the Freedom from Distractibility and Perceptual Organizational factors. This may have occurred because BD is less of a cognitive disorder and more of a pure behavioral disorder. Students who are labeled BD have difficulties in learning due to their behavioral disorders rather than from a neurological impairment. BD students have the neurological ability to attend, but have difficulty doing so because of interference from their behavioral and/or emotional difficulties.

The third group of students, those referred but not placed, also show the same pattern, although it was not significant. The factor score profile for these students indicated that they perform fairly consistent across all the factors measured by the WISC-R. Although these students are having difficulty in their classroom, it is not due to a handicapping condition. Balance among the three factors of intelligence measured on the WISC-R is

more evident in the intellectual profile of nonplaced students compared to the BD and LD diagnosed students.

Balance may be an important component when considering whether or not a handicapping condition occurs. Equal strengths on the three factors may facilitate more efficient learning. This may be especially important regarding the cognitive distractibility factor. In determining future placements, it may be beneficial to consider a student's IQ and factor scatter rather than IQ alone. Perhaps this difference in scores might be considered a "Cognitive Efficiency Index" and may be related to learning as highly as the student's overall IQ score.

In conclusion, this project implicates the distractibility factor as an important ability to be measured in the diagnosis of special education handicaps. In the future, it may be beneficial to give more attention to measuring and interpreting this factor for students who are referred for services.

Figure 1 - Factor scores as a function of diagnostic categories.

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