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Cognitive Impulsivity of Children:  
Its Handicap and Treatment

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The nature of cognitive impulsivity has been extensively researched in the literature. Despite the different interpretations of the concept of "cognitive impulsivity", it is agreed that cognitive impulsivity is a handicap for children. This paper, based on Hagan's (1965) model of impulsivity, attempts to examine the effects of cognitive impulsivity on children in different areas, such as affective/behavioral, educational and cognitive. In the latter section of the paper, different treatment programs are discussed.

The cognitive variable of impulsiveness is always referred to as "conceptual tempo". The latter was defined by Hagan (1965) as a dimension of cognitive style which he called "Reflection-Impulsivity." The reflection-impulsivity dimension essentially describes a child's tendency to display fast or slow response times, with corresponding many or few errors, in problem situations with high response uncertainty (i.e. problems with many alternate answers). As such, impulsive children tend to respond quickly without considering all the available alternatives, and consequently make many mistakes. Reflective children, in contrast, consider the alternatives carefully, withhold responding until they have a high probability of being correct and consequently make few mistakes. The most frequently employed instrument to assess cognitive reflection-impulsivity is the 12-item Matching Familiar Figures Test (MFFT: Hagan, Rosman, Day, Albert, and Philips, 1964). The MFFT is a match-a-sample
perceptual recognition task in which the child is shown a single picture of a familiar object and is instructed to select from an array of six variants one picture identical to the standard. On each of the test's twelve items, errors and latency time are recorded to identify the degree of conceptual reflection-impulsivity. In order to classify children as impulsive or reflective, a group of children must be tested on the KFFT. Typically, if the child's mean latency is above the group mean and his total errors are below the group mean, he is designated reflective. If the child's mean latency is below the group mean and his total errors are above the group mean, he is designated impulsive.

Reflection-impulsivity has been shown to be a relatively reliable and valid cognitive style dimension (at least for children six years of age or older) that has important significance to child development (Nelson & Finch, 1977).

A number of studies, using the KFFT, have found the relationship between cognitive impulsivity and impulsive behavior among children. Teacher rating scales and parent rating scales both indicated a relationship between impulsivity and impulsive behavior. Finch, Fleming, and Spirito (1980) asked teachers of emotionally disturbed children at a residential mental health center for children to rate on the Conners Teacher Questionnaire (Conners, 1969) in their classrooms. Their findings showed that impulsive children displayed significantly more
problem behavior. Specifically, the impulsive children scored significantly higher on Conners factors reflecting aggression, distractibility and hyperactivity. Montgomery and Finch (1975) asked teachers to complete Locus of Conflict Rating Scales (Armentrout, 1978) on their emotionally disturbed students. An externalization and an internalization score can be derived from this scale. In internalization of conflict, the impulses are highly controlled and the conflict is between impulses and their inhibitions. In externalization of conflict, impulses are freely discharged into the environment and the conflict is between the child's uninhibited impulsive behavior and the reactions they bring about in others. They found that children with an impulsive cognitive style were found to be externalizers while children with a reflective cognitive style were found to be internalizers. The Classroom Behavior Inventory (Schaefer & Aaronson, 1966) requires the teacher to rate a number of the child's in-class behavior on a 4-point continuum. McKinney (1975) in his study demonstrated that boys classified as impulsive on the AFPT were rated by teachers as being less task-oriented and less considerate than their reflective peers. Girls classified as impulsive in this study were rated by the teacher as being more distractable. In another study, Finch and Nelson (1976) asked parents to rate the Virginia Treatment Center Behavioral Questionnaire (Batchelder & Hammett, 1970) on their emotionally disturbed sons. The results showed that in contrast to reflective
emotionally disturbed boys, impulsives were more likely to talk of others blaming them unfairly, threaten to harm themselves, hit and bully other children, and be excessively rough in play. Clearly, the above research studies found that impulsive children have more behavioral and affective problems than their reflective counterparts.

There also exists a fair amount of evidence to indicate that an impulsive cognitive style exerts a handicapping influence in the educational process. Kagan (1965) found that children classified as impulsive on the KFFT perform significantly poorer on measures of reading proficiency. In his study, each of 130 children was given visual-matching problems (KFFT) involving designs and pictures and reading-recognition tests at the end of the first and second grade. Results indicated that impulsive subjects, those with fast response time and high error scores on the visual-matching tests, made more errors in reading English words on both occasions than the reflective subjects. Another study by Kagan and his associates (Kagan, Pearson & Welch, 1966) demonstrated that impulsives of the first grade children had faster response times and higher error scores on the inductive reasoning tests. In other words, impulsive children have poorer inductive reasoning power in contrast to the reflective children. Kagan (1966) did another study with the impulsive children and found that they were poorer in serial learning. In his study, he used third grade students previously classified
as either reflective or impulsive and they were administered a serial learning task under three different conditions: a threat group, a rejection group and a control group. In the experiment the experimenter told the child that he was going to test his memory and the child was urged to do as well as he could. The experimenter allowed the subject to practice with two lists of three and four words each until the subjects understood the nature of the task. The criterion task consisted of 4 different lists of 12 familiar words each. Each of the lists contained six words that belonged to a conceptual category, but each of these conceptually related words was surrounded by a word unrelated to that concept. The six remaining words in each list were minimally related to each other or to the concept contained in that list. After administration of 2 lists, the threat group was told that the next lists were difficult, the rejection group was told that their performance was poor, and the control group was given no special communication. The experimental intervention was to arouse anxiety over possible failure in the threat group and to arouse anxiety over the examiner's disapproval of the child's performance in the rejection group. Results showed that impulsive subjects in all groups reported more incorrect words before and after experimental intervention. Reflective boys who were told the next lists were difficult showed the largest increase in incorrect words. Lesiak (1978) investigated the relationship between the reflection-impulsivity
dimension and reading, and his results were in agreement with Kagan's findings. From his study, he found reflective first grade girls scored significantly higher than impulsive girls on all reading tests while reflective first grade boys scored significantly higher than impulsive boys on the critical reading measures. Further support for the importance of a reflective attitude in reading proficiency comes from a study by Egeland (1974), who found improved reading comprehension among inner-city schools 5 months after employing a training program that successfully increased their reflectivity. Impulsive children also have been demonstrated to perform significantly poorer on measures of arithmetic achievement. Cathcart and Liedtke (1969) found that the students the best in mathematics are those who are more reflective and take longer to consider the responses. They believed that students who hesitate before responding should not be underrated since their hesitation may be due to their cognitive style rather than to their lack of ability. Messer (1970) did a retrospective study on the stability of the cognitive disposition of children over two and a half year period. He found that children who failed a grade were discovered to be significantly more impulsive than their peers, but highly comparable in verbal intelligence. In his study, 65 first-grade boys who were first administered the WFFT in grade 1, 7 were found to have failed a grade 2 years later. Of these seven, five were impulsive, one was reflective,
and one was slow and inaccurate in grade 1. Two years later
the same seven children were still significantly more impulsive,
as indicated by the MFPT, than the sample as a whole. Despite
the above evidence showing that cognitive impulsivity can exert
handicapping influence in the educational process, we need to
take a cautious position since research results are far from
conclusive. Finch, Montgomery and Kemp (1974) failed to find
a relationship between cognitive style and academic achievement
in emotionally disturbed children. Sixty-five emotionally
disturbed children were administered the MFPT and standard
achievement tests. Results indicated that impulsive and reflective
children did not differ on their levels of academic achievement.
However, when actual grade placement was considered, impulsive
children were found to be placed two grade below their reflective
counterparts.

As far as the impulsive children's cognitive development
is concerned, there are many studies indicating that impulsive
children manifest less mature levels of cognitive development.
Finch, Edwards and Searcy (1977) administered MFPT and the
Visual-Aural Digit Span Test (Koppitz, 1970) to 42 subjects
to investigate the relationship between the reflection-impulsivity
cognitive dimension and short-term memory. Results showed that
on all memory tasks, reflective did significantly better than
did impulsives. According to Finch and Montgomery (1973),
reflective were found to employ more mature questions than did
impulsive ones. In their study, 44 emotionally disturbed
children were administered the FFT and after which 13 most impulsive and 13 most reflective were chosen. They then were administered Fixed Alternatives Question-Asking Game (Kosher & Hornsby, 1966) in which subjects sought information by asking questions that could be answered either "yes" or "no". Results demonstrated that impulsive children emitted one hypothesis-scanning question after another in an apparent attempt to guess the correct solution immediately while the reflective children delayed their initial impulse to guess and paused to consider the possible alternatives. Reflective children on a variety of perceptual, conceptual and perceptuomotor problem-solving tasks consistently performed better than impulsive counterparts. On a color-form matching test, which permitted subjects to match the standard on the basis either of color or form, reflective children gave more form responses (the more mature answers) than did impulsive children (Katz, 1971). Other studies showed that reflectives had superior short term visual memory on a visual recognition task in which the child had to recall which of two similar pictures had been presented previously (Siegel, Kirasie, & Kilburg, 1973). Reflectives were demonstrated to be more successful in solving mazes than the impulsives (Shipc, 1971; Weintraub, 1973). The less mature levels of cognitive development of the impulsive children have also been demonstrated with a number of Piagetian-type tasks, including: tests of life concept (Berzonsky, 1974); role taking skills (Clenwick & Burka, 1975); conservation tasks
(Darstis & Ford, 1977). By and large, cognitive impulsivity has been demonstrated as a handicap to children's cognitive development.

In the social and moral behavior dimensions, research studies found that impulsives were less attentive and less mature in moral judgment. Welch (1973) found that impulsive preschoolers likely to start and stop their activities and to chat or roam between activities, but reflectives sustain attention even while chatting. In moral maturity, Schleifer and Douglas (1973) found that reflectives had a more advanced stage of moral judgment. They used stories to elicit judgment about relative goodness and badness. Level of moral maturity was scored on the basis of subjects awareness of the intention of the actor as opposed to his reliance on consequences. Results clearly indicated that reflectives made moral judgment on the basis of intentions rather than consequences.

In addition to the above research findings showing that cognitive impulsivity is a handicap or a liability to normal child development, impulsives are found in much higher proportions than reflectives among children diagnosed as hyperactive, brain-damaged, epileptic and mentally retarded (Messer, 1976). In order to remedy this relatively stable personality trait, many different treatment approaches had been made to alter their conceptual tempo. Although the remedial programs are not perfect, they do yield promising results.
Two main strategies, each coming from different conceptual views of cognitive style, seem to be promising methods in attempting to modify cognitive impulsivity — cognitive training approaches and operant conditioning techniques.

The rationale behind the cognitive training approach is that what a child does during the interval between the presentation of a problem and subsequent response is an important covert element in his cognitive style, and therefore affects his ability to solve problems correctly. Meinichenbaum and Goodman (1971) did two studies with young impulsive children in order to see the effectiveness of a cognitive self-verbalization treatment program in modifying non-verbal behavior. In their first study an individual training method which asked the impulsive subjects to talk to themselves overtly and then covertly was compared with two control groups. Results indicated that self-instructional group improved significantly on a variety of psychometric tests which assessed cognitive impulsivity, motor ability and performance IQ. In their second study, Meinichenbaum and Goodman (1971) attempted to alter cognitive tempo with experimental models rather than under natural conditions. The purpose of the study was to compare the efficacy of cognitive self-instruction to a modeling procedure and a control group in altering the attentional strategy of impulsive children. The essential strategy used was to have the impulsive children observe a peer or adult model performing on the WFFT
or similar task while verbalizing, reflective response strategies in the modeling group. The subjects in the self-instruction training group were told to perform the task while speaking the instructions aloud to themselves, much as the model they observed had just done (e.g., I have to look carefully at this one, then this one"). Results showed that both modeling procedure and self-instruction training increased response latency time but only the self-instruction training resulted in a significant decrease in errors.

Recently, Finch, Wilkinson, Nelson and Montgomery (1975) did a study to investigate the relative effectiveness of cognitive training and training to delay before responding in modifying cognitive impulsivity in emotionally disturbed children. In their study, three groups of youngsters were compared. One group would receive training in verbal self-instructions, a second group would receive only training to delay before responding, and the third group was essentially a test-retest control group. Their results indicated that the children who were trained to employ verbal self-instructions were less impulsive in their responding, while those children who were trained to delay took longer before responding but made as many errors as previously.

Teaching impulsive children the visual scanning strategies directly is another promising method to decrease impulsivity. Egeland (1974) demonstrated that his intervention resulted in significantly improved performance on the WPFT and similar
tasks (in both latency and errors), and also had a generalization
effect to a test of reading achievement. Egeland taught his
subjects the explicit rules and basic strategies, which
included looking at the standard and all the alternatives,
breaking down the alternatives into component parts, and checking
the standard to determine its correct form. Other studies using
teaching scanning strategies (Albert, 1969; Nelson, 1969;
Gaines, 1969; Patterson & Debus, 1974) were unanimous in their
findings: increased WFFT latencies and decreased errors.

The operant conditioning approaches are another kind
of method used to modify cognitive impulsivity. This theo­
retical viewpoint assumes that the cognitive style one employs
is based on motivation. It is believed that one's motivation
to solve a problem is largely a function of the environ­mental
contingencies surrounding the situation; therefore, the
impulsive child responds impulsively because of lack of sufficient
motivation to employ reflective response from his cognitive­
behavioral repertoire. Based on this understanding of impulsive
children's impulsive response, we need to provide sufficient
motivation for them to elicit the desired cognitive style
rather than teaching them a new cognitive style. Briggs (1966)
in his dissertation was successful in increasing latency and
decreasing errors by using an operant approach which rein­
forced decreased or increased response latencies. In his
study, reflective and impulsive fourth-grade boys were rein­
forced by means of colored lights for showing either increased
or decreased latency from their previous responses. Reinforcement
for increasing latencies produced both longer latencies and few errors, while reinforcement for decreasing latencies led to shorter latencies and more errors.

By using a social punishment condition, Massari and Shack (1972) found that the number of errors both reflective and impulsive first-grade boys made on a two-choice discrimination learning task was significantly reduced. Erickson, Eynce and Routh (1973) penalized educable mentally retarded children for making errors on the Matching Familiar Figures Test by making them give up tokens exchangeable for food. The results supported the response cost strategy which led to increased latencies and decreased errors.

Recently, Nelson, Finch and Hooke (1975), working with emotionally disturbed children, demonstrated that the techniques of response cost and reinforcement were effective in modifying cognitive impulsivity both in terms of decreased errors and increased response time. In their study, they suggested that reflection-impulsivity dimension might involve a motivation-for-success component, as well as a fear-of-failure one. In order to test the hypothesis, they compared a group of impulsive and reflective children and their response to reinforcement versus response cost. Results indicated that impulsive children respond better under conditions of response-cost while reflective children respond better under conditions of reinforcement. In other words, the impulsive children did much better when they were given their reinforcers at the beginning of the session and had one taken away for each mistake that they made.
Kendall and Finch (1976; 1978) developed a treatment package which incorporates modeling, self-instructional training, and response cost procedures. This new strategy was demonstrated to be effective in producing positive changes both on FFT performance and on teacher-rated classroom behavior. In their first study, Kendall and Finch (1976) used a multiple baseline design in order to evaluate response-cost and self-instruction procedure with this youngster. The results showed that his observed behaviors were improved and the positive effects were generalized to the school situation as indicated from report cards and teacher ratings. Having received these encouraging results from the case study, Kendall and Finch (1978) did a group comparison study in order to evaluate the combined package of response-cost and verbal self-instructions on the impulsive behavior of emotionally disturbed children. Again, results were encouraging with some generalization effect to the school situation.

After so many years of research, cognitive impulsivity has been clearly demonstrated to be handicapping to child development. It has been found that impulsive children in contrast to reflective children are less concerned about the quality of their cognitive product, are less able to sustain attention, are more aggressive, make fewer advanced moral judgments, and are less considerate to others. In educational process, impulsive children are deficient in reading and mathematics skills; they deal with problems in a non-analytic fashion. As cognitive impulsivity is a deficit for children,
Many remedial programs had been employed to modify cognitive style. The cognitive approaches and the operant conditioning approaches are the two main strategies used in the remedial programs. In cognitive approaches, self-instruction training receives the most attention. Verbal self-instructions are actually step-by-step verbalizations about the problem definition, problem approach, focusing of attention, coping statements, and statements of self-reinforcement. In operant conditioning approaches, the response-cost procedure appears to be a very effective strategy to modify cognitive style. Recently, the treatment package incorporating self-instructional training, response-cost procedures, and modeling has been demonstrated to bring desired changes in impulsive children. By and large, although none of the remedial strategies can claim full success at this time, they do bring promising effects in modifying cognitive impulsivity to a certain extent. In conclusion, it is clear that cognitive impulsivity in children deserves our attention and further research on remedial strategies is necessary.
REFERENCES


