DOCUMENT RESUME

ED 227 640 EC 151 097

AUTHOR Brown, Ronald T.; Wynne, Martha Ellen
TITLE Attentional Processing and Teacher Ratings in Hyperactive, Learning Disabled and Normal Boys.
PUB DATE Aug 82
NOTE 21p.; Paper presented at the Annual Convention of the American Psychological Association (Washington, DC, August 23-27, 1982).
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Attention Deficit Disorders; *Attention Span; *Behavior Problems; Classroom Research; Elementary Education; *Hyperactivity; Inhibition; *Learning Disabilities; Learning Processes; Student Behavior; *Teacher Attitudes

ABSTRACT

Sustained attention and inhibitory control of 15 nonhyperactive, learning disabled (LD) boys, 15 hyperactive but not LD boys, and 15 normal boys (11-12 years old) were studied, on teacher ratings of impulse control in the classroom and testing results. Coming to attention, decision making, sustained attention, and attention-concentration were measured by the "Children's Embedded Figures Test," "Matching Familiar Figures Test," "Children's Checking Task," and a subtest of the "Wechsler Intelligence Scale for Children-Revised." Normal children were found to be superior to both clinical groups in attentional processing, while hyperactive children encountered more errors than their LD peers on those tasks involving sustained attention. The finding that teachers rated hyperactives as more impulsive than nonhyperactive LD children was interpreted to explain why hyperactives are generally singled out first and identified for specialized treatment. Findings were also interpreted as supporting the "passive learner" hypothesis for LD children, which often accounts for their poor academic functioning. (Author/SEW)

Attentional Processing and Teacher Ratings in Hyperactive, Learning Disabled and Normal Boys[1]

Ronald T. Brown[2]
University of Illinois-Chicago

Martha Ellen Wynne[3]
Loyola University of Chicago

Running Head: Attentional Processing

Abstract

Boys classified as nonhyperactive learning-disabled (LD), hyperactive but not LD, and as normal in behavior and achievement were contrasted on components of attentional processing and teacher ratings to elicit differences in sustained attention and inhibitory control. Multivariate analyses followed by univariate tests, indicated that normal children were superior to both of the clinical groups in attentional processing, while hyperactive children encountered more errors than their LD peers on those tasks involving sustained attention. That teachers rated hyperactives as more impulsive than nonhyperactive LD children was interpreted to explain why hyperactives are generally singled out first and identified for specialized treatment before their nonhyperactive LD peers. The finding that LD nonhyperactive children were rated as less impulsive by their teachers than the normal controls was interpreted to lend further support to the "passive learner" hypothesis in LD children which oftentimes accounts for their poor academic functioning.

Attentional Processing and Teacher Ratings in Hyperactive, Learning Disabled and Normal Boys

Much research has attested to the existence of attentional deficits in hyperactive children (Douglas, 1972, 1974, 1980; Douglas & Peters, 1979; Whalen & Henker, 1976). In fact, it has been argued that a more appropriate label for these children might be "attentional impulsivity disorder" in view of the fact that attentional disturbances are so salient in the clinical descriptions of hyperactive children (Diagnostic and Statistical Manual of Mental Disorders, 1979; Douglas & Peters, 1979). Although there is widespread acceptance regarding the pervasiveness of attentional problems in these children, there has been a burgeoning concern regarding the lack of clarity or specificity as to the precise meaning of the term "attentional disturbance" which has been attributed to hyperactive children. To make this problem more complex, attentional problems have been found to be prevalent in teachers' descriptions and psychological assessments of learning disabled children without hyperactivity. Thus, the degree to which the attentional deficits attributed to each of these two populations are similar or different has yet to be determined.

Douglas and her colleagues (Douglas, 1972, 1974; Douglas & Peters, 1979; Sykes, Douglas, Weiss, & Minde, 1971) have argued rather convincingly that hyperactive children are born with a constitutional predisposition toward poor impulse control and an inability to organize and sustain attention or, a deficit in the ability to "stop, look, and listen" (Douglas, 1972, 1974, 1980). According to some research, this disability may emanate from the hyperactive child's compulsion to seek out stimulation, particularly in nonstimulating situations (Zentall, 1975). It has further been suggested that problems with attention and impulse control permeate and impair the functioning of hyperac-

tive children and that these deficits are directly responsible for their academic failures (Douglas, 1980). More importantly, Douglas (1980) has insisted that the inability of hyperactive children to sustain attention and inhibit impulsive responding to be the primary qualities which distinguish these children from nonhyperactive learning disabled children.

In an attempt to ameliorate some of the present confusion regarding the primary deficits which might distinguish hyperactive and learning disabled children's information processing, Douglas (1980) has proposed a theoretical model which suggests that the two groups of children are characterized by distinctly different disabilities. For hyperactive children, Douglas' hypothesized model indicates a constitutional predisposition toward faulty attentional processing and poor inhibitory control, while for learning disabled children, the pattern of deficits is different. According to the model outlined by Douglas (1980), learning disabled children are born with a constitutional predisposition toward one or more specific disabilities such as a receptive language deficit or an inability to process visual or auditory information. Thus, while both groups experience impaired academic functioning, the underlying impairments for the two groups are a function of differential deficits. The model set forth by Douglas (1980) has also underscored the fact that these specific processing deficits which characterize learning disabled children are apt to make them quite vulnerable to distracting stimuli while they are engaged in difficult tasks. In fact, there has been considerable research which has suggested that learning disabled children are basically distracted by irrelevant information and therefore experience difficulty on tasks involving selective attention (Hallahan, Gajar, Cohen, & Tarver, 1978;

Hallahan, Tarver, Kauffman, & Graybeal, 1979; Hallahan & Bryan, 1981; Ross, 1976).

An analysis of the nature of hyperactive and learning disabled children's primary deficits is of prime importance since such a conceptualization may prove quite useful in determining a differential diagnosis for the two groups of children and eventually lead to the development of more sophisticated treatment approaches for each of the two groups. For example, in treating learning disabled children, Ross (1976) has recommended that strict emphasis be placed on teaching the child to selectively attend to relevant information, while Douglas and Peters (1979) have convincingly argued that it would be unwise to emphasize attentional and related symptoms at the expense of ignoring the child's original processing deficits. However, in our own training programs with learning disabled children at the University of Illinois, we have been particularly encouraged by the use of attentional training which has been found to be efficacious in improving academic performance including reading in these children (Brown & Alford, in press). Thus, the specific role of attentional deficits in remediating academic deficiencies of learning disabled children still remains unclear.

Keogh and her associates (Keogh, 1971; Keogh & Donlon, 1972; Keogh & Margolis, 1976) have further assisted the practitioner by demonstrating how psychological theories of attention which had previously been specific to normal adult populations, might serve useful in the diagnosis, treatment, and evaluation of children with learning disorders. Keogh and Margolis (1976) have attacked the concept of a global attentional deficit with handicapped learners and have suggested that there are separate unitary processes which

contribute to the total attentional problem of these children. Keogh and her colleagues (Keogh, 1971; Keogh & Donlon, 1972; Keogh & Margolis, 1976) have subdivided these attentional deficits into three distinct processes: (1) coming to attention, (2) making decisions, and (3) sustaining attention to as task over time. In fact, there is empirical data which indicates that children diagnosed as hyperactive are deficient in each of these attentional processes (Brown & Quay, 1977; Brown & Wynne, 1982; Brown, in press). Although deficits in attention have been reported in clinical observations of both groups of children, there have been relatively few systematic investigations comparing the attentional processing constellation of learning disabled and hyperactive groups. Only one study has been located which has attempted to identify and compare the attentional disturbances of the two groups and it has yielded very little to definitively distinguish the groups (Dykman, Ackerman, & Oglesby, 1979).

Should Douglas (1972, 1974, 1980; Douglas & Peters, 1979) be correct in her assertion that deficits in attention and impulse control distinguish hyperactive children from other more basic learning disabilities, hyperactive children would be expected to experience greater difficulty in attentional processing than their learning disabled counterparts. Moreover, such a careful analysis of attentional processing could lead to a refinement in diagnostic and clinical practices with each of the two groups of children. It was the purpose of the present study to further delineate the attentional deficits which are characteristic of the two clinical groups. Such a delineation was deemed as a prerequisite for the diagnostician and practitioner in the development of appropriate assessment and remedial programs for each of the two populations.

Method

Subjects. Fifteen hyperactive and 15 learning disabled (LD) boys were randomly selected from a university clinic population. In addition, 15 normal boys were selected from a nearby school which was representative of the university clinic population.

The criteria for including hyperactive children into this study were similar to those guidelines set forth in our previous research studies involving these children (Brown, in press; Brown, 1980; Brown & Sleator, 1979; Quay & Brown, 1980; Brown & Wynne, 1982). The hyperactive boys were accepted into our program after a rigorous diagnostic examination by qualified psychologists and a history of difficulty in coping with the regular school program. Interviews with the parents, detailed information from the schools, and classroom observations by trained observers pointed to the presence of the hyperactive child syndrome. Their teachers characterized them as being highly inattentive, distractible, and active. Each child's pediatric examination must have been negative for other major diseases and physical defects. A score of 15 on the Conners' Abbreviated Rating Scale (Conners, 1969) had been established as a minimum cutoff score to be considered as a potential subject in this study (Sprague, Cohen, & Werry, 1974).

LD nonhyperactive children selected for participation in the present study scored at least two grade levels below their expected grade placement in reading as measured by the Wide Range Achievement Test (Jastak & Jastak, 1965). In addition, teacher ratings indicated that none of the LD children presented persistent management or behavioral problems. No LD children who obtained Conners' scores of 15 or higher were included in the sample.

The normal children participating in this research were functioning at grade level in reading as measured by the Wide Range Achievement Test. In addition, the normal children were carefully screened to assure that they were free of any psychological or management problems. None of the 15 normal control children who were included in this research received teacher ratings of 15 or above on the Conners' scale.

No children with obvious physical defects nor diagnosed neurological dysfunction were included in any sample. Moreover, none of the children were receiving psychotropic medication. All subjects participating in the present study had Full Scale IQ's of 80 or above on the Wechsler Intelligence Scale for Children- Revised (Wechsler, 1974) and were from middle class families. The means and standard deviations for age, IQ, and Conners' teacher rating scores are presented in Table 1 for each of the two clinical groups and the normal controls.

Insert Table 1 about here

Although normal children were slightly younger than either of the two clinical groups, and LD children had slightly lower IQ's than the normal or hyperactive groups, no significant differences were obtained for age or IQ among the three groups when analyzed by a one-way analysis of variance. The hyperactive group had significantly higher Conners' teacher ratings than either of the normal or LD nonhyperactive groups.

Procedure. All children were administered a series of tests hypothesized to tap various components of attention. In addition, teachers were asked to complete rating scales designed to evaluate impulse control in the classroom. Children were tested individually; order of test administration

was counterbalanced.

Attentional Measures. Coming to attention was assessed with the Children's Embedded Figures Test (CEFT) (Witkin, Oltman, Raskin, & Karp, 1971). This test requires focusing, organization of the perceptual field, and determination of salience, abilities presumed to be related to coming to attention (Keogh & Margolis, 1976). Decision making was assessed with the Matching Familiar Figures Test (MFF) (Kagan, Rosman, Day, Albert, & Phillips, 1964), a widely used measure of decision speed and accuracy under conditions of response uncertainty. Latency scores (the time required to make the first response to each of the 12 tasks) and error scores (the sum of errors made across the 12 tasks) were obtained for each child. Sustained attention was measured with the Children's Checking Task (CCT) (Margolis, 1971). The CCT was developed as a technique for measuring ability to sustain effort to a task. The CCT includes a five page booklet with rows of printed numbers and a tape recording of a series of numbers recorded in random order at the rate of one number per second. The tape and booklet were prepared so that there are fourteen audio-discrepancies for each page where the digit presented auditorially does not match the corresponding digit in the booklet. The child is required to listen to the numbers on the tape recorder while checking them against an almost identical series in the booklet. This test was scored on two types of errors, omissions (missed discrepancies) and commissions (correct numbers marked as incorrect). Total administration time for the CCT is 30 minutes.

Also included in the attentional measures was the attention-concentration of the WISC-R (Keogh, Welter, Mc Ginity, & Donlon, 1973). The attention-concentration factor (Arithmetic, Digit Span, and Coding subtests) has been

utilized in several analyses of Wechsler profiles of hyperactive children (Spring, Yellin, & Greenberg, 1976) and has been shown to be sensitive in discriminating clinical groups from normal children (Brown, in press; Keogh, Welter, Mc Ginity, & Donlon, 1973; Wynne, 1979).

Rating Scales. Teachers were requested to rate each child's impulsivity based on measures consisting of 19 descriptive statements which have been shown to be sensitive to impulse control in normal children (Barratt; 1965). Teachers responded using a five-point Likert-type scale ranging from "never describes this child to always describes this child." The reliability of this scale when used to rate children from special populations has been found to be quite high (.85) (wynne, 1979).

Results

There were seven variables of which test scores were available for each of the groups (hyperactive, learning disabled (LD), and normal controls). Table 2 presents the means and standard deviations of each of the measures for the three groups.

Insert Table 2 about here

Comparisons of hyperactive, LD, and normal samples yielded a multivariate F of 3.59, $p < .001$. Separate univariate analyses of variance to examine the differences between hyperactive, LD, and normal controls on each of the dependent measures indicated that significant differences occurred for the MFF error measure $F(2, 42) = 3.68$, $p < .05$, the MFF latency measure $F(2, 42) = 4.18$, $p < .05$, the CCT omissions error measure $F(2, 42) = 6.08$, $p < .01$, the CCT commission error measure $F(2, 42) = 5.43$, $p < .01$, the attention concentration factor of the WISC-R $F(2, 42) = 11.36$, $p < .001$, and the teacher impulsivity ratings $F(2, 42) = 11.38$,

$p < .001$. A non-significant F ratio was obtained for the CEFT.

A Scheffe's post-hoc analysis was conducted to determine where these differences occurred. Post-hoc analyses indicated that the hyperactive group differed from the LD group on the MFF latency measure of impulsivity ($p < .05$), the CCT omissions error measure of sustained attention ($p < .05$), and the teacher ratings ($p < .05$). Additional post-hoc comparisons indicated that hyperactive children differed from normal controls on both the CCT omissions and commissions error measure ($p < .05$) and the MFF latency measure ($p < .05$). Furthermore, post-hoc analyses indicated that the LD group differed from the normal controls on both the CCT error measures ($p < .05$) and the attention concentration factor of the WISC-R ($p < .05$).

Discussion

Of particular importance was the finding that teachers rated hyperactives as more impulsive than nonhyperactive LD children. Such a finding probably explains why hyperactives are singled out first and identified for specialized placement. As the present data indicates, it is the hyperactive child who fails to sit still, speaks out of turn, hits other children, and disrupts general classroom routine (Ross, 1976). In fact, an inspection of our data even indicates that LD children were rated as less impulsive by their teachers than the normal controls. Dykman and his colleagues (Dykman, Ackerman, & Oglesby, 1979) have suggested that LD children to a greater degree than normal controls, wish to please others, and since they gain approval for their prosocial behaviors, teachers judge them as emotionally more controlled than hyperactives. Thus, as Dykman and his associates (Ackerman, Elardo, & Dykman, 1979; Dykman, Ackerman, & Oglesby, 1979) have noted, one explanation for LD children's learning deficits might be that they are too "passive and rule

bound." Consequently, passivity as a trait can impede learning in a similar way as attentional problems and impulsivity. Thus, while less frequently identified as classroom behavioral problems, the LD "passive learner" also has a poor prognosis for academic success.

The findings of the present study further indicate that hyperactives experienced significantly greater difficulty than nonhyperactive LD children on tasks requiring sustained attention. However, nonhyperactive LD children also experienced significantly greater difficulty in sustaining attention than did normal controls. Thus, these findings do not entirely support the hypothesis set forth by Douglas and Peters (1979) which suggests that the inability to sustain attention is the primary deficit which distinguishes hyperactive children from their LD counterparts. The findings from the present study, however, are consistent with that research presented by Dykman et al., (1979) which was unable to identify cognitive tasks which clearly delineated the two clinical groups. It appears safe to conclude, however, that either of the groups will perform less well than normal children of comparable age and intelligence on most cognitive tasks which are high on attentional demands. If we accept Douglas' (1980) assumption that attentional problems are constitutionally determined for hyperactives only, one plausible explanation for the presence of attentional deficits in LD children might simply be that these deficits are acquired as a result of continued failure experiences in the classroom. As Ross (1976) has indicated, impulsivity, distractibility, and restlessness may develop in LD children in an attempt to escape the failure due to experiences which are beyond these children's capacity. Thus, the present data may suggest that while problems in sustained attention are most

probably primary and far more severe in hyperactive children, they also occur in LD children as a function of continued failure experiences.

References

Ackerman, P.T., Elardo, P.T., & Dykman, R.A. A psychosocial study of hyperactive and learning disabled boys. Journal of Abnormal Child Psychology, 1979, 7, 91-99.

Barratt, E. Factor analysis of some psychometric measures of impulsiveness and anxiety. Psychological Bulletin, 1965, 16, 547-554.

Brown, R.T. Impulsivity and psychoeducational intervention in hyperactive children. Journal of Learning Disabilities, 1980, 13, (5), 249-254.

Brown, R.T. A developmental analysis of visual and auditory sustained attention and reflection-impulsivity in hyperactive and normal children. Journal of Learning Disabilities, in press.

Brown, R.T. & Quay, L.C. Reflection-impulsivity in normal and behavior disordered children. Journal of Abnormal Child Psychology, 1977, 4(5), 457-461.

Brown, R.T. & Alford, N. Ameliorating attentional deficits and concomitant academic deficiencies in learning disabled children through cognitive training. Journal of Learning Disabilities, in press.

Brown, R.T. & Sleator, E.K. Methylphenidate in hyperkinetic children: Differences in dose effects on impulsive behavior. Pediatrics, 1979, 64, (4), 408-411.

Brown, R.T. & Wynne, M.E. Toward a clearer understanding of attentional disturbances in hyperactive children. Paper presented at the 1982 annual convention of the Council for Exceptional Children, Houston, Texas.

Conners, C. A teacher rating scale for use in drug studies with children. American Journal of Psychiatry, 1969, 126, 152-156.

Diagnostic and statistics manual of mental disorders (3rd ed.). American Psychiatric Association, 1980.

Douglas, V.I. Stop, look, and listen: The problem of sustained attentional and impulse control in hyperactive and normal children. Canadian Journal of Behavioral Science, 1972, 4, 259-282.

Douglas, V.I. Sustained attention and impulse control: Implication for the handicapped child. In Psychology and the Handicapped Child, DHEW Publication No. 73-0500, U.S. Department of Health, Education, and Welfare, 1974.

Douglas, V.I. Higher mental processes in hyperactive children: Implications for training. In R.M. Knights & D.J. Bakker (Eds.), Rehabilitation, treatment, and management of learning disorders. Baltimore: University Park Press, 1980.

Douglas, V.I. & Peters, K.G. Toward a clearer definition of the attentional deficit in hyperactive children. In G.A. Hale & M. Lewis (Eds.), Attention and the Development of Cognitive Skills, New York: Plenum Publishing Corp., 1979.

Dykman, R., Ackerman, P.T., & Oglesby, C. Selective and sustained attention in hyperactive, learning disabled, and normal boys. Journal of Nervous and Mental Diseases, 1979, 1(67), 288-295.

Hallahan, D.P., Gajar, A.H., Cohen, S.B., & Tarver, S.G. Selective attention and locus of control in learning disabled and normal children. Journal of Learning Disabilities, 1978, 11, 231-236.

Hallahan ,D.P. & Bryan, T.H. Learning disabilities. In D. Hallahan & J. Kauffman (Eds.), Handbook of Special Education, New York: Prentice-Hall, 1981.

Jastak, J.F. & Jastak, S.R. Wide Range Achievement Test. Wilmington, Deleware: Guidance Associates, 1965.

Kagan, J., Rosman, B.C., Day, D., Albert, J., & Phillips, W. Information processing in the child: Significance of analytic and reflection attitudes. Psychological Monographs, General and Applied, 1964, 78, 578.

Keogh, B.K. Hyperactivity and learning disorders: Review and speculation. Exceptional Children, 1971, 38, 101-110.

Keogh, B.K., & Donlon, M.G. Field dependence, impulsivity, and learning disabilities. Journal of Learning Disabilities, 1972, 5, 331-336.

Keogh, B.K., & Margolis, J.S. A component analysis of attentional problems of educationally handicapped boys. Journal of Abnormal Child Psychology, 1976, 4(4), 349-359.

Keogh, B.K., Welter, J., Mc Ginity, A., & Donlon, G. Functional analysis of WISC performance of learning disabled, hyperactive, and mentally retarded boys. Psychology in the Schools, 1973, 10, 178-181.

Margolis, J.S. Academic correlates of sustained attention. Unpublished doctoral dissertation. University of California, Los Angeles, 1971.

Quay, L.C. & Brown, R.T. Hyperactive and normal children and the error, latency, and double median split scoring procedures of the Matching Familiar Figures Test. Journal of School Psychology, 1980, 18, 12-16.

Ross, A.O. Psychological aspects of learning disabilities and reading disorders. New York: Mc Graw-Hill Book Company, 1976.

Sprague, R.L., Cohen, M.N., & Werry, J.S. Normative data on the Conners' Teacher Rating Scale and Abbreviated Scale. Champaign, Ill.: University of Illinois, Institute for Child Behavior and Development, 1974.

Spring, C. Yellin, A.M., & Greenberg, I. Effects of imipramine and methylphenidate on perceptual-motor performance of hyperactive children. Perceptual and Motor Skills, 1976, 43, 459-470.

Sykes, D.H., Douglas, V.I., Weiss, G., & Minde, K.K. Attention in hyperactive children and the effect of methylphenidate (Ritalin). Journal of Child Psychology and Psychiatry, 1971, 12, 129-139.

Wechsler, D. Wechsler Intelligence Scale for Children - Revised. New York: Psychological Corporation, 1974.

Whalen, C. & Henker, B. Psychostimulants in children: A review and analysis. Psychological Bulletin, 1976, 83, 1113-1130.

Witkin, H.A. Oltman, P., Raskin, E., & Karp, S. Manual for the children's embedded figures test. Palo Alto: Consulting Psychologists Pressm 1971.

Wynne, M.E. Time estimation as a measure of impulsivity in emotionally disturbed adolescent females. Unpublished doctoral dissertation, University of Michigan, 1979.

Zentall, S. Optimal stimulation as theoretical basis of hyperactivity. American Journal of Orthopsychiatry, 1975, 45, 549-563.

Footnotes

[1]This research was supported in part by U.S. Public Health Service Grant No. MH-36-448 and by a research award grant from the University of Illinois-Chicago graduate school research board.

[2]Requests for reprints should be sent to Ronald T. Brown, Ph.D., Department of Special Education, University of Illinois- Chicago, P.O. Box 4348, Chicago, Illinois 60680.

[3]The collaborative efforts of the authors are equal.

Table 1

Descriptive Statistics for Hyperactive, Learning Disabled, and Normal Controls

Subject Characteristics	Hyperactive Mean	Hyperactive SD	Learning Disabled Mean	Learning Disabled SD	Normal Mean	Normal SD	F	Significance
Age (in months)	147.13	26.08	149.73	19.65	138.53	14.10	1.20	(NS)
FSIQ[a]	93.07	14.79	89.60	13.56	93.13	10.89	.35	(NS)
Conners	20.00	3.32	5.40	4.22	5.07	4.61	65.40	.0001

[a]FSIQ - WISC-R Full Scale IQ

Table 2

Means and Standard Deviations of Hyperactive, Learning Disabled, and Normal Children on Attentional Measures and Teacher Ratings

	Hyperactive		Learning Disabled		Normal	
	Mean	SD	Mean	SD	Mean	SD
MFF Error	10.53	6.55	11.27	5.02	6.27	4.61
MFF Latency (in seconds)	136.61	68.53	108.72	47.88	175.66	72.06
CCT Omission (errors)	19.73	17.25	12.87	11.99	4.13	3.34
CCT Commission (errors)	7.00	5.90	7.80	8.44	1.20	1.70
EFT (number correct)	16.13	7.32	16.07	6.01	19.93	2.55
Attention-Concentration Factor (total score)	23.20	6.55	21.00	5.96	30.73	4.98
Teacher Ratings	68.64	5.91	51.34	14.36	58.84	7.07