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ADAPTIVE ACTION STYLE IN THE PREDICTION OF MASTERY IN GRADE ONE

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ABSTRACT

ADAPTIVE ACTION STYLE IN THE PREDICTION OF MASTERY IN GRADE ONE

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This thesis investigates the central importance of characteristic adaptive action style for achievement and adaptation in 5-6 year olds. While excessive service motivation has so often precluded a focus on the child's active resources, this study considers the child's unique style of interacting with his significant environment, his active role in facilitating his own learning and adjustment. It aims to measure and understand adaptive action style in terms of dynamic determinants and consequences.

It provides two original instruments (Continuous Cognitive Task [CCT], used as a "Dynamic Behaviour Assessment Paradigm [DBAP]", and Teachers' Checklist), each designed to measure "dynamic adaptive characteristics" in significant situations. The original use of a DBAP to assess personality in this age group, consistent with the trend towards Interactionism, adapts a dynamic assessment method used with adults. The CCT, a pencil-and-paper task providing a sample of achievement-oriented activity after tuition, practice, and challenge, enables objective measurement and graphic presentation. The cognitive nature of the task also allows consideration of efficiency of higher mental functioning.

Voluntary Focused Receptivity, Achievement Motivation, and Pervasive Anxiety (Checklist factors) moderately effectively establish construct validity of two CCT measures, supporting Atkinson and Birch's view that achievement-oriented activity reflects need for Achievement, and anxiety.

Factor analysis highlights a fundamental criterion factor, Mastery, combining Scholastic Achievement with Active Adaptive Behaviour vs. Maladaptive Inertia. Predictive findings highlight characteristic adaptive activity as the core prerequisite for

Scholastic Achievement and for Mastery. Luria's psychoneurological perspective guides consideration of processes underlying performance on the CCT, demonstrating that adequate voluntary attention, information processing, and sustained voluntary action explain performance, subsequent Achievement and Mastery. Findings show the efficacy of the CCT in identifying individuals in concurrent Readiness and subsequent Mastery groups.

The study provides an economical research tool, with features favouring wide applicability, to investigate fundamental adaptive characteristics. It establishes activity, not opposed by anxiety, as the child's core resource, emphasizing the need to use this understanding to assist young children. Findings with the present sample justify wide-scale investigation.

DECLARATION

I declare that *this thesis is my own, unaided work. It is being* submitted for the degree of Doctor of Philosophy in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other University.

M.S. Hoffenberg

Muriel Shirley Hoffenberg

...day of July, 19...

In loving memory of my Parents,
Bella and Morris Holtz

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PREFACE

My background, personal philosophy, and interest in young children's development attracted me to the study of *characteristic* dynamic motivational resources, *resources which* promote adaptive action in *pursuit* of mastery-oriented goals. I undertook this venture in order to challenge my own resources and make a small contribution to the understanding of young children.

An initial background in personality research (*several years* at the National Institute *for Personnel* Research [NIPR], under the *guidance* of Dr H. Reuning), followed by many years of clinical work with diverse groups of young children who required special assistance in using their resources adequately, culminated in the present study. There appeared to be an *interesting* opportunity to integrate my *research* and clinical experience.

The importance of motivation and adaptive activity for adequate achievement and adjustment had become increasingly clear to me. Exposure to the assessment needs and limitations for *preschool* children led to the consideration of *adapting*, for this age group, a dynamic *method* of assessing personality in adults (viz. the use of Continuous Work Tests in experimental situations). An updating review of current literature confirmed the need and relevance of the contemplated study, and provided current *theoretical perspectives*.

I aimed to provide, *investigate*, and understand objective quantitative measures with adequate psychometric properties, of characteristic adaptive action style in 5-6 year old children. These measures would be derived from the test I devised, *the* Continuous Cognitive Task (*CCT*), *presented* in a special *learning/performing* situation. Specific features of the CCT would allow it to be also viewed as measuring functional efficiency through all three phases of the mental act. Several features should facilitate wide applicability, including cross-cultural *use*.

CCT performance would *provide*, what I termed, a 'Dynamic *Behaviour Assessment* Paradigm' (DBAP) to measure these dynamic adaptive personality and functional characteristics in 5-6 year olds. I proposed to investigate construct validity and enhance definition of these measures (by means of *the Teachers'* Checklist designed for *this purpose*, and preschool teachers' Readiness

judgements) *before* viewing their value as predictors of scholastic achievement (*Wide* Range Achievement Test) and classroom adjustment (Devereux Elementary Behaviour Rating Scale).

I proposed to *remove* the customary limitation of using only scholastic *achievement as a criterion* of adequacy by including an affective/behavioural *view* of the child's habitual active adaptive resources *manifest* in the classroom. This view should allow the full predictive *value* of the child's characteristic motivational resources to be *evaluated*. I also proposed to provide a preliminary view of the *efficacy of the* CCT measures in identifying individuals needing assistance, *resistance* aimed at facilitating the use of their own resources.

I am indebted to *Dr* H. Reuning for my initial interest in Continuous Work Tests *and for* encouraging my renewed enthusiasm, also for his assistance *with the* selection of the designs used in the CCT and the formulae *for* deriving specific measures. I am grateful to Prof G. Straker *for her* early valuable assistance in her initial role of Supervisor. *I am* especially grateful to Prof M. Seling, the original co-*supervisor*, who accepted the role of sole supervision and supported the completion of my study. I appreciate his statistical guidance and patient attempts to steer me towards simplicity and essence.

I am grateful to Arthur *Edwards* for his computer programming assistance and to the *supervisors and* staff of the Jabula, Orange Grove, and Yiddish Folk *nursery schools* for their cooperation. Special thanks to my *colleagues and* friends, Pam Behr, Irene Baker, Pearl Levey, Rochelle Grossman *and* Ellen Falestrant, for their interest and their assistance *in* administering the CCT. I would also like to acknowledge the *financial* assistance of the Human Science Research Council.

My final appreciation *goes to my* husband, Monte, and my children, Mark and Lynne, *who endured*, supported, and assisted for many years with total caring in *every* way they could. Special thanks to Mark for his dedication *in* accepting the arduous task of editing, and for giving so *much careful* thought and perceptive guidance.

M.S. Hoffenberg
July 1987

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1 INTRODUCTION

In the liberal socio-political climate of the sixties in the United States concern grew about providing equal educational opportunities for all children. This concern was translated into legislation regarding the education of young disadvantaged and handicapped children, *legislation which challenged professionals* in the field of child development and early education. This challenge however has not been uniformly met. Assessment practices did not adequately serve the legislative requirements, nor did they keep pace with the rapid growth of National services. It would seem that the desire to help children, and the pressure to find those who might be in need of assistance, very often precluded an adequate focus on, or understanding of, the child's own active resources or potential resources for promoting his own development. Conceptually appropriate psychological tools were needed to assess relevant aspects of child development in order to meet the legislative challenges more effectively.

1.1 CONCEPTUALLY-RELEVANT ASSESSMENT FOR ENRICHMENT PRACTICES

Conceptual support for Early Intervention was provided by Hunt's influential book Intelligence and Experience , published in 1961. Hunt *challenged the notion* of "fixed intelligence" (Hunt, 1961, 1979; McCarthy, 1986; Reynolds, Egan & Lerner, 1983) and emphasized that early enriched and ordered experiences could enable the child to "achieve a substantially faster rate of intellectual capacity" (Hunt, 1961, p. 363, cited by Reynolds et al., 1983). Early empirical findings, highlighting not only the positive gains of appropriate environmental intervention, but also the contrasting negative effects of non-intervention, increased the sense of urgency about early diagnosis (Abbott & Crane, 1977).

The requirements of Statutes, introduced to provide National Early Childhood Programmes for the disadvantaged and educationally handicapped, and followed by large-scale evaluations, emphasized the limitations of existing assessment measures and the need to devise new measures appropriate to the goals of the programmes (Abbott & Crane, 1977; Bernheimer & Keogh, 1986; Reynolds et al., 1983).

Legislation introducing compensatory early education programmes for disadvantaged children with limited opportunity (e.g. Head Start) required that all models include a system of evaluating the effectiveness of the programme. Legislation aimed at providing equal opportunities for handicapped children, the 1968 Handicapped Children's Early Education Assistance Act, PL 90-538, required that all programmes evaluate not only programme effectiveness but also child progress. The Education of All Handicapped Children Act of 1975, PL 94-142, which sought to stimulate expansion of these services, effectively increased the focus on detecting the educationally at-risk preschool child. This Act also added the challenging requirement that individual education programmes be formulated for each child considered to be educationally handicapped, or potentially handicapped. Valid, relevant, and well-conceptualized assessment measures were thus needed for preschool children, closely related to the concepts underlying Early Intervention.

These Statutes led to the rapid evolvement of special educational opportunities for preschool handicapped children (McCarthy, 1986). Intervention programmes were regarded as innovative and of high quality (McCarthy, 1986; Reynolds et al. 1983). McCarthy, reporting the finding that many curricular approaches were theoretically guided, highlighted the cognitively-oriented views of Hunt (1980), Kirk (1968), White (1975), Lillie (1975), and Feuerstein (1980) as being of special interest. Although efficacy research led to an overall positive endorsement of Early Intervention (Edmiaston & Mowder, 1985; Reynolds et al., 1983), the quality of this research did not appear to equal the high quality of the diverse conceptually-guided educational programmes. Nevertheless, McCarthy reiterated and strongly supported the underlying logic and need for Early Intervention on the basis of Hunt's views on the educability of intelligence (1960, 1980). These views, she maintained, provided the rationale and full justification for the continuation of this practice. It could be seen that the cognitively-oriented theories had inspired and justified Early Intervention with preschool children and often guided approaches to curriculum; these theories, however, had not adequately influenced evaluation of intervention efficacy.

Reviews of efficacy research revealed notable limitations and problems. Limitations revolved around the initial failure to design these studies in terms of gains for individual children, and the failure to provide adequate data to evaluate the goals and ambitions of the programme. There was a frequent failure to evaluate child change appropriately, and a general failure to take into account the nature of child-programme transactions and interactions. It seemed that far more refined and conceptually-guided assessment of individuals and of child-programme interaction was necessary for appropriate evaluation of efficacy.

The legislation that was introduced, *reflecting the desire* to provide special educational opportunities for all children who might need them, even those who might be mildly educationally handicapped, also spawned and spurred the parallel practice of Early Identification. Attempts to identify mildly handicapped children were shown to be *fraught with difficulties*. Early Identification efforts to find measures which would accurately identify children at risk for Learning Disability (one of the most challenging categories of children in need of intervention) have been the most prolific and problematic. These efforts gave rise to innumerable studies to investigate *early predictors of* scholastic achievement. A great number of these were carried out with 5-6 year old children, shortly before or after commencing school.

Findings, discussed and analyzed in Chapters Two and Three, once again highlighted the dearth of conceptually-relevant measures for *this age-group*, i.e. measures that were directly relevant to the ambitious goals of Early Identification. Studies emphasized the inadequacies, predictive and conceptual, of facets selected for this purpose, and the need to develop more effective and relevant measures. This survey suggested that the fundamental views of the cognitive theorists supporting the notion of intervention had also failed to guide the search to identify and understand the educational needs of those children who might experience difficulty in learning. It appeared thus that the conceptual *quality of* existing assessment practices did not match the generally high quality of Early Intervention programmes. Prevailing assessment practices were also conceptually inadequate for guiding the challenging decisions required by Early Identification.

Although several researchers still endorsed Early Identification with qualifications (e.g. Fletcher & Satz, 1982; Miller & Sprong, 1986; Reid & Hresko, 1981), and surveys in the LD field continued to emphasize its importance (Adelman & Taylor, 1986), serious doubts were expressed about the efficacy of identifying the future Learning Disabled (LD) chil. (Adelman, 1982; Greenfield & Scott, 1986; Keogh, 1986). Doubts revolved around both the possibility and advisability of identifying the potentially learning disabled child, especially before he had received instruction (Sears & Sears, 1980; Reid & Hresko, 1981). There was concern about the potentially damaging consequences of false labelling. Researchers also questioned whether relatively-enduring characteristics could be identified in this age group to serve as reliable predictors (Adelman, 1982; Keogh, 1986; Keogh & Becker, 1973; Reid & Hresko, 1981.)

Dissatisfaction was also expressed with the potential of prevailing theories, assessment tools, models, and methods in Early Identification to provide adequate educational understanding and guidance in order to facilitate meaningful intervention decisions. Prevailing theories in the learning disability field were limited in that they did not enhance understanding of prerequisites for learning, nor of the characteristics of children with learning disability. There was a general failure to focus from a comprehensive theoretical base on relevant and relatively-enduring aspects of the individual child with the power to explain learning and guide teaching (e.g. Abbott & Crane, 1977; Adelman, 1982; Lidz, 1977, 1983, 1986, 1987; Torgesen, 1986), and a frequent failure to consider the learning situation and environment (e.g. Adelman, 1982; Feshbach et al., 1977; Hernheimer & Keogh, 1986).

In sum, it seemed that the importance and logic of Early Intervention and Early Identification have not been disputed. What has been questioned, however, is (a) the relevance of evaluation methods and assessment for determining outcomes of preschool intervention for individual children, and (b) the possibility of initial accurate non-stigmatizing identification of the preschool child who might be in need of intervention, by the provision of assessment data with the potential to guide appropriate intervention decisions.

An analysis of prevailing Early Identification practices and studies led me to conclude that they had limited potential to

generate, what I termed, 'decision-relevant data' in order to serve the basic purpose of this practice, viz. accurate selection of children for appropriate intervention. Studies rarely focused on relatively-enduring dynamic characteristics depicting the essential active adaptive role of the child. Identification efforts focused largely on manifest skills, acquired knowledge, and *classroom* behaviour, with a notable disregard of the child's perspective and active role in learning, his characteristic affect, expectancies, motivation, voluntary attention, activity, and self-regulation. In addition, the selection of only academic criteria to evaluate the predictive value of the chosen *facets likewise precluded a focus* on the child's characteristic active adaptive functioning. Thus, neither the selection of predictors nor criteria facilitated a comprehensive theoretically-based view of the characteristic integrated functioning of an active motivated child responding to the opportunities and *demands of his environment*.

1.2 IMPORTANCE OF FOCUSING ON ADAPTIVE FUNCTIONING

I considered that conceptually-relevant assessment of 5-6 year old children, shortly before or after they were expected to learn from instruction within the formal school situation, would have dual *importance in meeting the challenges* of Early Intervention and Early Identification. Such assessment would be important both in evaluating fundamental individual gains from the enhanced preschool opportunities afforded by Early Intervention, and in detecting the potentially educationally handicapped child in a way that would *facilitate* understanding, and enhance decisions regarding his educational needs. Considering the need for a more relevant conceptual focus for assessment, cohesive with the theories underlying Early Intervention, I aimed to provide a theoretically-based objective focus on fundamental characteristic adaptive functioning in the 5-6 year old child. Objective assessment of this nature should also be of value in facilitating research in child development and adjustment.

In support of the logic of intervention, McCarthy (1986) outlined Hunt's views on the educability of intelligence (1961, 1980). Hunt documented the critical importance of environmental stimulation for the developing intellect of the infant, emphasizing that the influence of the environment was only indirect. He said, 'an infant's effort to *make sense out of his perceptual* encounters

... leads him to strategies of information processing and skills in coping which build one upon another" (1961, p.3). Hunt also stressed that "the competencies and motivational systems that an infant develops are not the product of his environment, but rather of his adaptive functioning" (1980, p. 65). He concluded thus that it was "the experience of functioning rather than the environment per se that controls along with genetic endowment, the course and rate of development, and the ultimate level of achieved competence" (p. 65).

McCarthy (p. 266) had advocated that decision-makers "seek interventions that provide experiences which foster psychological development". I considered that decision-makers could only intervene to "provide" special opportunities rather than experiences. The ultimate success of intervention would depend on the child's experience of functioning through his use of these special opportunities. In my view, the basic goal of Early Intervention was not only to provide special opportunities but also to facilitate the use of these opportunities by the disadvantaged, handicapped, or at-risk child in order that he might enhance his experiences and thus accelerate "the course and rate of development, and the ultimate level of achieved competence" (Hunt, 1980, p. 65).

Hunt had highlighted a functional prerequisite for the infant's development. This prerequisite was the infant's own active adaptive role within his environment, viz. "an infant's effort to make sense out of his perceptual encounters" (1961, p.3). I was interested in investigating the child's adaptive effort in the use of his environment at a later stage in his development. The value of this focus on adaptive functioning when making intervention decisions for individual children had been noted by several authors (Coulter & Morrow 1978; Feuerstein, 1979; Sundberg, Snowden, & Reynolds, 1978; Zorgesan, 1986; Weller, Strawser, & Buchanan, 1985.)

1.2.1 Adaptive Action Style

Psychoneurological theory and research support the central importance of adequate activity for higher mental functioning and for the achievement of a goal (Luria, 1973). Empirical findings confirm its importance. Characteristic purposeful goal-directed activity, however, has rarely been a central focus in evaluating intervention efficacy or in predicting achievement.

I aimed to investigate characteristic "adaptive action style"

in 5-6 year old children: to evaluate how individuals tend to confront and to use enriched opportunities, and to understand this *behavioural style in terms* of motivational determinants and effective consequences. My focus was on evaluating the child's characteristic "effort" in interacting with an enriched environment. I considered that active adaptive functioning was a prerequisite for learning, achieving, and adapting to *the opportunities and demands* of the environment, and that it would therefore be valuable to consider relatively-enduring individual differences in children along this dimension. I aimed first to provide appropriate measures for assessing the preschool child shortly before he was scheduled to commence formal instruction.

Assessment at this stage would be relevant retrospectively to the outcome of earlier intervention aimed at facilitating the child's use of special opportunities and fostering his psychological development (McCarthy, 1986.) It would also be relevant prospectively to the identification of those children who might be unlikely to use future educational opportunities effectively. In sum, assessment of active adaptive style in a relevant situation could thus be used to evaluate the overall efficacy of intervention for individual children, and also to guide decisions about future intervention.

In discussing Early Intervention programmes, McCarthy (1986) stressed the importance of the cohesiveness of philosophy and practice. I focused on the cohesiveness of philosophy and practice with *respect to the goals of intervention* and how each individual child's inadequacies or gains were assessed. The cohesiveness of philosophy and practice would be evident in viewing adaptive action style or characteristic active adaptive functioning as a <u>goal</u> for Early [preschool] Intervention and as a <u>criterion</u> *of intervention* efficacy in the subsequent evaluation of the 5-6 year old child. It would also be evident in viewing active adaptive functioning in the 5-6 year old as a <u>predictor</u> of future adaptation, i.e. in guiding how the educationally at-risk child is initially identified at this age, and how these conceptually-relevant assessments guide the selection of future educational options. A focus on the assessment of characteristic active adaptive functioning in a relevant and significant situation should provide some conceptual continuity in evaluation of past intervention efficacy, and consideration of

future intervention decisions.

1.2.2 Dynamic Adaptive Characteristics

It would seem that adaptive action style should reflect the child's fundamental adaptive motive to interact *effectively* with the environment, a motive viewed *as encompassing* and forming the base for, the *child's need* for effectiveness, competence, control, self-determination, mastery, and achievement, as well as his need to avoid failure (Atkinson & Raynor, 1978; Corsini & Marsella, 1983; Deci & Chandler, 1986; Hayes, 1962; Lamberth, Rappaport & Rappaport, 1978; Stott, 1976; White, 1959.) *As my* investigation focused on both antecedent and *effective* aspects of adaptive action style, I *used* the global term "dynamic adaptive characteristics" to include characteristics which directly influenced or represented the child's adaptive action. These were tendencies, in response *to* environmental demands and resources, *towards voluntary* attention and voluntary *self-regulated action*, as well as the underlying *attitudes, needs*, and motives which influenced these tendencies.

Dynamic adaptive characteristics have been used, not only as distinguishing characteristics of diverse groups, but also as significant targets for intervention. Maladaptive attitudinal and motivational characteristics, *as* well as other functional *prerequisites for adequate* cognitive functioning and adaptation have *been* emphasized in the disadvantaged or culturally deprived (Abbott & Crane, 1977; Anderson & Messick, 1974; Bridgeman & Shipman, 1978; Feuerstein, Rand & Hoffman, 1979; Lefcourt, 1976; Lidz, 1983, 1986, 1987; Stipek, Lamb, & Zigler, 1981.) In their work with culturally-*deprived adolescents*, Feuerstein and his colleagues *focused* on the ultimate importance of the individual's own active adaptive resources, his capacity to learn, change, and develop. They emphasized the importance of appropriate attitudes, work habits, and modes of functioning, *considering these* characteristics to be adaptive *prerequisites* for *adequate* cognitive functioning. *They also* regarded these characteristics as accessible to change. I considered that if maladaptive dynamic characteristics were detected in young children, the goal and direction of intervention would be clear and relevant. Facilitation of *adaptive* attitudes and independent self-regulated *action*, directed towards satisfaction of *the child's* fundamental adaptive motivation, would be worthwhile targets for intervention.

Despite doubts expressed about whether relatively-enduring characteristics with trans-situational consistency could be assessed in preschoolers as potentially reliable predictors of achievement, dynamic action-related characteristics influencing learning, achievement, and environmental adaptation have frequently been highlighted (Abbott & Crane, 1977; Campbell, 1985; Kohn & Rosman, 1972a, 1972b, 1973a, 1973b). "Disorders of attention regulation" and "activity modulation" have been found to be among the "most common problems occurring in childhood" (Shaywitz, Schnell, & Shaywitz, 1986, p. 348). Core dynamic maladaptive characteristics (inadequate voluntary attention, task-related activity, and/or inappropriate behaviour) were consistently cited as indicators of learning disability and of attention deficit disorder.

The selection in this study, as the dimension of interest, of core dynamic adaptive resources, theoretically and empirically linked to the disadvantaged, emotionally maladjusted, and learning disabled, seemed thus to be both relevant and worthwhile. The focus on relatively-enduring but changeable interactive characteristics, considered by cognitive and psychoneurological theorists to be fundamental adaptive prerequisites for learning and achievement, should address several of the problems in assessment for Early Intervention and Identification. It should also provide a uniform way of viewing diverse children with marked differences in cultural background, cognitive, and adaptive functioning. The selection of dynamic adaptive characteristics as the focus of assessment should also reduce the damaging potential of labelling. The focus on motivation and application, generally regarded as accessible to change, should reduce the danger of the usual "stigma" related to categorization along intellectual or learning disability dimensions.

1.3 EXISTING MEASURES OF DYNAMIC ADAPTIVE CHARACTERISTICS

A survey revealed that measures of dynamic adaptive characteristics for diverse groups of preschool children were clearly needed, and existing measures not considered to be adequate. Most available measures reflected the internal antecedents of adaptive motivation rather than the effective aspects manifest in behaviour-environment interaction (Sundberg et al., 1978). Even as measures of internal antecedents they were often regarded as inadequate due to the inherent limitations of self-report and semi-projective instruments and due to inadequate construct validity

with this age group (Bridgeman & Shipman, 1978; Silon & Harter, 1985; Stipek, Lamb, & Zigler, 1981; Uguroglu, Schiller, & Walberg, 1981). Stipek et al. (1981) concluded that research on motivation in young children had been retarded by the dearth of motivational measures with adequate psychometric properties.

Adaptive behavioural characteristics in a relevant situation (task orientation, work habits, classroom skills, and adjustment) had frequently been assessed by means of teachers' rating scales (Feshbach, Adelman, & Fuller, 1977; Schaefer, Aaronson, & Small, 1970; Stevenson, Parker, & Wilkinson, 1976b), but rarely viewed as manifestations of characteristic adaptive motivation. Kohn & Rosman (1972a, 1972b, 1973b, 1974) were among the few researchers (e.g. Bridgeman & Shipman, 1978; Weller, et al., 1985) who did view observed behaviour in terms of personality characteristics. They interpreted a factor they derived from preschool observation, Interest Participation vs. Apathy Withdrawal, as an adaptive personal characteristic, one of two socio-emotional dimensions depicting relatively-enduring attributes. Although this factor portrayed dynamic adaptive characteristics in a situation of environmental interaction, it did not include the child's perspective. Nor did its measurement satisfy the requirements for a comprehensive model of assessment for ecological competence, a theoretically-based model accepting the reality of the continuous interaction between intraindividual and situational facets (Sundberg, Snowden, & Reynolds, 1978, p. 207).

1.4 NATURE AND SCOPE OF THE STUDY

I proposed that the child's fundamental adaptive motive to interact effectively with the environment would be manifest in his characteristic adaptive action style. Adaptive action style would represent a syndrome of relatively enduring and general tendencies towards voluntary energy mobilization, preservation, and regulation towards the achievement of a personal goal or in response to environmental opportunities and demands. This behavioural style was viewed as a core adaptive resource, a prerequisite for adequate cognitive functioning, achievement, and adjustment. In order to investigate adaptive action style as a predictor of scholastic achievement and classroom adjustment it was necessary (a) to devise a mode of assessment which would provide adequate and objective theoretically-based measures of this fundamental adaptive resource,

(b) to devise an appropriate means of investigating concurrent construct validity of these measures, and (c) to provide conceptually-adequate criteria for examining their predictive v .dity.

1.6.1 Rationale for Developing th. Cont..nuous Cognitive Task

I aimed to derive objective theore'cally-based measures of adaptive action style in a dynamic simulated classroom situation, a significant learning/performing situation of opportunity and demand. The hypothesized link between fundamental adaptive motivation and characteristic adaptive action, I reasoned, should enable measures to be derived in this situation reflecting the child's characteristic adaptive motivation and style of action.

To *this purpose, I devised* the Continuous Cognitive Task (CCT) for 5-6 year old children, adapting, modifying, and expanding a dynamic and successful cross-cultural method of assessing aspects of personality in adults, (Irvine & Reuning, 1981; Lazarus, 1957; Reuning, 1957, 1979, 1983; Reuning & Wortley, 1973; Shoul & Reuning, 1957; Vernier, 1982). The use of performance on Continuous Work Tests provides, what I have termed, a "Dynamic Behaviour Assessment Paradigm (DBAP)", consistent with the concept of Interactionism in personality assessment. This dynamic method of assessment appeared to be most appropriate for evaluating dynamic adaptive personality characteristics in young children. The views of Atkinson & Birch (Atkinson & Raynor, 1978), relating relatively enduring and relatively general dynamic adaptive motivational dispositions (the Motive to Achieve Success and the Motive to Avoid Failure) to achievement-oriented activity, provided an appropriate theoretical perspective from which to view performance on this task, and from which to derive well-defined personality constructs.

The CCT, designed for the older preschool child who had not yet received formal academic instruction, aimed to simulate the demands and resources of a life-like classroom situation. The task, *simulated situation*, and challenge were designed to minimize the role of ability and maximize the role of independent voluntary effort. A challenge for maximum work and total concentration on this simple *continuous task follows* tuition, *practice*, mastery, and affirmation. Independent self-paced performance on the CCT over a period of fifteen minutes provides a miniature sample of the child's behaviour - a sample of *achievement-oriented action*. CCT

performance yields objective measures of productivity, efficiency, and application trends, *as well as providing* a Curve of Work.

A special feature of the CCT is its potential to yield measures of dual significance. As this task requires *higher mental* functioning in a simple but effort-demanding cognitive situation, CCT performance appeared to have the potential to reflect more than the child's general adaptive motivational and action style. It might also reflect the child's specific style of functioning in an *achievement-oriented* cognitive situation, his characteristic "active constructive role" [Wittrock & Lumsdaine, 1977, p. 449]) in confronting cognitive *stimuli and challenging* executive demands. Thus the specific cognitive nature of the achievement-oriented activity increased its potential relevance and *significance*, emphasizing the need for an additional complementary theoretical view. A psychoneurological perspective (Luria, 1973), consistent with the stress by cognitive theorists on the central role of activity in cognition and cognitive development, allowed this sample of *achievement-oriented* activity to be also viewed in terms of efficiency of higher mental functioning through all three phases of the mental act.

As performance on the CCT was conceived as a dynamically integrated behavioural measure, reflecting characteristic adaptive affect, attitudes, motives, and functional efficiency in an achievement-demanding cognitive situation, it should, *hypothetically*, facilitate a focus on antecedent and/or effective characteristics of adequate cognitive and adaptive functioning. CCT performance measures *should thus represent* characteristic functional efficiency in a cognitive situation, viewed as an integrated product of basic adaptive motivational and functional *competencies*.

1.4.2 Dynamic Behavioural Assessment in Early Enrichment

Sundberg et al. (1978) stressed the importance of theoretically-based measurement of adaptive competencies in significant environments for facilitating decisions about individuals. They also pointed out that ecological assessment of adaptive personal characteristics should include the motives of the individual and the demands *and resources* of the environment. The CCT satisfied these requirements. The dual theoretically based focus on characteristic behaviour of an *active*, motivated child responding to the opportunities and demands of a relevant dynamic

situation in order to satisfy his basic adaptive motivation, should address some of the aforementioned problems and limitations in assessment for Early Intervention and Identification. It should, theoretically, aid evaluation of the efficacy of Early Intervention programmes by providing a focus on fundamental interactive characteristics in a relevant situation. The inclusion of situational demands should also enhance the potential relevance of the assessment data for accurately identifying individuals for appropriate intervention. Simulation of anticipated demands for adaptation in a formal learning environment, should facilitate identification of the pre-school child who would soon be subjected to similar demands and expectations. The CCT should, hypothetically, ultimately have the potential to aid intervention decisions about individuals.

1.4.3 Devising Measures for Construct Validity

In order to investigate concurrent construct validity of the quantitative performance measures derived from the CCT, I obtained observational ratings and school readiness judgements from the pre-school teachers. The observational ratings were derived from the Teachers' Checklist, specifically designed to provide independent measures of adaptive motivational and functional characteristics in a different significant situation. The pre-school teachers' readiness judgements were included on the hypothesis that characteristic effectiveness or 'adaptive action style' would be the underlying basis for these judgements. Criteria readiness groups were formed from these judgements in order to view the potential of the CCT to distinguish between them and to accurately identify individual children within specific groups.

1.4.4 Selection of Conceptually-Cohesive Grade One Criteria

Finally, relevant valid assessment devices (scholastic and affective/behavioural) were selected for reassessment of these children in Grade One. Analysis of structure of the Wide Range Achievement Test (Jastak & Jastak, 1978 edition) and the Devereux Elementary School Behaviour Rating Scale (Spivack & Swift, 1967) was carried out, independently, and in combination, before using these instruments as criteria to assess the overall predictive validity of CCT performance measures and their potential for facilitating accurate predictions about individuals.

I had proposed that dynamic adaptive characteristics would be

measured by aspects of cognitive and executive functioning on the CCT in a significant situation. Viewed from a reverse *perspective*, the CCT would provide measures of cognitive functioning influenced by dynamic adaptive characteristics. It seemed that the inclusion of criteria integrating cognitive and dynamic adaptive competencies within a significant environment would be the most appropriate for *investigating both* the nature and predictive validity of the integrated CCT measures. The use of integrated criteria should again provide conceptual *continuity and cohesiveness*.

2 EARLY IDENTIFICATION OF LEARNING DISABILITY

The prolific Early Identification efforts arising from the legislative focus on enhancing educational opportunities, highlighted the inadequacies of prevailing assessment practices with preschool children. Children with a variety of handicaps and degrees of impairment had been included under the 1968 Handicapped Children's Early Assistance Act. The practice of Early Identification became associated mainly with finding ways to detect and provide services for children whose subtle handicaps were not easy to recognize, children who were nevertheless regarded as being in need of intervention. These children, often described as 'mildly' impaired, were considered to be at risk for specific learning disability.

2.1 THE HANDICAP OF SPECIFIC LEARNING DISABILITY

A formal definition of the category of 'children with specific learning disabilities' was formulated by the National Advisory Committee on Handicapped Children in its annual report to Congress in 1968. This definition became official in 1969 when the United States Congress passed The Children with Specific Learning Disabilities Act. Thus the handicap of Specific Learning Disability came into focus. This official definition was still used in Public Law 94-142, The Education of All Handicapped Children Act of 1975:

> The term 'children with specific learning disabilities' means those children who have a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which disorder may manifest itself in imperfect ability to listen, think, speak, read, write or spell, or do mathematical calculations. Such disorders include such conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. Such term does not include children who have learning problems which are primarily the result of visual, hearing, or motor handicaps, of mental retardation, of emotional disturbance, or environmental, cultural, or economic disadvantage [Public

Law 94-142, Section 5(b)(4), 1975).

Sabatino & Miller (1980, p. 76) suggested that this definition "may be incapable of describing a meaningful population for research or for providing data that are useful for instructional management or placement". Serious doubts have also been expressed about definition and the 'integrity of the diagnostic process" (Algozzine & Ysseldyke, 1986, p. 394). These authors noted that "almost twenty years after the official definition was printed, definition remains a problem".

2.2 THE GROWTH OF EARLY IDENTIFICATION

Specific Learning Disability has proved to be one of the most popular and most controversial diagnostic categories, generating countless studies in the search for the less overt manifestations of future (or even current) educational handicap. Numerous professionals began an active search for ways to identify young children who might develop later learning problems. This search for the more subtle, yet valid, predictors of future learning disability has been the most challenging and prolific. It is necessary therefore to examine these Early Identification efforts in some detail, even though the focus of my study was not confined to the learning disabled child.

The growth and extent of Early Identification efforts aimed at detecting and providing services for children with learning disability are evident in the following statements:

"The enthusiastic endorsement of the concept of early identification as a preventive strategy for working with children with learning disabilities has led to widespread implementation of a variety of screening methods or systems" (Keogh, 1977, p. 267).

"The identification of learning problems among children during early childhood has become an increasingly critical issue as evidence continues to accumulate concerning the importance of both early detection and prevention of learning difficulties" (Wallace & Larsen, 1978, p. 147).

"In recent years, there has been a great expenditure of energy directed toward the early identification and treatment of children with learning disabilities. Most American school systems have screening programs at the kindergarten and first-grade levels" (Reid & Hresko, 1981, p. 132).

Since 1970, with the mandatory inclusion of handicapped

preschoolers in Head Start programmes, and the expanded efforts resulting from the 1975 legislation (PL 94-142), considerable effort has been exerted towards identifying children with potential learning disabilities at the preschool level. As Fletcher & Satz (1984, p. 193) expressed it, "Early detection of learning problems has been recognized as a major step in creating intervention programs for preschool children at risk for poor academic adjustment." Many attested to the increasing popularity and extensive implementation of screening techniques, as well as the notable volume of research with this age group (Greenfield & Scott, 1986; Lindquist, 1982; Meisels, 1984; Miller & Sprong, 1986; Wilson & Reichmuth, 1985).

A large number and variety of measures (selected or devised) were used in attempts to identify children considered to be at risk for learning disability. These attempts gave rise to innumerable studies designed to assess the predictive validity of the screening and diagnostic measures used to detect incipient or future learning problems.

2.2.1 Goals of Early Identification

An early caution endorsed by Keogh & Becker (1973), held that diagnosis is only desirable when it leads to prevention or remedial action.

The practice of Early identification was based on the belief that predicted school problems might be reduced by early treatment (Werner, Algozzine & Trifiletti, 1979). The underlying assumptions were that it would be possible to identify accurately children who were at risk for school failure and that appropriate educational intervention decisions could be made. It was assumed that professionals would know how to find at-risk children and how to intervene.

It seemed that the original advocates of Early Identification had not actively questioned whether early diagnosis (or rather prediction) would be accurate; nor had they addressed the issue of how Early Identification would lead to prevention or early treatment of learning problems. Urgent mandatory, practical challenges were readily accepted in the climate of optimism about the possibility of change and the enhanced feelings of responsibility of educationalists. Professionals in the field aimed with assurance to identify those children who were at risk for

learning disability and intervene to prevent subsequent problems. The oft-quoted watchwords of the pioneers in the field of Early Identification, "early assessment and prevention", (de Hirsch et al., 1966, cited by Wallace & Larsen, 1978) had expressed ambitious and confident goals.

2.2.2 Outcome

2.2.2.1 Accurate Detection

A little over a decade later there were marked feelings of disappointment and disillusionment, and cries for caution, moderation, and revision of the former goals, even a plea for abandonment of the goals of Early Identification (Adelman, 1978). Thus the growth of enthusiasm, service dedication, and commitment was followed by a commensurate growth of anxiety in several major reviewers of these endeavours (Abbott & Crane, 1977; Feshbach et al., 1977; Keogh, 1973, 1977; Lidz, 1977; Mercer et al., 1979; Ross, 1977; Stevenson et al., 1976b). The consensus appeared to be that no major or irrevocable decisions be made about individual children on the basis of screening measures, especially not exclusion from educational programmes (e.g. Feshbach et al., 1977; Keogh, 1977).

With the increased focus on preschool screening, and the fact that PL 94-142 allowed "a diagnosis based on abilities thought to be correlated with school performance" (Reid & Hresko, 1981, p. 133), these concerns deepened (Adelman, 1982; Beers & Beers, 1980; Greenfield & Scott, 1986; Lindquist, 1982; Meisels, 1984; Miller & Sprong, 1986; Reid & Hresko, 1981; Satz & Fletcher, 1979; Skuy, Shmukler & Westaway, 1985). The inordinate energy expenditure was contrasted with the lack of efficacy of existing measures. Adelman's warning (1982, p. 255) was still considered applicable in 1986 (Greenfield & Scott):

"Because of the trend toward widespread application, it seems important to clarify that evidence does not support the efficacy of available predictive and identification procedures, especially those already being used for massive screening of preschoolers and kindergarteners."

In 1977 Keogh had cautioned, "there is often little solid evidence to support use of the techniques and children may be identified as 'at risk' on the basis of fragmentary and selective test findings" (p. 267). Almost a decade later she asserted,

"Predicting the future in at best a risky enterprise. Predicting the future of something as ambiguous as learning disabilities (LD) is probably better described as foolish" (Keogh, 1986, p. 455).

Despite the conclusions of Adelman (1982) and Keogh (1977, 1986), some reviewers and investigators (e.g. Fletcher & Satz, 1982; Miller & Sprong, 1986; Reid & Hresko, 1981) have endorsed the practice with certain qualifications. One of these qualifications was limitation of the practice by excluding certain groups of children. Reid & Hresko (1981), for example, suggested that with preschool children it was too early to be certain that they were learning disabled and therefore inadvisable to apply this label. Beers & Beers (1980) had also advocated that identification of learning disabilities in preschoolers be discontinued. Fletcher & Satz warned against id ying children considered to be only mildly at risk for learning disability. Greenfield & Scott however (1986, p. 135) acknowledged the difficulty of identifying "children with subtle or specific cognitive deficiencies", but continued their efforts to develop a new approach to screening.

Several surveys in the field of learning disability have reflected declining optimism about the possibility of accurate identification, but continued emphasis on its importance. The 1975 survey of leaders in the LD field showed that 80 per cent of respondents believed that learning disability could be identified with assurance before the age of five, whereas only 45 per cent of the 1981 respondents held this view (Tucker, Stevens & Ysseldyke, 1983). A 1984 survey, aimed to highlight fundamental concerns facing the field (Adelman & Taylor, 1986, p. 426), again emphasized the importance of "preventing or at least identifying and correcting LD at an early age".

It appeared that the original goals of Early Identification, viz. assessment and prevention, were still considered important, but the optimism about achieving the first step towards prevention (i.e. accurate identification of at-risk children) was fading. The alternative of "at least identifying and correcting learning disability at an early age" suggested that confidence even in this regard was tenuous. Adelman (1982) cited the conclusion of Hobbs (1975, p. 94) that "mild and moderate problems (by far the largest number) ... are difficult to detect and assess even by well-trained professional people administering complete examinations with the

best equipment".

2.2.2.2 Effective Intervention

Reid & Hresko (1981), p. 144) re-emphasized that those who advocate the practice of Early Identification "do so in the hope of intervening successfully". They referred to Schaer & Crump's review (1976) of the results of a number of programmes attempting to intervene with young children suspected of having learning disabilities. They found that the results of these programmes had been inconclusive, being based on limited findings and making unsupported claims for improvement.

Whereas numerous studies had been carried out investigating and often endorsing the efficacy of Early Intervention programmes with preschool children, many of these studies had not been designed to follow up the progress of the individual child. Most reviews of the outcome of Early Identification of individuals have focused predominantly on problems of detection, dealing cursorily with the ultimate efficacy of decisions and subsequent intervention with those individual children who were detected.

2.3 INTEGRATION OF REVIEWERS' CONCERNS

There appeared to have been an overall dissatisfaction about accomplishments of Early Identification efforts and even some advocacy of abandonment of this practice. The general consensus however regarding the continuing need to provide valid and useful assessment data justifies further efforts in this regard. I will therefore present an integrated view of the concerns of the major reviewers of Early Identification to provide a cumulative perspective. From there I will examine the relevant theory and assessment research.

Two major concerns were about (a) accuracy of prediction and (b) educational relevance and utility of the assessed dimensions. The first issue concerned the accuracy with which individual children who might need assistance could be detected by the available measures. The second concerned the nature of these measures and their relevance for guiding instruction and education.

2.3.1 Predictive Accuracy

2.3.1.1 Possibility of Accurate Identification

Keogh (1973, 1977), who had written extensively on the practice of Early Identification, stressed that preschool and early kindergarten screening or Early Identification was essentially a

predictive activity. The *basic assumption*, she said, was that it was *possible* to identify accurately those children who really were actively "at risk" for future school failure. Keogh questioned this assumption, as did several others (e.g. Bears & Bears, 1980; Reid & Hresko, 1981).

Fundamental questions were raised concerning the existence of *differentiating* characteristics in the future learning disabled child, also about the availability and reliability of assessment measures for this age group. Bears & Bears (1980) queried whether the characteristics of the learning disabled child were known. Reid & *Hresko* (1981, p. 144) questioned the basic assumption that "identifiable observable criteria exist which can be used to differentiate the future learning disabled child from his peers" and that "there are suitable instruments which can be used to *test* and screen such children".

Lidz (1977) discussed the general issue of reliability in assessment of preschool children. She drew attention to the young child's intrinsic variability (Murphy, 1956) and the related finding that the occurrence of symptoms might *vary from* situation to situation (Flapan & Neubauer, 1970; Silverman, 1971). Doubts were expressed about whether relatively-enduring characteristics with trans-situational consistency could be assessed in this age group, an age group apparently characterized by *variability*. Adelman (1982, p. 257) referred to the *views* of Redican (1976, p. 29) suggesting, "*among* kindergarten children there are very few consistent and identifiable patterns of characteristics associated with future learning problems".

More recently, however, some optimism has been *expressed* about the possibility of identifying *psychoneurological* manifestations of *future disorders* (Hartlage & Telzrow, 1983, p. 525). Incorporating the findings of several investigators, these authors claimed, "It is now possible for neuropsychologists to make fairly accurate predictions at an early age about *which children* will develop neuropsychologically *based disorders*".

2.3.1.2 Consequences of Inaccuracy: Caution Advocated

Keogh & Becker (1973) expressed concern about possible short-term and long-term consequences of labelling. They *suggested* damaging or negative effects *such as* increased anxiety, "*self-fulfilling prophecy*" and possible generalization to affective

and motivational facets of development. In 1975 Hobbs warned professionals to be "extraordinarily cautious" in their *response* to the growing needs of schools and other agencies for early *assessment* tools. Concern about the potential hazards of labelling and classification has pervaded the literature on Early Identification (e.g. Fashbach et al., 1977; Gidz, *1977*; Mercer, Algozzine & Trifiletti, 1979; Miller & Sprong, *1986*; Reid & Hresko, 1981; Satz & Fletcher, 1979; Wilson & Reichmuth, 1985).

Mercer et al. *claimed* that the negative effects of the assignment of *inappropriate* disability labels to nonhandicapped children had been demonstrated in numerous studies. Reid & Hresko cited the *convincing* studies of Foster, Schmidt, and Sabatino (1976) *demonstrating* the negative effects of self-fulfilling prophecies. Wilson & Reichmuth (1985, p. 182) stressed that "students labelled as being at-risk may be subjected to inappropriate expectations by teachers and parents".

2.3.1.3 Evaluating Predictive Utility

Considering the potentially adverse consequences for individual children of detection, classification and selection *errors*, the issue of predictive utility has been highlighted and partially addressed. Increasingly stringent statistical criteria and formulae have been proposed to facilitate *systematic*, comprehensive, and communicable evaluation of detection accuracy and error (e.g. Meisels, 1984; Wilson & Reichmuth, 1985).

The consensus *was* that classificatory data, using the prediction-*performance* matrix, the most prevalent prediction model, was *essential for* evaluating the predictive utility of screening instruments and the incidence of misclassification. Mercer et al. (1979) stressed that it was important to apply this systematic approach to the evaluation of Early Identification studies in order to investigate whether the negative effects of a label outweighed the positive effects of intervention based on this practice. Satz & Fletcher (1979, p. 69) stressed the need to know the *instrument's* "usefulness in detecting those high-risk children *who would* most benefit from an early intervention program". They pointed out (1979, p. 65) that adequate evaluation of the predictive utility of an early detection device *was essential* "to prevent an increasing misuse and misinterpretation of prediction results that concern the high-risk child".

Reviewers lamented the fact that many instruments lacked evaluative data to address the fundamental issue of predictive efficacy and the consequences of error (Fletcher & Satz, 1984; Lindquist, 1982; Mercer et al., 1979; Meisels, 1984; Reid & Hresko, 1981; Satz & Fletcher, 1979; Wilson & Reichmuth, 1985). In 1979, Satz & Fletcher concluded that this issue was "virtually ignored" in early detection research. Several years later Meisels (1984) still maintained that the majority of screening tests failed to report classificational data. From his extensive review, Lichtenstein (1980, 1981, 1982), found that only two out of 51 studies provided such data. Mercer's review of more than 70 studies, revealed that only 15 had provided adequate data for classification.

The focus on overall hit rate, it was noted, without adequate attention given to the positive and negative predictive utility of the instruments, could be very misleading. After reanalysing data from a comparative longitudinal study reported by Feshbach, Adelman, & Fuller (1974), Satz & Fletcher (1979) pointed out that although the overall hit rates for both approaches were 73% and 77%, both approaches failed to detect over 70% of the high risk children. These authors illustrated that two approaches with similar hit rates could have very different utilities: In their own comparative study (1984), they found that despite overall hit rates of 71% and 86% for their two predictive approaches, teachers would have missed 87% of severe reading problems in Grade 2, whereas the tests would only have missed 34%. Findings from their earlier study (1982), analyzed in a 4 X 4 matrix, revealed a high overall hit rate (77%), and a high percentage of accuracy (85%) in identifying children in three of their four reading categories. However, prediction of the fourth category, mild risk, would have misclassified 51% of the children who would have become average - superior readers.

From his survey of those single instruments, test batteries, and teachers' perceptions which did provide adequate data for classification, Mercer (1979) concluded that an overall hit rate of 70% to 90% seemed to be representative of most early identification studies. Adelman, however, (1982, p.257), concluded that single tests had been "grossly inadequate", and that, "In general, the best psychometric and rating scale approaches have produced similar, modest results. That is, they accurately identify a mode rate percentage of problems, but also result in many false positive and

negative errors."

2.3.2 Educational Relevance and Utility

2.3.2.1 Need for Individual Educational Programmes

The second concern was about the educational relevance and utility of the assessment measures, instruments, and methods used for Early Identification. Keogh (1977) had expressed concern about the educational limitations of many of the screening instruments. She stressed the necessity for Early Identification programmes to provide information which could be used to plan "differential educational programs for particular children" (p. 273). She concluded that early identification efforts were wasteful and irrelevant if they only labelled or categorized and that, "the purpose of screening must be appropriate educational programs".

Hartlage & Telzrow (1983) stressed that it was generally accepted that individualization of instruction for children with special educational needs was appropriate and worthwhile. They noted that this belief had been incorporated into PL 94-142, in the Statute's requirement for Individual educational programmes.

2.3.2.2 Limitations in Reliability and Validity

Several authors warned that the reliability and validity of the screening measures were not adequate to support their use for diagnosis and remedial planning (Adelman, 1982; Fletcher & Satz, 1984; Reid & Hresko, 1981). These authors noted the frequent misuse of screening data to guide intervention and emphasized the distinction between data derived from screening and from diagnosis.

2.3.2.3 Consideration of Nature of the Guiding Measures

Reid & Hresko (1981) discussed the nature of the measures used and their relevance for guiding instruction. They distinguished between causal (or prerequisite) measures and maturational correlates such as perception. Emphasizing the importance of considering whether correlated behaviours "tap relevant abilities" (p. 137), they concluded that the use of correlational measures could not be justified as a basis for instruction.

2.4 INTEGRATION OF FUNDAMENTAL ISSUES

In a 1985 article, Wilson & Reichmuth have by implication integrated these two fundamental concerns. Their critical comments and focus highlighted the need for clear conceptualization throughout the planning and evaluation of screening programmes. Their discussion facilitated a clear focus on the purpose of Early

Identification and stressed the need to examine validity in terms of this purpose. The final focus of their article was seeking criteria to evaluate when the predictive accuracy of early-screening programmes could be regarded as sufficient.

They argued that "accuracy of prediction is of little value and cannot be considered sufficient unless the predictions lead to *better educational* opportunities for the students about whom they are made" (Wilson & Reichmuth, 1985, p. 182). They stressed the consequent *need to examine* prediction efforts in the context of decision strategies, elaborating (p. 187) that "the accuracy of the sorting process has to be *viewed* in the *context* of intervention decisions". Stressing that the purpose of most screening programmes was "to select certain students *for*, *what is hoped* to be, appropriate educational intervention" (p. 183), they concluded that it was "the selection and decision process" that *required* validation.

2.5 NEED FOR DECISION-RELEVANT DATA

Wilson & Reichmuth's exacting criteria ultimately evaluate predictive accuracy in terms of the conceptual quality of two basic decisions, the decision regarding whether or not educational intervention is required and, if required, the decision about the form of intervention that will provide better educational opportunities for the individual child. Issues of predictive accuracy and fundamental educational relevance and utility of the assessment measures become intrinsically linked.

The selection and decision process is based on screening and diagnostic measures. The focus on the selection and decision *process*, guided by these measures, emphasizes the need for these measures to have clear educational relevance for the individual child *interacting* with his *environment*.

The provision of assessment measures with adequate educational and psychological relevance *to guide* these fundamental decisions about intervention for individual children is even more challenging than those needed for the design *of an individual* instructional or educational programme. Measures guiding decisions about what might constitute appropriate educational intervention (*e.g. whether or not* the child requires special education, or which type of programme to choose) require a high degree of conceptual clarity.

Several authors have discussed the problem of intervention

decisions for groups of children with diagnostic ambiguity or uncertainty (e.g. Bernheimer & Keogh, 1986; Meisels, 1984; Reid & Hresko, 1981). Bernheimer & Keogh (p. 79) drew attention to the dilemma of parents, when confronted with diagnostic uncertainty in their preschool children, in choosing from "a wide range of choices between programs differing in goals, emphases, and instructional modes".

Reid & Hresko (1981, p. 144) discussed the issue of special education placement for preschool children who were considered learning disabled and suggested that in this age group it was "often too soon to differentiate the child's primary problems and therefore be certain into which category to place him (e.g., is he emotionally disturbed or learning disabled?)".

This finding led them to speculate that the high-risk preschool child might benefit more "if he were offered a flexible, varied and challenging program early in life: a program in which he could learn and explore under the guidance of an experienced teacher" (Schaer & Crump, 1976, p. 94). Reid & Hresko (1981, p. 146) considered that such a programme with the potential to assist children in assuming "an active role in their own learning", might be of particular benefit to a child who may later become learning disabled.

Their discussion drew attention to the polarized educational options for mildly-handicapped preschoolers, very highly structured and specific programmes versus those that were "flexible" and "varied". Consideration of these polarized options for children with diagnostic ambiguity emphasized the potential difficulty of intervention decisions. It also underlined the need to derive data with fundamental educational relevance, data with the power to guide difficult intervention decisions concerning what might provide "better educational opportunities" (Wilson & Reichmuth, 1985, p.182) for a particular child.

Thus the quality of assessment data for the selection and decision process regarding a group of children with subtle or ambiguous handicaps, such as those assumed to be at risk for learning disability, is particularly challenging.

2.6 ANALYTIC REVIEW OF EARLY IDENTIFICATION RESEARCH

I carried out a survey of existing theories and research in order to view the ways in which Early Identification has been attempted and its efficacy evaluated. This analytic survey was

undertaken in order to examine the possible reasons for the limited accomplishments and to consider a more productive and relevant approach. Identification research was evaluated in terms of its potential to provide decision-relevant measures. In the next chapter I shall examine the cohesiveness between the purpose of Early Identification and the studies designed to evaluate its efficacy.

2.7 THE ACTIVE ROLE OF THE LEARNER

Ironically, in the search for ways to identify children who needed special educational help, crucial theories on learning and development were overlooked. The child's intrinsic motivation in cognitive development was largely disregarded. A striking anomaly was the influence of Hunt's concept of experience and intelligence on the burgeoning practice of Early Intervention and Identification, and the virtual disregard of this concept in assessment endeavours. It would seem that Hunt's views had inspired the optimism about the potential of environmental intervention: they had not however guided the search for the "learning disabled" child.

3 COHESIVENESS IN THE LEARNING DISABILITY FIELD

Prevailing theories and identification research did not enhance understanding *of the prerequisites for* learning nor of the characteristics of the learning disabled child. Neither did they provide an *adequate focus* on the child's active role in learning. They seemed therefore to be intrinsically inadequate for guiding *intervention* decisions appropriately. In this chapter, I shall examine the prevailing theories and identification research in the Learning Disability field in the light of the fundamental purpose of Early Identification and suggest possible reasons for this failure.

3.1 FUNDAMENTAL PURPOSE

In the previous chapter, I discussed the fundamental purpose of Early Identification as the selection, for appropriate intervention, of individual children at risk for learning disability. To serve this purpose, the primary decisions that were needed were: (a) whether or not a particular child required educational intervention and (b) if required, what form of intervention would provide better educational opportunities for this child.

3.1.1 Decision-Relevant Data for Primary Decisions

To this purpose, I suggested that *data with adequate* educational relevance for the individual child were necessary to guide these fundamental *decisions*. *I used the* term decision-relevant data to represent conceptually-based assessment data with the potential to guide *consideration* of basic educational intervention decisions for individual children.

It would seem that decision-relevant data should provide a theoretically-based view of dimensions with a logical relevance for scholastic achievement and classroom adjustment. The central importance of adaptability has been increasingly recognized (Sabotino & Miller, 1980; Skuy, Shmukler & Clarke, 1984; Skuy, Shmukler & Westaway, 1985; Torgesen, 1986; Weller, Strawser & Buchanan, 1985).

I proposed therefore that the theoretically-based view should include not only the child's manifest level and *mode* of cognitive functioning, but also his unique style of adapting to *instructional*

requirements in a relevant learning environment. This view should show how the child functions in a relevant environment and suggest how his current functioning is likely to influence subsequent achievement and adjustment. It should enable consideration of why he functions in this way. Such a view should facilitate deliberation about if and how he needs to be helped.

I proposed that selected theories should facilitate consideration of all major possible causes of manifest cognitive and adaptive deficits (neurological, developmental, experiential and motivational) and their consequences for learning.

3.2 PREVAILING THEORIES IN THE LEARNING DISABILITY (LD) FIELD

I shall first present Torgesen's ideas (1986) on the underlying conceptualization in the field of learning disabilities in order to view the potential of the prevailing theories to guide the development of decision-relevant data.

The 1984 survey of the LD field revealed that "the most fundamental concern expressed was that the field does not draw adequately on theoretical advances in disciplines relevant to understanding learning, learning problems, and their correction" (Adelman & Taylor, 1986, p. 424). Torgesen (1986), who was asked to respond to this concern, provided the following exposition.

He described two fundamental assumptions defining the field of learning disabilities and guiding the associated research (p. 399):

> One of the most fundamental assumptions of our field is that learning disabilities are caused by limitations or deficiencies in basic psychological processes that are not adequately measured by standard intelligence tests, but that are required to successfully perform academic tasks. A second broad assumption is that these cognitive limitations are caused by naturally occurring variation in the neurological substrate that supports all intellectual activity, or by damage to this substrate caused by accident or disease.

These assumptions, he asserted, had guided "an enormous volume of research that has sought to identify the specific cognitive limitations and neurological problems that are characteristic of learning disabled children" (p. 399). They had also guided efforts to devise remedial programmes using information about children's processing deficits.

Current criticism of these fundamental assumptions, according to

Torgesen, was (a) that they had not led to "clear benefits in the treatment of a well defined and easily identifiable subgroup of underachievers" and (b) that they had not led to "*the creation* of any theories that successfully link *specific processing* disabilities to academic *failure and then* provide a useful framework from which to develop effective remedial strategies" (p. 400).

The history of the L.D. field, Torgesen stated, had shown "the repeated failure of neuropsychological or cognitive *processing* theories to provide explanations of *learning disabilities* that offer power either to make *accurate prognostic* statements or to program *effective instruction*" (p. 400). His view, however, was that the relevant scientific paradigms had not yet been given a fair test as they had only recently developed "a cohesive set of assumptions and useful methodologies" to enable theories and *procedures* to be created and tested. He *concluded therefore* that there was reason for optimism *about future possibilities*.

Torgesen said that the research and theory in the LD field, derived from two of the three prevailing scientific paradigms (neuropsychological and information processing), *focused* on different aspects of these fundamental *assumptions*. Both paradigms, he noted, assumed that "*learning* performance is the result of an *interaction* between instructional conditions and a child's particular learning style or abilities" (p. 404). The neuropsychological paradigm, he explained, "attempts to understand intellectual behaviour in terms of the *specific brain systems* that support it"; information *processing* theories focus on "how information *is represented* and manipulated in the mind" (p. 401).

He elaborated (p. 403) that information processing theory was particularly weak in explaining behaviour change, as researchers have concentrated on "providing descriptions of how *a given task* is accomplished at a specific *skill level* and have paid much less attention to *methods for increasing* skills levels". He concluded that there were no comprehensive theories in the field with the potential to "explain the relationships between processing deficits, academic failure, and treatment outcomes" (p. 403).

Torgesen referred to several *specific conceptual* advances arising from research in the *information* processing paradigm, viz the verbal deficit theory (Vellutino, 1979) and the concept of a "mal-adaptive" learning style in LD children. This mal-adaptive

style had been frequently documented, he said, but the *reasons* not yet understood (Torgesen & Licht, 1984).

Torgesen advocated that researchers explore theories about LD children that focus on *aspects* other than their primary academic and intellectual *deficits*. He endorsed statements (Adelman & Taylor, 1983; Licht, 1983) about the need for a more complete theoretical view of children's attitudes and motivation.

3.3 POTENTIAL OF PREVAILING THEORIES TO GUIDE DECISIONS

Torgesen had referred to the assumption that "learning performance is the result of an interaction *between* instructional conditions and a child's particular *learning* style or abilities" (p. 404). It seemed that the prevailing theories and paradigms were adequate for explaining the interaction between the child and his instructional environment in terms of brain function; and adequate for describing this interaction in terms of mental representation and manipulation. However, the existing theories did not appear to be adequate for explaining this interaction in *terms of its causes* and consequences.

Prevailing theories *did not facilitate* a focus on the immediate volitional *cause of* this interacti (viz. effort mobilized by a *motivated* child). Nor did they enable a view of past causes which had influenced the development of the child's current level and mode of cognitive functioning, and the development and maintenance of his particular learning style. Furthermore, none of the prevailing theories explained the effects of this *interaction on* achievement and classroom adjustment or suggested how the interaction could be improved. Without *theoretically*-guided consideration of these additional factors (causes and consequences of this interaction leading to a strategy for improvement), it would be difficult to decide about intervention.

An anomaly in the LD field appeared to have been the neglect of motivational theories despite the fact that both psychoneurological theory (Luria, 1973) and information processing theory (Merluzzi, Rudy, & Glass, 1981, cited by Torgesen, 1986) recognized and acknowledged the child's active constructive role in seeking and using information. The absence of a motivational perspective precluded understanding of why the child interacted with instructional conditions in a particular way and how this interaction could be enhanced. This omission, in my view, seriously

limited the potential of the prevailing theories to generate decision-relevant data for considering the need and direction of intervention or further diagnostic assessment. This there seemed to be a lack of cohesiveness between the prevailing theories and theories required to serve the fundamental purpose of Early Identification.

3.4 SPECULATION ABOUT THEORETICAL LIMITATIONS

Torgesen (1986) and others (e.g. Deci & Chandler, 1986; Keogh, 1986) have referred to the theoretical confusion and limitations throughout the field of learning disability. One of several reasons for the confusion. Torgesen suggested, (p. 405) was "that it experienced its greatest growth as a political-social entity rather than as an area of scientific enquiry". Sabotine & Miller (1980, p. 77) had also noted the adverse influence on the field of "the professional's service motivations, rather than science motivations: i.e. "an intense desire to assist handicapped individuals".

The anomaly of recognizing the child as an active organism (implicit in both psychoneurological and information processing theory) and generally disregarding this perspective throughout the learning disability field (Deci & Chandler, 1986) appeared to have significant philosophical implications. These implications were perhaps again a manifestation of excessive service motivations.

Despite a growing body of research in several related fields emphasizing the child's essentially active role in selecting, perceiving, thinking, evaluating and structuring the environment (e.g. Atkinson & Raynor, 1978; Luria, 1973; Wittrock & Lumsdaine, 1977), the child's active role had been largely ignored in the field of Learning Disability and the associated Early Identification studies. The focus in Early Identification had been predominantly on the active role of the educators rather than the active role, resources or potential resources of the child functioning in a learning situation.

3.5 FUNDAMENTAL PURPOSE AND ASSESSMENT RESEARCH

Predictive studies associated with Early Identification will be viewed in terms of their potential to generate decision-relevant data in order to serve the fundamental purpose of this practice, viz. the selection of individual learning disabled children for appropriate intervention.

I shall examine the major methods of assessment and facets

selected for screening or diagnosis, in terms of this potential. I shall also examine the design of the associated predictive studies in these terms. Psychometric tests and teachers' rating scales were the main methods used in Early Identification, psychometric assessment being the more usual approach (Mercer et al, 1979; *Greenfield & Scott, 1986*).

3.6 COHESIVENESS: PREVAILING THEORIES AND ASSESSMENT REQUIREMENTS

In addition to theoretical insufficiency in the field, a further problem was the *lack of cohesiveness between existing* theories and assessment practices. The major reason for this was the unavailability of assessment tools with the power to measure the hypothesized constructs (Torgesen, 1986).

Torgesen reported (p. 400) that although the federal regulation (Federal Register, Dec. 29, 1977) defined learning disabilities "in terms of the deficient processes that underlie poor learning performance", there was "no requirement to assess cognitive processes in the operational procedures for diagnosing a learning disability". He suggested that these procedures had not been included "simply because there were no well established, widely accepted methods available to measure the psychological processes involved in learning" (p. 400).

As noted in the previous chapter, PL 94-142 had allowed, for the *detection* of preschool learning disabled children, "a diagnosis based on abilities thought to be correlated with school performance" (Reid & Hresko, 1981, p. 133). This provided considerable latitude for *identification efforts* and contributed to theoretical confusion in the field.

3.7 PSYCHOMETRIC TRENDS

3.7.1 Atheoretical Selection of *Facets*

Many Early Identification efforts appeared from the published research to be atheoretical, guided merely by the need to find an adequate assortment of facets through which *sufficient predictive* accuracy could be attained. Most facets selected were those that were "thought to be correlated" with school performance (Reid & Hresko, 1981). Efforts were directed mainly towards maximizing predictive accuracy rather than enhancing understanding.

An early evaluation of thirty-one single variables used to identify at risk children led to the conclusion (subsequently

endorsed by Adelman, 1982; Keogh & Becker, 1973; Wallace & Larsen, 1978) that *single* variables had very little validity when used alone as predictors of learning problems. The limited utility of individual screening measures for accurate identification led to the search for a *combination* of variables through which increased predictive validity was achieved.

Wallace & Larsen (1978) referred to the preliminary work of de Hirsch, Jansky & Langford (1966), in *developing a* predictive Index of reading failure, as the first comprehensive effort of individual screening of young children with learning difficulties. They reported that a brief battery (Jansky & de Hirsch, 1972), *selected* on the *basis of* predictive validity, emerged from a two-year study and became the best known predictive index based upon a combination of variables. This Screening Index was, according to Wallace & Larsen, characterized *by a* combination of acquired knowledge and current skills (visual-perceptual-motor, language, and memory).

Other screening batteries were selected through longitudinal studies on the basis of optimal predictive utility (*e.g.* Fletcher & Satz, 1982; Stevenson et al., 1976a; Stevenson & Newman, 1986). Again, a combination of visual-perceptual-motor skills and acquired knowledge characterized the brief screening battery used *by Fletcher* & Satz.

Optimal predictors (optimal in terms of predictive utility) were derived from a large battery of measures of prereading and prearithmetic skills, *perceptual-motor skills*, and simple and complex forms of learning and memory (Stevenson et al., 1976a). The authors concluded (p. 398) that "later performance depended not only on accomplishments of the child before *entering school* but also upon *the child's* learning and memory abilities". They acknowledged however that an understanding of the relative utility of the various measures was difficult to attain.

3.7.2 *Consideration of* the Nature of the Variables

Meisels (1984) distinguished between the nature of variables used in school-readiness tests and in developmental screening tests. He concluded that they *sampled different*, although partially overlapping behaviour. He suggested (p. 294) that school-readiness tests tended to focus on skill acquisition ("current skill achievement and performance") and that *developmental* screening *focused* on the ability to acquire skills, generally including

cognitive, language and sensorimotor functions.

3.7.2.1 Focus on Underlying Biological *Factors*

The use of developmental tests (focus on biological factors) *appeared to* show the influence of the fundamental assumptions guiding the field of learning disability (Torgesen, 1986). Many identification efforts were obviously guided by the *prevailing* theories in the field, focusing on *manifestations* of possible neurological *weaknesses* or deficits in specific areas (e.g. Bender Visual-Motor Gestalt Test [Bender, 1938; Koppitz, 1964] and the Frostig Developmental Tests [Frostig, Lefever & Whittlesey, 1964]).

An early atypical but highly praised test (Wallace & *Larsen*, 1978) was the Meeting Street *School Screening* Test (MSSST), a brief *individual screening* test guided by a comprehensive psychoneurological model of information processing (Hainsworth & Siqueland, 1969). In their design, the authors utilized the 1969 definition of a child with learning disabilities *presented* by the Council for Exceptional *Children*.

They focused on the specific deficits in perceptual, integrative or expressive processes which severely impair learning ability, viewed through the construct of psychoneurological efficiency. The MSSST, guided by a systematic developmental *neurological* approach, was designed to *determine* how effective a child is in processing *information* through the major modalities (gross-motor, visual-perceptual-motor, and language). The concept of general processing efficiency was emphasized. Although many of the *tasks of* the MSSST were similar to other *screening measures* involving visual, perceptual, motor, *memory*, auditory, and language abilities, the skills measured by the MSSST were viewed as reflecting processing efficiency.

Although neuropsychological test batteries *have* not traditionally been used in *Early Identification*, recent research has *shown their* value in the LD field (Obrzut & Hynd, 1983) and there is considerable current interest in their diagnostic and remedial potential. An important recent advance in psychometric diagnostic assessment was an individually-administered *measure of intelligence*, the Kaufman Assessment *Battery for* Children (K-ABC) (Kaufman & *Kaufman*, 1986), based on theories researched by neuropsychologists and cognitive psychologists (Das, Kirby & Jarman, 1979; Das, Leong & Williams, 1978; Luria, 1973). This test was intended *for many*

purposes, including psychoeducational evaluation of learning disabled children, educational planning, and placement.

The Mental Processing Scales of the K-ABC have been devised and investigated from a neuropsychological perspective with a focus on the sequential-simultaneous processing dichotomy (Gooley & Ayres, 1985; Kamphaus & Kaufman, 1986). The test designers aimed to detect the child's most efficient processing style in order to guide remedial efforts. There has also been interest in the possibility of differential diagnosis of subtypes of developmental dyslexia by means of these scales.

3.7.2.2 Focus on Acquired Skills with Direct Academic Relevance

There was a growing concern with providing data, not only with efficacy for detecting individuals in need of intervention, but also for guiding individual educational programmes (Hartlage & Telzrow, 1983; Keogh, 1[illegible]id & Hresko, 1981). This led to interest in the nature of the screening measures and their relevance for guiding individual instruction. Reid & Hresko (1981) were concerned about the instructional relevance of the screening measures and distinguished between indirect and direct screening tests.

3.7.3 Summary

In sum, a large number of psychometric efforts had focused predominantly on identification of at-risk children without a clear focus on the nature of the measures utilized. Screening batteries with an assortment of measures were devised to maximize prediction, optimal screening batteries being derived from longitudinal studies on the basis of predictive validity or utility.

There was some consideration of the nature of the facets stimulated by those who aimed to separate skill acquisition from the ability to acquire skills. There was also some concern about the relevance of assessment data for guiding instruction. Efforts guided by the prevailing theoretical assumptions in the field measured cognitive skills and abilities, viewed as a reflection of neurologically-based processing.

3.7.4 Evaluation in terms of Decision-Relevant Data

3.7.4.1 Requirements of Decision-Relevant Data

In examining the relevance of measures derived from these studies, I have posed the following question: Do the assessment measures facilitate understanding of a particular child by providing

an adequate theoretically-based view of prerequisites with a *logical* relevance for learning in a classroom situation? I selected two major spheres of *functioning* for consideration, cognitive and *adaptive*. I proposed that logical prerequisites for learning should be adequate cognitive processing and an adequate style of adapting to instructional conditions in a relevant learning *environment*.

The specific questions *were*: (a) Do these measures provide an adequate *view of* the child's cognitive processing skills? and (b) Do they show his unique style of adapting to instructional requirements in a relevant situation, i.e. his style of interacting, learning and performing? Furthermore, can these *manifestations* (a) and (b) be explained by selected *theories* suggesting differential underlying *causes or combinations* of causes in terms of neurology, development, experience and motivation? Finally, do selected theories also suggest how these manifestations influence subsequent achievement and classroom adjustment, and how inadequate functioning may be improved?

3.7.4.2 Meeting These Requirements

The use of traditional psychometric testing was said to have been unsuccessful in promoting a view of the child's active functioning (cognitive processes and adaptive style within a relevant *situation*. As Torgesen (1986, p. 407) pointed out, "There were no well-established, widely accepted methods available to *measure* the psychological processes involved in learning." Direct measures of the essential underlying psychological processes could not be provided.

Few *studies* provided an alternative indirect view, based on hypothetical constructs. Most psychometric efforts measured the products of prior learning (acquired knowledge) or the products of current cognitive processing (performance *on* brief cognitive, linguistic, visual-*perceptual*-motor, memory, and learning tasks). *These* products were not generally viewed from theoretical perspectives and thus consideration of the determinants and effects of these manifestations was not facilitated.

A few exceptional tests, however (e.g. MSSST and K-ABC), did provide *theoretically*-based data, facilitating a view of cognitive processing from a psychoneurological perspective. This perspective however did not enable clear consideration of other dynamic factors of the individual child (such as motivation or adaptive *style*) with

the potential to influence his test performance and future cognitive processing in a relevant *learning situation*. If the child showed deficiencies or inadequacies in cognitive processing, theoretically-based consideration of all possible major *causes* or combinations of causes, necessary for aiding intervention decisions, had not been facilitated. These tests provided meaningful data with *potential* relevance for decisions, but this data was not adequately viewed through a comprehensive dynamic theory of behaviour.

Most *psychometric efforts* failed therefore to serve the fundamental purpose of Early Identification. They failed to generate data with adequate *relevance for considering* primary intervention decisions or for guiding the direction of further diagnostic assessment.

3.7.5 Possible Reasons for These Limitations

3.7.5.1 Purpose and Design of Predictive Studies

Reviewing these trends in Early Identification in the light of the goals of assessment and prevention and the disappointing outcome, it seemed that *professional* zeal to meet the practical need of finding accurate pointers of future school problems was often counterproductive.

The fundamental purpose of Early Identification was the selection of individuals for appropriate intervention; the actual purpose of many of these psychometric efforts appeared to have been solely detection of children believed to be at risk for learning *disability*. Little thought was given to how the facets utilized would guide consideration of appropriate intervention decisions.

The concern with predictive *accuracy* predominated and the associated predictive studies were accordingly designed to investigate only the predictive efficacy of measures *utilized*. They were not designed to enhance theoretical understanding by investigating the nature of the theoretical constructs.

It is suggested that most of these investigations failed to generate decision-relevant data as they did not investigate the nature and *fundamental* educational relevance of the facets selected to predict achievement. Instead they focused predominantly on adequate predictive accuracy to detect *children* or to identify maturational correlates or component skills of reading, considered relevant for instruction.

Predictive studies can be designed (a) to enhance the

theoretical understanding of selected outcomes or criteria (Kerlinger & Pedhazur, 1973) and/or (b) to find ways of achieving maximum predictability of these criteria. The focus on one or the other as the predominant reason will have a marked influence on the choice of predictors and the type of relationship there will be between predictor and criterion.

The question as to whether predictors are chosen to investigate or provide an understanding of their functional relationship with the criteria, or merely on the basis of conceptual proximity to the criteria appears to be critical. The purpose of the predictive study is therefore of prime importance in determining which facets will be selected for assessment and outcome.

In the period under review, it appeared that the practical purpose of accurate identification (i.e. achieving maximum predictability) guided the selection and validation of most of the early facets chosen for assessment, with very little thought of how these measures would in turn provide the means (i.e. appropriate understanding) for guiding intervention decisions.

By focusing mainly on products rather than on active processes with a functional relationship to achievement, it was only possible to view the child's manifest level of skill or knowledge. The opportunity was generally not afforded to examine (by means of theoretically-based predictive studies) the dynamic factors or processes which had promoted or interfered with this attainment. Without an understanding of these prerequisite processes, it would be difficult to guide decisions about appropriate intervention.

There seared therefore to have been a basic flaw in the design of these early psychometric studies if they were intended to serve the combined goals of assessment and prevention.

3.7.5.2 Selection of Criteria

The first limitation imposed on most of these studies was the selection of exclusively academic criteria, mainly reading achievement, as the yardstick of success at school. The use of achievement tests as the sole measure of educational outcomes proved to be very limiting and restrictive. In evaluating school success or failure, no consideration was given to the child's active functioning, application and adjustment within the school situation.

In posing questions for evaluating decision-relevant data, I asked whether theories suggested how the facets selected as

predictors influenced subsequent achievement and classroom adjustment. This question could not be answered fully as most predictive studies did not include criteria of classroom adjustment.

3.7.5.3 Selection of Screening Measures

With a few exceptions, facets selected to predict these academic criteria were likewise barren, static and limited in terms of their potential for promoting conceptual growth. Theoretical findings in the fields of child development and education were virtually ignored in the search for predictors.

Reid & Hresko (1981) stressed the need to consider "what content is sampled and how relevant and representative it is". They suggested (p. 133) that "the problems identified in the screening procedure must be critical to successful school performance" and that "the behaviors sampled by the screening instrument must be representative of the total activity".

Prevailing theories in the learning disability field stressed interaction between the child and instructional conditions. The traditional use of psychometric assessment failed to provide a view of this interaction. Although many of these tests were carried out in a classroom situation, interaction was not a focus of psychometric assessment.

Psychometric screening and diagnostic efforts focused almost exclusively on the assessment of acquired knowledge, cognitive, language and visuel-perceptual-motor skills and sub-skills, as well as component reading skills. Progress from the use of single variables to a combination of psychometric variables had merely broadened the range of similar dimensions; it had not promoted understanding of other factors "critical to successful school performance". Furthermore, the nature of the relationship between predictors and criteria was not investigated.

3.7.5.4 Philosophical Focus

Ironically, the urgent need to identify individuals about whom important decisions were to be made was pursued almost exclusively by a focus on manifest skills or acquired knowledge with an almost total disregard of the active, motivated, self-regulating and feeling individual child.

Similarly, the criteria chosen to indicate successful achievement ignored the facet of the child's feelings and adjustment within the classroom situation. Professionals seemed to be

preoccupied with their potential role as saviours or facilitators (possibly through excessive service motivations) with no regard for the child's own potential resources for active learning or for effecting change.

3.7.5.5 Traditional Limitations of Psychometric Testing

Lidz (1983, p. 69) maintained that "psychology's historical concern with individual differences has never been adequately represented by the psychometric tradition of static, normative testing". Keogh & Becker's earlier criticism of this method (1973) suggested that identification based on standardized quantified test instruments screened out important evaluative information such as classroom behavior, task approach and application.

3.8 SUPPLEMENTARY OBSERVATION

Hainsworth & Siqueland (1969) stressed the value of observation of the child's behaviour as a supplement to scores derived from psychometric tests. They used a behaviour rating scale and clinical observation as part of their diagnostic evaluation, considering that this added a new and useful dimension to traditional evaluation. This approach afforded a potential change in the philosophical focus by providing a view of the child's active functioning and some of the unique behavioural factors influencing his cognitive functioning in a testing environment. The use of appropriate theories could enhance consideration of this behaviour.

3.9 TEACHERS' RATING SCALES

3.9.1 Observation of Behaviour in the Classroom Situation

There was increasing reaction against the major use of the static assessment paradigm with its generally exclusive focus on cognitive products. The recognition of observational potential gained momentum during the seventies. The parallel trend in Early Identification, which had slowly developed alongside the favoured use of psychometric test procedures, was the use of observation to assess the child's behaviour in the classroom situation. Behavioural manifestations were regarded as relevant for learning and achievement. Keogh & Becker (1973) stressed the potential value of identifying functional aspects of children's performance which might serve as the basis for instruction.

Attempts to focus on dynamic behavioural facets considered to be more relevant for educational intervention led to increased enthusiasm about using observational techniques in relevant

situations. Many proponents of this view advocated more *meaningful* and relevant assessment of children *by the teachers* who worked with them in the *classroom* situation (Abbott & Crane, 1977; Feshbach et al., 1977; Goodman & Hammill, 1975; Stevenson, Parker, & Wilkinson, 1976b; Wallace & Larsen, 1978). They considered that the major concerns about lack of educational relevance of *measures* used in Early Identification could *be addressed* in this way (e.g. Goodman & Hammill 1975; Wallace & Larsen, 1978).

3.9.2 Teachers' Potential to Recognise Relevant Behaviours

Several of the investigators stressed the importance, not only of the techniques of observation and the *inclusion of* the classroom situation, but *also of* the particular potential of teachers to *recognize* relevant abilities, behaviours, and problems. Goodman & Hammill (1975) expressed strong views in this regard, stating that teachers were more aware than any other professional group *of the* characteristics, skills, and behaviours that facilitate school success.

3.9.3 Facets Assessed

Teachers' rating scales used in Early Identification varied according to the rationale for the selection of the *behavioural* facets.

3.9.3.1 Identifying Dimensions for Direct Intervention

The scales that emerged as a direct outgrowth of the concern about educational relevance of the assessment data focused largely on providing data for direct use in *instruction or* remedial intervention. The *items of several* of the scales were the product *of teachers'* views and judgements of manifestations that they considered relevant to learning (Goodman & Hammill, 1975; Stevenson et al, 1976b).

Scales devised in this way were *in the* main characterized by comprehensiveness *rather* than clarity of conceptual focus, although *some* dimensions with theoretical significance did emerge. The view was broadened to include a wide spectrum of "relevant characteristics": cognitive abilities, functional *task-related* aspects (such as general *classroom skills*) and personal-social behaviour. Through factor analysis, the focus on a few core functional constructs emerged along with specific cognitive skills or broad-based general behavioural characteristics. "Relevant" skills and behaviours were identified in a relevant situation, for

teaching, training, or modification.

3.9.3.2 Identifying Dimensions with Some Theoretical Basis

The Student Rating Scale (Feshbach et al., 1977), for example, was based on a model presuming that the deficits a child displayed were a joint function of predispositional and situational variables. The use of this model appeared to have facilitated, in addition to the usual dimensions (cognitive, language, and perceptual), the identification of a relevant and relatively stable personal functional characteristic, Attention and Behavioural Control. This dimension has been regarded by many researchers and educationalists as a "prerequisite" for learning (Draeger, Prior & Sanson, 1986; Hallahan & Kaufma, 1983; Kagan & Kagan, 1970; Luria, 1973; McKinney & Feagans, 1983; Rohwer, 1970; Ross, 1976, 1981; Shaywitz, Schnell, & Shaywitz, 1986; Sheldon White, 1965). In this scale, however, Attention and Behavioural Control had not emerged clearly as a prerequisite skill, but merely as one of five relevant dimensions.

Another important and influential scale, The Pupil Rating Scale (PRS), specifically developed to identify children with learning disability, used the guiding construct of psychoneurological inefficiency (Myklebust, 1971). It was the outgrowth of large-scale screening project for learning disabilities [illegible] been considered influential in focusing attention on sub-learning disability. Each behavioural item was "clearly defined and clarified" (Wallace & Larsen, 1978), and the five behavioural areas, Auditory Comprehension, Spoken Language, Orientation, Motor-Coordination, and Personal-Social behaviour, were all found to be related to "success in learning" (Myklebust, 1971).

Although the focus in development of this scale had been screening for learning disability, the inclusion of detailed manifestations of information-processing efficiency (in four of the five dimensions) enabled specific areas of deficit functioning to be identified. This provided clearly defined target behaviours for intervention.

In contrast, the Personal-Social Behaviour subsection of this Scale was broad-based, incorporating work habits, social interaction, personal responsibility, and adaptation to new situations. Clear targets could not be as readily identified in these broad spheres of functioning.

3.9.4 *Expanded Scope of Assessment*

The scope of assessment had been significantly expanded to incorporate not only *cognitive skills and abilities* manifest in the relevant classroom situation, but also adaptive aspects, such as classroom skills and personal-social behaviour.

3.9.4.1 Task-Related Behaviour

The importance of task-related behaviour for *prediction of* achievement was confirmed through the studies. Classroom skills, (dynamic functional aspects such as "working hard", "paying attention" [Stevenson et al., 1976b] and Task Orientation, [Schaefer, 1970]) had been included in most of the major scales, allowing a focus on orientation, application, and work habits to emerge. Several studies (Flook & Veltcer, 1977; Kohn & Rosman, 1973a; Landsberger, 1981) yielded predictive findings which demonstrated the importance of these constructs. In Landsberger's *study*, for example, using the Schaefer-Aaronson Classroom Behaviour Inventory, it was found that Task Orientation had the strongest and *most consistent* relationship to achievement.

3.9.4.2 Personal-Social Dimensions: Expanded Criteria

In *addition, the inclusion* of Personal-Social facets in most of the scales reflected recognition of the influence of these personality facets and *provided a view* of the child as a person. These facets, however, were either very limited or very broad, general, and not well defined.

The availability of the Personal-Social Behaviour Dimension of the Myklebust Scale gave rise to an important *development*. This was the focus on 'socio-emotional functioning' not only as a predictor of achievement, but also as a criterion of success (Skuy, *Shmukler* & Clarke, 1984; Skuy, Shmukler & Westaway, 1985).

3.9.4.3 Summary

In sum, a wider range of facets was assessed through teachers' rating scales used in Early Identification studies. The use of factor analysis enabled meaningful dimensions to be viewed. These included acquired knowledge, cognitive abilities, manifestations of information-processing in the basic modalities, classroom skills, and personal-social dimensions. Many of the component items had *been derived* from teachers' or clinicians' views and experience, occasionally enhanced by means of a theoretical framework. There was *consequently some* variation in the conceptual clarity and focus

of the dimensions which were obtained.

3.9.5 Evaluation in terms of Decision-Relevant Data

Most of the teachers' rating scales used for Early Identification endeavours did not appear to have gone far enough in promoting understanding of the child's functioning in this situation in order to guide consideration of the primary educational intervention decisions or the direction of further assessment.

In addition to cognitive functioning, affective aspects (task-related skills) and personal-social dimensions had been included in the scales and emerged as relevant for subsequent achievement. There was, however, little theoretical focus on the *unique factors within the child which influenced these behavioural facets*. Neither was a theoretical focus provided on the nature of the relationship between these aspects and subsequent achievement. For example, although adaptive task-related facets (affective "interaction with instructional conditions" [Torgesen, 1986]) had emerged as important for subsequent achievement, these manifestations were generally not viewed from a theoretical perspective as products of the integrated functioning of a motivated child.

The use of teachers' rating scales for Early Identification appeared to have been largely successful in encompassing behaviours with greater potential relevance to learning in a classroom situation (viz. cognitive and adaptive functioning in a relevant environment). It seemed to have even been partially successful in pinpointing and isolating some specific targets for instruction, training or "modification" (Goodman & Hammill, 1975; Hresko & Brown, 1984). With a few exceptions (e.g. Myklebust, 1971), it appeared to have been largely unsuccessful in promoting understanding of why the child might be manifesting deficient functioning or inappropriate behaviour, or how intervention should be planned.

In general, the child's perspective had not been considered and the "active, constructive role of the learner" (Wittrock & Lumsdaine, 1977, p. 449) still not highlighted. A focus on the child's adaptive resources and personality facets, particularly affect and affective motivation, had not been facilitated. It appeared in general that behaviours considered "relevant" had become more accessible to the teachers, but not necessarily more meaningful.

In terms of identifying targets for intervention, the expressed goal of several investigators (*Goodman & Hammill*, 1975; Keogh, 1977; Stevenson et al, 1976a, 1976b), this trend appeared to have been partially successful. In terms of broader educational goals (Lidz, 1977), the advances appeared to have been most inadequate. In terms of the provision of decision-relevant data, aspects with greater potential relevance to *learning* had been included in these scales, but adequate theoretically-based perspectives had not been provided. In particular, theories were not provided from the child's perspective, reflecting his active role in learning. These omissions hindered deliberation about the possible determinants and *implications of the child's classroom* behaviour.

3.9.6 Possible Reasons for Limitations

3.9.6.1 Design in Terms of Purpose

Most of the rating scales were devised to identify children who needed intervention by identifying manifestations considered to be *of greater* "educational relevance" than psychometric measures. The purpose however was still largely practical, i.e. identifying children by means of these "relevant" facets which could then form targets for intervention (instruction or behaviour change).

Generally, the aim had been to identify rather then to understand these manifestations in terms of their determinants and their consequences. As a result, the rating scales may have measured manifestations associated with achievement, but not necessarily the determinants of achievement.

Adequate conceptualization of the measures had generally not been provided. The purpose had been mainly identification of children in terms of relevant educational targets, rather than understanding the unique factors within the individual child which might interfere with his learning. *Consequently, most* of the assessment measures derived were still not adequate for guiding appropriate educational intervention decisions for individual children, or for guiding the direction of in-depth assessment.

3.9.6.2 Selection of Criteria

The associated predictive *studies were, as* before, usually limited by the selection of only academic criteria. A notable exception, however, was the expansion of criteria to include socio-emotional functioning (Skuy, Shmukler & Clarke, 1983; Skuy, Shmukler & Westaway, 1985).

3.9.6.3 Selection of Screening Measures

A wide spectrum of screening measures had been selected, ranging from clearly defined specific spheres of cognitive functioning to broad and general behavioural tendencies. The selection of a few of these facets was based on theoretical models, the selection of others based on the experience and knowledge of teachers or other professionals. Constructs were genetally identified (or confirmed) through factor analysis. These dimensions were usually not viewed in an integrated way, through a comprehensive theory of behaviour. The nature of the relationship between predictors and criteria was generally not considered.

A notable omission in most of the scales was the exclusion of personal affective, attitudinal, and motivational measures despite the opportunity for teachers to observe personality characteristics. This omission was surprising in view of the early recognition of the importance of personality characteristics and dispositions for intellectual development.

3.9.6.4 Philosophical Focus

This trend appeared to have been largely effective in returning the child to the classroom situation for assessment (away from "outside" professionals), where teachers could regain responsibility and control, and plan instruction and remediation aided by systematic observations. The active guiding role of the "outside" professionals had been rejected and assumed by the teachers directly concerned with the children.

Again, studies had focused almost exclusively on the active role of the educators rather than the active and constructive role of the feeling and motivated (or demotivated) child.

3.9.6.5 Limitations of this Assessment Method

The intrinsic disadvantage of teachers' rating scales had been emphasized by several investigators. Issues such as "selective perception" and lack of objectivity had been noted (Keogh & Barker, 1973, 1977; Skuy, Shmukler & Westaway, 1985). Reid & Hresko (1981, p.137) referred to conclusions from several studies that disruptive behavior or non-conformity was the critical factor influencing teachers' perceptions of children's functioning in the classroom. They concluded that "most decisions made in classrooms are directed toward optimizing management rather than learning".

A comparative investigation of the efficacy of psychometric tests and teachers' rating scales (Fletcher & Satz, 1984, p. 203) led these authors to conclude, 'if there are classroom behaviors that represent precursors of poor achievement, ... teachers find it difficult to identify these behaviors in a classroom setting'.

3.10 *OVERALL CONCLUSIONS*

In discussing the fundamental purpose of Early Identification (the selection of individuals for appropriate intervention), I suggested it was *necessary* to derive a view of the child's active functioning in a relevant learning environment. This view should be based on theories that promote understanding of the child's functioning, both in terms of causes within the child and its effect on his achievement and school adjustment.

There appeared to have been very limited success in providing adequate *theoretically-based assessment* of individual children along relevant, integrated, *personal* dimensions with direct functional relevance to learning and adjustment. Early Identification studies did not promote a *view of the* integrated functioning of an active motivated child in a relevant *learning* environment.

Studies using psychometric testing generally provided a very limited view of a *limited range* of measures. There was no clear focus on the nature of *these measures* or the nature of their relationship to subsequent *achievement*. It was not possible to derive a direct view of the child's active functioning (cognitive or adaptive); neither was it *possible* to derive an adequate theoretically-based *view of measures* in terms of their determinants. An occasional theoretical view was provided in terms of brain function. No theoretic view was provided in terms of other dynamic causal child factors.

Identification studies *using* teachers' ratings generally provided a broader view with greater potential relevance. Observations of the *child's active* functioning (cognitive and adaptive) in a relevant *environment were* encompassed, and constructs derived by factor *analysis*. Some of these constructs were theoretically supported. *These constructs* were however not viewed through a comprehensive theory of behaviour, facilitating a view of the integrated functioning of *a motivated* active child.

Thus studies did not *succeed in measuring* the child's cognitive or adaptive functioning *objectively*, nor in providing a

theoretically-based *view* to explain their determinants. Neither did *they explain* how the child's intellectual behaviour and adaptive style related to academic achievement and classroom adjustment. It appeared that prevailing theories and studies had not generated sufficient theoretically-based data to *facilitate* selection of individual children for *intervention*, or to facilitate decisions about *appropriate* intervention.

3.11 DISCUSSION

The overall failure to derive decision-relevant data appeared to be due to a lack of cohesiveness between the *fundamental* purpose of Early Identification and the *actual* purpose which had guided the selection of *theories* and research efforts. The fundamental purpose required both an adequate view and understanding of the child's active functioning. The actual purpose was only to provide a view as a means of identification (of children or deficits). *In general*, no attempt was made to understand *the child's* manifestations in terms of *motivational characteristics*. Nor was there an attempt to understand the effect of these manifestations on learning and adjustment.

The failure to consider the child's active role in learning *was* profound. It appeared that the importance of adaptability had been recognized in the *LD field but given* insufficient attention in Early *Identification*. Torgesen (1986, p. 405) stated that "information processing research has repeatedly emphasized the enormous flexibility and adaptability of the human organism as it attempts to learn about the world" and suggested that, for *this* reason, information about neurological *deficits* for practical management might *only be required* for a very small number of extreme problems. It seemed surprising that no attempts were made to include a clear focus on the child's active adaptive style in identification studies.

There appeared to have *been a major* philosophical and actual omission *in the selection* of theories and the design of studies for Early Identification, perhaps related to excessive service motivations. A fundamental problem appeared to be the limited perspective precluding an adequate focus on the child *as an active* motivated being with *characteristic adaptive* resources. This neglect might *well* have limited the accuracy with which those in *need* of intervention could be identified.

It appeared to me that the prevailing focus on manifestations of a disorder rather than on a dynamically functioning child with a disorder, striving to interact with relevant aspects of the environment, had seriously limited accomplishments in Early Identification. This focus seemed to have limited the development of assessment measures with the power to aid meaningful educational decisions for individual children.

4 DYNAMIC ADAPTIVE CHARACTERISTICS

In the previous chapter I focused on the prevailing theoretical concern with the interaction between the child's "abilities or learning style" and "instructional conditions" (Torgesen, 1986). I discussed the limited accomplishments, in the associated Early Identification studies, in measuring this interaction adequately, or promoting understanding of its causes and consequences. In particular, I noted that this interaction had not been viewed clearly in terms of dynamic adaptive personal characteristics of the child. By "dynamic adaptive" characteristics I mean action-related characteristics which either influence or portray adaptive interaction, i.e. interaction between the child and the significant learning environment with its opportunities and demands for adaptation.

Several reviewers had considered that there were no stable characteristics in young children that could serve as reliable predictors of school success (Adelman, 1978, 1982; Keogh & Becker, 1973, 1986; Reid & Hresko, 1981). Individual characteristics of preschool children had frequently been viewed as unstable, tending to change with environmental interaction. This led to the view among several investigators that identification of reliable predictors was essentially problematic. The consequent possibility of incorrect "labelling" of the child was one of the reasons why Adelman (1978) had considered Early Identification endeavours to be potentially damaging and had advocated abandonment of this practice.

Despite these doubts, dynamic functional characteristics had emerged as some of the most successful predictors of achievement (e.g. Flook & Vellicer, 1977; Frances, 1976; Shaywitz, Schnell, & Shaywitz, 1986). Frances (1976, p. 292) cited the findings of Gilly (1974) about the predictive value of "factors related to energy and regulatory mechanisms governing the efficient use of intellectual potentialities." Early Identification studies had sometimes measured adaptive functional manifestations (such as task orientation, and classroom skills), but generally failed to focus on them as manifestations of motivated adaptive action-related

personality characteristics. This inadequate focus made it difficult to prove or disprove the view that there were no stable characteristics in this age group that could serve as reliable predictors of achievement.

4.1 CHARACTERISTICS OF LEARNING DISABLED CHILDREN

Distinctive characteristics were highlighted by attempts to classify LD children into meaningful subtypes. The consensus appeared to be that learning disabled children were a heterogeneous group (Fisk & Rourke, 1983; Keogh, 1986; Stringer, 1986). Fisk & Rourke (1983) reported that research studies have shown that most learning disabled children can be classified reliably into meaningful subtypes, based on statistical analysis of their performance on measures known to be sensitive to the functional integrity of the brain, or based on patterns of academic performance. They suggested expanding subtype investigation to include social, emotional, and personality functioning, as well as general adaptation.

McKinney & Feagans (1983) pointed out that although LD was defined in terms of cognitive and linguistic processes, there was increasing evidence that LD children also displayed maladaptive behaviours. They recommended that the behavioural correlates and consequences of different subtypes should be determined. Their findings suggested that certain non-adaptive classroom behaviours may be essential characteristics of learning disability. A subsequent publication (Rourke, 1985, reviewed by Stringer, 1986) incorporated subtype analysis of an expanded range of characteristics, establishing a clear relationship between LD subtypes and social behaviour and a tentative relationship between subtypes of LD and personality style.

4.1.1 Maladaptive Style in LD Children

4.1.1.1 Generalized Performance Deficit

During the last decade, maladaptive functional characteristics, depicting the interaction between the child and instructional conditions, became an important focus in considerations about the nature of learning disability (e.g. McKinney & Feagans, 1983; Torgesen, 1977, 1980). This focus was valuable as it highlighted the dynamic, changeable nature of this interaction.

Torgesen's publications steered attention towards the possibility that poor performance on cognitive tasks reflected

deficits in application rather than ability. He claimed (1977, p.28) that researchers were "beginning to view performance on *experimental tasks as* the product of adaptive activity on the part of the child". He postulated that a generalized performance deficit in LD children, manifest in many different task settings, "is attributable to the failure to engage in certain kinds of goal-directed activities rather than to capacity or structural limitations" (1980, p. 19).

Torgesen suggested that "difficulties in the application of efficient task strategies may be a general characteristic of learning disabled children, even across groups that have different kinds of specific processing problems". He concluded that the use of efficient strategies required an active adaptation to tasks, and that there was some evidence that LD children may process information less actively than normal children.

Hallahan & Sapona (1983, p. 1*6) reviewed *additional findings* supporting the notion of the LD child as a passive learner and concluded, "The picture we get is of a child who does not actively involve himself or herself in the learning situation". This notion was strongly supported by the preliminary findings of McKinney & Feagan (1983) aimed at deriving *behavioural sub-types*.

4.1.1.2 Specific Maladaptive Manifestations

Shaywitz, Schnell, & Shaywitz (1986) referred to an extensive review of learning disability articles (Keogh & McMillan, 1983, p. 348) suggesting that "the only consistently cited indicators, in addition to *school failure*, were short attention span and hyperactivity". Attentional disturbances (of fundamental significance for environmental interaction) have become a central issue in considerations of the nature of learning disability and its subtypes (e.g. Brown & Wynne, 1984; Draegen, Prior & Sanson, 1986; *Dykman, Ackerman*, Holcomb, & Boudreau, 1983; Ross, 1976; Ross & Pelham, 1981; Shaywitz et al., 1986).

Dykman et al. (p. 53) maintained that "a major problem for most LD children is the inability or unwillingness to sustain attention", as well as an inertia in switching from inner to outer involvement in order to become appropriately alert. Inattention, Impulsivity, and Hyperactivity were operational criteria for Attention Deficit Disorder (ADD) with Hyperactivity (a separate diagnostic category, DSM-III, created by the American Psychiatric Association [*Ross &*

Feiham, 1981)). Recent research investigating these manifestations (Shaywitz et al., 1986) led to the finding that attentional problems were integral to both behavioural and cognitive deficits. These authors concluded that distractibility was frequently coincident with diagnoses of hyperactivity and learning disabilities.

4.1.1.3 Consideration of Causes

There has been increasing interest in understanding the causes of these maladaptive manifestations (general and specific) depicting the child's interaction with instructional conditions. Biological, environmental, metacognitive, attitudinal/motivational and other personality factors have been considered. Torgesen (1977, 1980) recognized the importance of understanding these manifestations, but concluded (1986) that the cause had not yet been determined.

He speculated in his earlier articles (1977, 1980) about the possible reasons for the "application deficit" or strategic inefficiency, postulating that the "passive learner" might be unprepared by the environment (preschool teachers and parents) to "assume the role of active organized learner" (1980, p. 24). He suggested that there were "individual differences in cognitive-emotional dispositions toward the use of purposive activity in intellectual performance" (1977, p. 35). Torgesen stressed the importance of "certain metacognitive skills that are vital in establishing efficient self-regulation of cognitive processing activities" (1980, p. 24). Distinguishing between incidental and intentional learning, he suggested that some children might have an IQ - achievement discrepancy (the most common criterion for diagnosis of LD) because of "failure to adapt to new learning challenges" (1977, p. 36).

He suggested that the lack of functional efficiency might therefore be due to the failure "to attain a certain kind of relationship to the task" (1977, p. 37), and that general immaturity of personality and cognitive development might easily influence "the ability or ' .ination to pursue learning in a structured, active way". Torgesen also considered an alternative view, speculating that the characteristic passivity of the LD child might be an effect rather than a cause of failure. In support of this view, he referred to findings highlighting the phenomenon of learned helplessness in LD children. Stressing that active energy was required for efficient intentional learning, he emphasized the

importance of understanding the "motivational structures in the child" (1977, p. 38).

An important consideration, he said, was whether tasks measured specific deficits or the child's active involvement in the task. This, he noted, would influence the direction of remedial efforts, a choice between careful instruction in the use of efficient task strategies or more general efforts to assist the child to understand his potential role as an "active and important agent in his own learning" (1977, p. 39).

Licht (1983), defined the LD child's deficient interaction in motivational terms. She asserted that the motivational problems of LD children were among the most consistently reported characteristics of this group. LD children, she said, were characterized by off-task behavior and inattentiveness, as well as difficulties with concentration and persistence, especially when faced with difficult tasks.

This passivity or motivational deficit in LD children was depicted either as the failure to develop adequate motivation towards intellectual pursuits or as a secondary problem associated with experiences of failure. Licht (1983) favoured the latter interpretation, adding that these secondary motivational problems had the potential to compound existing problems. This view was also implicit in the description by Kavale & Forness (1986, p. 130) of the learning disabled child as a "disassociated learner in the sense of a student not actively involved in the learning process". They suggested that this disassociation represented the foundation for learning disability and their framework suggested "how it may be logically conceptualized that some children disassociate themselves from academic learning and come to be termed learning disabled."

Obrzut & Hynd (1983) reported research demonstrating the likelihood that LD children have brain activation patterns that are more susceptible to "attentional effects" than are those found in normal children. They suggested that future studies should ascertain the reason for this increased susceptibility.

Dykman et al. (1983) discussed studies comparing hyperactive and hypoactive children, and speculated about whether the behavioural attributes of hypoactive children (viz. passivity of personality, lack of energy and reduced flexibility on problem solving) were related to variations in excitation and inhibition in the nervous

system. They concluded that psychophysiological differences existed between these groups and that others were still to be discovered. They maintained, however, that the issue of whether or not attentional deficits in LD children implied nervous system abnormality had not been resolved.

They commented on the increased emphasis on the role of conscious intention in performance, stressing that "we choose where to direct our attention and we decide how much effort we will exert to solve various problems" (1983, p.50). They noted that most experimental paradigms did not clearly separate attention and intention, and stressed the need to use the "best available paradigms and develop new ones which focus on attentional-intentional problems and effortful cognitive processing".

Volitional aspects were strongly emphasized in a recent study of attention deficits in hyperactivity (Draegen et al., 1986, p. 411), and considered to support the following view: "non-compliance is a major contributor to the poor performance of hyperactive children, which can be seen as an 'application deficit' rather than an 'ability deficit'".

Campbell (1985), on the other hand, maintained that noncompliant behaviour of hyperactive children could be explained in terms of problems with impulse control. She reported findings suggesting a particular personality style in these children: "Longitudinal studies indicate that impulsive, active, and noncompliant behavior may reflect a style of interacting with the environment that is relatively persistent when assessed across situations and over time using multiple indices." A similar view emerged from Brown & Wynne's study (1984) investigating attentional characteristics of particular subgroups (hyperactive and non-hyperactive). They claimed findings which supported the notion of a constitutional predisposition in hyperactive children toward poor impulse control, and difficulties in organizing and sustaining attention.

4.1.1.4 Integrated View and Current Focus

Core dynamic maladaptive characteristics, consistently cited as indicators of learning disability and of attention deficit disorder, were maladaptive generation, focus, and regulation of activity. These characteristics are clearly manifestations of "energy and regulatory mechanisms governing the efficient use of intellectual

potentialities" (Gilly, 1974, cited by Frances, 1976, p.292). Characteristic lack of adaptive activity was considered by several theoreticians to be the essential nature of learning disability.

Consideration of causes emphasized the importance of understanding the dynamic relationship between aspects of the child's personality and his style of functioning in a learning environment. It seemed that the reasons for these maladaptive manifestations had not yet been clearly established but the influence of physiological variation, cortical abnormality, attitudes and volition have all been considered.

Maladaptive motivation and attitudes to achievement were postulated, resulting in both a maladaptive intentional learning style and a maladaptive performance style. It would seem therefore that learning disabled children generally manifested what I have termed a "maladaptive achievement style" (learning and performance) in relation to intellectual tasks. I have used the general term, maladaptive achievement style, although there will clearly be variations in the specific maladaptive manifestations impeding dynamic adaptive interaction.

Investigation into the nature and aetiology of attentional disturbance appeared to be of prime importance (Dykman et al., 1983). Although physiological explanations were proposed, there was increasing concern with understanding the role of motivation, volition, and intention, i.e. considering causes in terms of dynamic adaptive motivational characteristics.

4.2 DYNAMIC ADAPTIVE CHARACTERISTICS IN DIVERSE GROUPS

Shaywitz et al. (1986, p. 348) maintained that, "disorders of attention regulation, activity modulation, and learning are among the most common problems occurring in childhood." Specific dynamic adaptive characteristics (functional and attitudinal/motivational) have frequently been used to describe significant features of diverse groups of children manifesting achievement or adjustment problems. Many of these characteristics, however, do not appear to be exclusive to one particular group, but would appear to be important initial indicators, alerting investigators or practitioners to current or future difficulties or exceptionalities.

Dynamic maladaptive characteristics have also frequently been highlighted as targets for intervention (Abbott & Crane, 1977; Adelman & Chaney, 1982; Anderson & Messick, 1974; Brown & Wynne,

1984; Deci & Chandler, 1986; Feuerstein et al., 1979; Hallahan & Sapona, 1983; Kohn & Rosman, 1972a; Lefcourt, 1976; Rohin, Fischel, Brown, 1984; Sabotino & Miller, 1980; Stipek, Lamb, & Ligler, 1981; Stipek & Weisz, 1981; Weiner, 1974).

Although hypoactive passive behaviour had not, in Early Identification studies, been considered a potential predictor of future learning disability, this syndrome had been considered an important socio-emotional manifestation. It was initially investigated in disadvantaged children and found to predict poor academic achievement (Kohn & Rosman, 1972a). Kohn & Rosman (1972a, 1972b) emphasized the notion of individual differences in characteristic activity vs. passivity in preschool children as a gauge of socio-emotional functioning. They considered the child's characteristic tendency to participate actively in the preschool environment to be an adaptive socio-emotional characteristic reflecting mastery. Preschool teachers' observations of Active Participation vs. Apathy were found to be significant predictors of early scholastic achievement.

Functional characteristics had clearly formed the basis for defining, describing, and differentiating groups of children with characteristic cognitive functioning (e.g "retarded performers" or "low functioning" [Feuerstein et al., 1 nd "functional limitations" of the developmentally disab heimer & Keogh, 1986, p. 62]). At the other end of the sc productivity had been highlighted as a feature of gifted children (Albert, 1975, cited by Sundberg et al., 1978), and attentiveness a feature of "genius" (William James cited by Dykman et al., 1983).

The work of Feuerstein and his colleagues (1979) was most influential in highlighting the importance of dynamic adaptive prerequisites of adequate cognitive functioning. Feuerstein's original work with "culturally deprived" adolescents led him to conclude that these individuals lacked adaptive behaviour and that their manifest deficits in cognitive functioning did not reflect "real incapacities". Instead, he suggested that the observed deficits had been determined by deficiencies in certain prerequisites of adequate cognitive functioning, which he labeled as ineffective attitudes, faulty work habits and inadequate modes of thinking. These characteristics were clearly "dynamic" i.e. influencing or portraying active adaptation. Feuerstein regarded

these deficiencies as not being stable or immutable, but, on the contrary, as accessible to change through training.

The notion of adaptability was central to his views. Feuerstein focussed on the modifiability of maladaptive attitudes, work habits, and modes of thinking. He viewed the need for active adaptation to be of paramount importance in the modern world and concluded that the only meaningful and lasting way to prepare oneself is by developing one's capacity to change or the ability to modify oneself.

The Coleman Report (1966, cited by Lefcourt, 1976) had drawn attention to characteristic attitudes among the disadvantaged which limited their potential for achievement. Feuerstein (1979) described the passive attitudinal characteristics of the "culturally deprived" as central determinants of low cognitive functioning. He maintained that the culturally deprived viewed themselves as "passive recipients" rather than "active generators" (p. 81) and lacked the "requisite need system to develop the necessary functions" (p. 57). He considered that this basic attitude was "reflected in a state of passivity vis-a-vis the world and the incoming stimuli" (p.81).

In sum, Feuerstein emphasized the central importance of appropriate dynamic causal characteristics (attitudes, motives, and needs) and affective or functional characteristics (work habits and modes of thinking). He regarded these characteristics as the essential prerequisites for adequate cognitive functioning, itself a prerequisite for adaptation.

Thus dynamic (action-related) *prerequisite characteristics for* adequate cognitive functioning, learning, and active adaptation had been emphasized within and without the field of learning disability. The importance of appropriate attitudes and motivation manifest in adaptive action tendencies (or adaptive action style) had been clearly endorsed.

4.3 VALUE OF ASSESSING ADAPTIVE BEHAVIOUR

Assessment of adaptive behaviour in learning disability was advocated by Weller, Strawser & Buchanan (1985), who pointed out that this was one of the few exceptionalities that did not "endorse the assessment of adaptive behaviour to designate severity" (p. 201). Emphasizing the potentially enhanced diagnostic value of such assessment, they suggested that measures of adaptive behaviour could

be used to determine homogeneity and "a continuum of severity" among learning disabled children. They noted the views of Coulter & Morrow (1978) who endorsed the assessment of adaptive behaviour in all special education categories for identification and placement, as well as for intervention and programming.

The importance of assessing "personal adaptive resources and characteristics in significant environments" when making decisions about individuals was also advocated by Sundberg, Snowden, & Reynolds (1978, p. 196). These authors maintained, "When construct systems make provision for adaptive competencies, they will contribute to more comprehensive, decision-related assessment results (p. 183)." *Torgesen's report* (1986, p. 405) of research findings, emphasizing the "enormous flexibility and adaptability of the human organism as it attempts to learn about the world", lent theoretical support to these views.

4.4 NEED FOR MEASURES OF DYNAMIC ADAPTIVE RESOURCES IN PRESCHOOLERS

Weller, Strawser, & Buchanan (1985, p. 201) reported a scarcity of standardized measuring instruments of adaptive behaviour not developed exclusively for and normed on one specific population (e.g. retarded, behaviourally handicapped, or children with attention deficit disorder). Measures, for preschool children, of dynamic adaptive characteristics (influencing and representing adaptive interaction) were clearly needed, and existing measures not considered to be adequate.

4.4.1 Disadvantaged

Enhancement of motivation in preschool disadvantaged children, in order to facilitate active adaptation in an achievement-oriented environment, had been an important goal in Early Education programmes (Abbott & Crane, 1977). Evaluation efforts highlighted the absence of relevant reliable measures of motivational characteristics, with an established relationship to achievement (Bridgeman & Shipman, 1978; Stipek et al., 1981). Bridgeman & Shipman emphasized that research had been very limited, largely due to a lack of adequate measuring instruments of early motivation. Stipek et al. concluded that the appropriate evaluation of large scale childhood intervention efforts (e.g. Head Start and Follow Through) remained problematic and controversial.

Dissatisfaction with existing criteria for evaluating the outcome of Early Education programmes resulted in the alternate

focus on "Social Competence" in relation to Head Start objectives. Social Competence referred to "an individual's everyday effectiveness in dealing with his environment" (Zigler, 1972, cited by Anderson & Messick, 1974, p. 283). This effectiveness can alternatively be viewed as characteristic adaptive action or adaptive action style. Preschool measures of dynamic adaptive characteristics, reflecting both the motivation to interact effectively and the tendency to interact effectively, were clearly needed to evaluate intervention efficacy.

4.4.2 Children At-Risk for Learning Disability

Observations and hypotheses concerning the nature of learning disability support the need, while seeking children at risk, to measure dynamic adaptive characteristics which facilitate or represent not only incidental learning (as measured by IQ tests) but as Torgesen (1977) suggested, also intentional learning. There was thus a need to measure dynamic prerequisites (attitudinal and effective) for adapting to "new learning challenges" and for assuming "the role of active, organized learner".

4.4.3 Hyperactives or Children with Attention Deficit Disorder

The need for further research to develop "solid normative data" for Attention Deficit Disorder was recognized by Ross & Pelham (1981). Several years later the absence of adequate measures was still noted. According to Campbell (1985, p.407), "Definitional, diagnostic, and measurement problems have plagued researchers interested in hyperactivity", and these problems are compounded in diagnosis of young children because of the need to examine behaviour in a developmental context. She noted the failure of the diagnostic criteria (for DSM-iii) to provide age-appropriate or developmental criteria and stressed the need for "multiple measures of attention and impulse control, appropriate for preschoolers" (p. 423). Draegen et al. (1986, p. 411) noted that "the difficulties of finding an objective and reliable way of diagnosing hyperactivity in children have remained intractable despite considerable clinical and research effort." Rosenberg & Beck (1986) confirmed that standardized batteries for assessing childhood hyperactivity have not been developed.

4.4.4 Integration of These Assessment Needs

Adequate measures were clearly needed to assess preschool children to assess dynamic adaptive or interactive characteristics (causal/motivational and stylistic), viewed as prerequisites for adequate cognitive functioning and achievement. Despite the doubts about the existence of stable characteristics in preschoolers that could be used to predict achievement, dynamic adaptive personal characteristics, considered to be prerequisites for learning, achieving, and adapting to the environment, had been highlighted. These characteristics were used, not only to distinguish diverse groups, but also as significant targets for intervention. Adequate measures of these characteristics were not available.

4.5 GUIDELINES FOR ASSESSING ADAPTIVE CHARACTERISTICS

In their discussion of conceptual frameworks relevant to practical applications of clinical concern, Sundberg et al. (1978) stressed the need to base individual decisions on specific measures of personal adaptive resources or characteristics which are clearly defined, theoretically-based, and manifest in significant environments. They stressed that investigators should emphasize the individual's potential contributions and competence. The term competence, they said, denoted a search for positive characteristics, especially capabilities for coping with life situations. They defined competence as "personal characteristics (knowledge, skills, attitudes), which lead to achievements having adaptive payoffs in significant environments (p. 196)." They referred to the work of Mischel (1973, 1976), who advocated the use of both personal and situational variables in considering personality.

These authors stressed the importance of relating assessment to theory in order to derive well-defined constructs, suggesting that construct systems which make provision for adaptive competencies would contribute to more comprehensive, decision-related assessment results. As competence suggested an ecological situation, they considered context and environment to be vital for understanding behaviour. The notion of adaptation, they said, underlined the need to assess both the motives of the person and the demands and resources of the environment (p. 196). Finally, they advocated a comprehensive model of assessment based on the reality of continuous interaction between intraindividual and situational facets.

4.6 PRESENT STUDY

The present study did not evolve out of the increasing focus on dynamic adaptive characteristics used to describe children with learning disability, or those with inadequate cognitive and socio-emotional functioning; nor did it evolve out of the need to evaluate motivation and interactional effectiveness in disadvantaged children; nor the views of Sundberg et al. (1978) or Feuerstein (1979).

My interest in measuring adaptive motivation, attention, and action in preschoolers developed independently. My approach appeared however to incorporate many of these ideas and to satisfy the requirements of Sundberg et al. (1978). The focus on dynamic changeable characteristics (attitudes and motives, attention and action), viewed as prerequisites for learning, and measured in a dynamic situation, had some similarities to the work of Feuerstein (1979). Feuerstein attributed central importance to the passive attitude of the culturally deprived. I sought to measure the behavioural manifestations of these fundamental attitudes.

My interest had arisen from clinical experience, extending over many years, with children diagnosed as "cerebral palsied", "hyperactive", "learning disabled", "behaviour problem" and/or "emotionally disturbed". The observation that so many of these children were characterized by problems of attention, motivation, and energy deployment led me to consider the possibility of deriving direct objective measures of these tendencies.

4.6.1 Adaptive Action Style

Viewing the child's characteristic tendency to interact adaptively with relevant aspects of the environment to be a core personal adaptive resource, I hypothesized that adaptive action style would have direct relevance for both educational achievement and environmental adaptation. I regarding action style as pervasive and relatively enduring, but nevertheless accessible to change, and, therefore, a worthy target for intervention. I considered that the focus on relatively enduring effective motivational ... teristics influencing a wide spectrum of behaviour seemed li... to enhance research, programme evaluation, prediction of learning and adaptation, and individual identification. I therefore concluded that the measurement, in preschool children, of effective motivational characteristics would be both worthwhile and desirable.

I proposed to measure and investigate style of adaptive action or interaction. I proposed (a) to derive specific theoretically-based measures in a life-like situation, (b) to enhance understanding of these measures by viewing their determinants and nature, (c) to view them as predictors of achievement and adjustment, and (d) to view the potential for making relevant decisions about individuals on the basis of these specific measures.

Direct measures of behaviour-environment interaction would be derived within a simulated classroom situation. I considered that theoretically-based objective measures of characteristic adaptive activity could serve as research tools with adequate psychometric properties and ultimately provide reliable *specific measures along* a relevant personal dimension to facilitate decisions about individuals.

In relation to current preschool issues, I hoped to derive theoretically-based measures along a relevant personal dimension which could (a) provide adequate criteria for individual children of competence and adaptive motivation in evaluating the outcome of early educational programmes or remedial intervention, (b) aid in the detection of coping failure or exceptional, facilitatory motivational resources, (c) assist in the prediction of learning or adjustment difficulties, (d) facilitate decisions about individual children, particularly the need for intervention, and (e) derive worthwhile targets for intervention.

I noted that adaptive functional characteristics had been assessed in Early Identification studies, but not viewed in an *integrated and theoretically-based* manner to enhance understanding of the individual child interacting with relevant aspects of his environment. Attitudes and motivation had rarely been viewed. I considered that meaningful intervention could not be planned without adequate understanding of adaptive activity in individual children, reflecting the child's active and constructive role in achievement and adaptation. I aimed first to enhance understanding of adaptive action style by reference to relevant theories of motivation (Atkinson & Rayner, 1978). I then proposed to view its effect on higher mental functioning through all three phases of the mental act (Luria, 1973; Feuerstein et al., 1979).

Feuerstein had quoted Hunt's argument that, 'The idea that development ... is an open-ended process puts a logical limitation

to the predictive validity of tests of intelligence, or on measures of any personal characteristic" (Hunt, 1961, p 310). It seemed to me that Hunt, who generally stressed the importance of intrinsic motivation, was not at that time considering dynamic personal characteristics. I reasoned that the measurement of adaptive action style would be directly relevant to the prediction of development and achievement. Characteristic adaptive action reflecting the desire and tendency to experience, interact, learn, achieve, change, and develop should, logically, enhance the child's opportunities to develop, and ultimately, his development.

The importance of motivational characteristics for achievement and adaptation has been widely recognised (e.g. Adelman & Taylor, 1986; Atkinson & Raynor, 1978; Deci & Chandler, 1986; Feuerstein et al., 1979; Lamberth, Rappaport & Rappaport (1978); Licht, 1983; Sabotina & Miller, 1980; Strivek et al., 1981.) Adaptive action style would portray characteristic affective motivation.

4.7 PHILOSOPHICAL IMPLICATIONS

4.7.1 Focus on Child's Active Resources

By examining adaptive action style, I hoped to provide a means of focusing on an active, motivated, self-regulating child with characteristic adaptive resources. The philosophical similarity between my approach and Feuerstein's was the focus on the ultimate importance of the individual's own active adaptive resources, his capacity to learn, change, and develop. I considered that the child's own active motivational resources and potential for learning and effecting change could (and should) be evaluated before determining the need for *professional intervention*.

I hoped by these measures ultimately to identify those children who were not using their own resources effectively and who were, therefore, in need of intervention. I also considered it desirable and worthwhile to be able to identify those children with highly effective motivational resources. These children might have the potential to overcome or compensate for other areas of deprivation, handicap or specific difficulty without active intervention.

4.7.2 Target for Intervention

If intervention were deemed necessary, the facilitation of characteristic adaptive action should provide a significant and worthwhile target. The ultimate goal of intervention would be to facilitate the child's motivation and tendency to mobilize energy

effectively in order to meet environmental demands, opportunities, and challenges, and thereby develop his own potential.

4.7.3 Motivational/Functional Labelling Less Damaging

The selection of a motivational/functional dimension in preference to ability or capacity should reduce the potential dangers and damaging effects of error. It seemed that "labels" along a motivational or functional dimension could readily be viewed as modifiable, having therefore less potential to be damaging.

4.8 APPLICABILITY

Very much encouraged by a survey of existing needs and trends in Early Childhood Assessment, I saw that the provision of objective measures of dynamic adaptive resources would *fulfill a real and* extensive need in the field. I considered that objective evaluation of children along a motivational/functional dimension could possibly have wide applicability within and between groups differing in cultural background, psychoneurological efficiency, motivational, emotional and behavioural adjustment.

Sundberg et al. (1978) had expressed the hope that the assessment of cognitive functioning in normal, retarded and brain-damaged groups would be interrelated at some future time. I considered that the provision of adaptive functional and motivational measures might *also enhance a future possibility* of integrating measures of prerequisites for adequate cognitive functioning in diverse groups. Objective measures of dynamic adaptive prerequisites would have potential value in many spheres of research (developmental, cognitive, educational, cross-cultural, behavioural, *personality* and *psychoneurological*). They might also have clinical applicability in the future.

5 ADAPTIVE ACTION STYLE

Recognising the importance of considering the child's active constructive role in achievement and adjustment, I have dealt with the rationale for selecting dynamic adaptive characteristics as a central focus of the study. I was interested in investigating effective motivational characteristics (adaptive action style or characteristic use of environmental opportunities), explained by personality characteristics which influence this style of acting, viz. fundamental adaptive attitudes, needs, and motives. I had noted that neglected facets in early prediction of learning difficulties had been the child's personality characteristics and evaluation of the situation, his attitudes, needs, motives, expectations and incentives for acting effectively in using environmental opportunities, demands and challenges.

In view of the paucity and limitations of existing adaptive measures, I devised a way of assessing this dynamic resource in 5-6 year old children. Adapting a technique used with adults, I used performance on a continuous cognitive task in a significant situation as a "Dynamic Behaviour Assessment Paradigm (DBAP)". This dynamic method of assessment was consistent with the trend towards Interactionism in personality assessment, and could be readily viewed from an appropriate motivational perspective (Atkinson & Raynor, 1978).

5.1 ADAPTIVE MOTIVES

According to Sundberg et al. (1978, p. 196), ecological assessment of adaptive personal characteristics should include the motives of the individual and the demands and resources of the environment. Motives relevant to the prediction of early childhood achievement and adaptation would appear to be those concerned with the child's need for effectiveness, competence, control, mastery, and achievement.

The desire to interact effectively with the environment has been regarded as fundamental adaptive motivation (Deci & Chandler, 1986; Hayes, 1962; Stott, 1976; White, 1959). White considered the fundamental desire for competence or effective environmental

interaction to form the base for higher-order *motives such as play*, curiosity, and exploration. He asserted that mastery and achievement also had their roots in this *fundamental motivation*. Hayes (1962) stated that White's higher-order motives (exploratory, manipulatory, curiosity, play) served the *common biological function* of promoting learning.

Deci & Chandler (1986, p. 594) postulated "three such major psychological needs", self-determination, competence, and relatedness, which they suggested motivate people to "act on the environment to conquer challenges, and in so doing to develop internal structures that guide subsequent behaviour". They described the human being as an active organism whose nature "is to experiment, explore, grow and develop ... to strive for effective *interaction* with the environment, to move from dependence toward autonomy, and to construct an ever more elaborate, refined, and unified *internal representation* of itself in relation to the world".

Stott (1976) claimed experimental confirmation of a general factor of *Effectiveness Motivation in 6 year olds*, which he defined as the child's tendency to establish relationships of effectiveness with his world. He maintained that *this general concept* was discerned by a focus on its components (e.g. the achievement motive, the reinforcing power of success, curiosity, the *exploratory drive*, and aggression).

These constructs have been of interest to many *personality* theorists and those concerned with academic achievement. Characteristic action tendencies had captured the interest of early clinicians (e.g. Harry Stack Sullivan, 1953). The notion of a fundamental motive to gain control over the environment, mastery and autonomy has gained renewed prominence and interested many investigators concerned with personality development and adaptive functioning (e.g. Corsini & Marsella, 1983; Deci & Chandler, 1986; Lamberth, Rappaport & Rappaport, 1978). In discussing *self-determination* and mental health, Corsini & Marsella referred to Adler's statements (1956, p. 156) that life is "movement directed toward *growth, mastery* and autonomy" and that man "is and wants to be master of his fate".

Corsini & *Marsella claimed* that this notion has been validated by a vast body of research on internal vs. external control, begun by Rotter (1966) and *discussed at length* by Lefcourt (1976, p.186).

They referred to Adler's views that striving for success was "inherent in the structure of life" (1964), and that this principle could still be applied to discouraged individuals, for whom success was redefined as the avoidance of further failure.

Lamberth, Rappaport, & Rappaport (1978) refer as to the focus by existential writers on the drive for mastery. They maintained that evidence supported the conclusion that the drive to achieve competence and mastery was a powerful force even in infancy. The motivation to achieve mastery in childhood, was conceived as more than being competent, involving motives that were self-defined as well as a sense of commitment and satisfaction. These authors also referred to the existential concept of The Motivation to Confront Experience.

Lamberth et al. maintained that the construct, need for Achievement (n-Ach), a sphere of interest that had grown out of the work of Murray (1938), has generated considerable interest and research. They referred to *Murray's original definition of* this psychogenic need as "the tendency to do things as rapidly and/or as well as possible" (p. 164), and reported that he had developed the Thematic Apperception Test to promote research on human needs. *Need* for Achievement was also described by Murray (1943, p.5) in the following way: "To work at something important with energy and persistence. To strive to accomplish something creditable. To get ahead in business, to persuade or lead a group, to create something. Ambition manifested in action."

Lamberth et al. described n-Ach as a complex social motive that has been studied extensively since David McClelland's initial research in the 1940's. Atkinson and his colleagues (Atkinson & Raynor, 1978) have also been interested in need for Achievement as a determinant of achievement-oriented activity. Atkinson postulated two fundamental motives, the Motive to Achieve Success and the Motive to Avoid Failure, both viewed as determinants of achievement-oriented activity.

5.2 *EXISTING PRESCHOOL MEASURES OF ADAPTIVE MOTIVATION*

Sundberg et al. (1978, p. 206) referred to a useful framework for characterizing competency methods (Goldfried & D'Zurilla, 1969). *Definitions were* said to emphasize achievements or accomplishments, internal antecedents, or behaviour-environment interactions. Existing measures of adaptive motivation will be

characterized in this way.

5.2.1 Internal Antecedents of Adaptive Motivation

Most of the attempts to measure motivation in preschool children had focused on attitudes or the "internal antecedents" of adaptive motivation, rather than effective aspects manifest in behaviour-environment interaction. Sundberg et al. pointed out the limitations of the antecedents approach, which he regarded as often richly theoretical but far from the situation. These inherent limitations appeared to have been compounded in the assessment of preschool children.

The conclusion was that these methods of assessing motivation appeared to have intrinsic validity limitations with preschoolers (Bridgeman & Shipman, 1978; Silon & Harter, 1985; Stipek et al., 1981; Uguroglu, Schiller, & Walberg, 1981), and to be inappropriate as measures of adaptive motivational characteristics manifest in real-life situations (Sundberg et al., 1978). Stipek et al. emphasized (1981, p. 132) that although there were a number of emotional and motivational measures available (Walker, 1973), there remained "a dearth of such measures having satisfactory psychometric characteristics especially when employed with very young children (of preschool and elementary school age)".

Subsequent attempts by Silon & Harter (1985) to adapt, for children between the ages of 4 and 7, an existing self-report instrument designed to measure preference for challenge, curiosity, and independent mastery, also revealed limitations when applied to the younger group. Likewise, the Multidimensional Motivation Instrument (Uguroglu et al., 1981), administered to Grade One children, led the authors to conclude that the very young children did not fully understand the items on the instrument.

5.2.2 Behaviour-Environment Manifestations of Adaptive Motivation

Sundberg et al. (1978) suggested that a comprehensive model of assessment was needed for viewing ecological competence, a model which "must take into account the person's stimulus selection and categorising process, self-regulating and goal concepts, the potential behaviour repertoire, situational expectations and response selection in the interacting feedback loop with the environment" (p. 207). Existing behaviour-environment measures had generally not even been viewed as adaptive motivational

characteristics. I noted previously that characteristic effective action (work habits and classroom skills) had frequently been assessed in rating scales, but rarely viewed as manifestations of adaptive motivation.

A few researchers, however, had drawn attention to this relationship. Task Orientation (Schaefer, 1970) was viewed (a) as an indication of the child's achievement motivation, as perceived by the teacher (Bridgeman & Shipman, 1978), (b) as a dimension of *socio-emotional* functioning measuring attention and motivation (Kohn & Rosman, 1973a, 1974), and (c) as a measure of adaptive behaviour (Weller *et al.*, 1985).

Another interesting adaptive personal characteristic, Interest-Participation *vs.* *Apathy Withdrawal*, had been assessed by Kohn & Rosman (1972a) in the preschool environment. These authors claimed that this adaptive *action tendency* (manifest by both attitudinal and effective aspects) was one of two socio-emotional dimensions which assessed relatively-enduring *attributes of the* child (Kohn & Rosman, 1972a, 1973b). It had also been found to be a valid measure of "emotional health-disturbance" (Kohn & Rosman, 1973c). These measures were theoretically based and derived from observations of behaviour-environment interaction, but they did not satisfy the requirement for a "comprehensive model of assessment for ecological competence" (Sundberg et al., 1978).

5.3 INTERACTIONISM

Lamberth et al. (1978) cited the early view of Rotter (1954, p.85), who said, "The unit of investigatio for the study of personality is the interaction of the individual and his meaningful *environment*." Clearly the value of Interactionism for assessing personality has been gaining recognition. Sundberg et al. *emphasized the growing* trend towards Interactionism in personality assessment. They cited Mischel's view (1976) that people are "active, seeking, *thinking beings* who bring certain characteristics to any situation and develop specific behaviours in combination with that situation." In *their review of personality* trends, Nelson & Mitchell (1978) referred to the view that "the use of the personality paradigm in environmental *psychology ... may* be expected to articulate and improve the paradigm itself" (pp. 556-567). They concluded, "Personality theory is going to *develop concepts and* methods which will embody what is found out about behaviour in

situations and about person-by-situation *interactions*." Corsini & Marsella too (1983) stated that Interactionism was "a growing trend."

5.4 DYNAMIC BEHAVIOUR ASSESSMENT PARADIGM

I proposed to derive, for 5-6 year old children, objective measures of relatively-enduring motivational characteristics from a sample of adaptive achievement-oriented action in a significant situation requiring sustained *application*. I devised a dynamic life-like situation in order to derive this sample of adaptive action, postulating that it could be used as a 'Dynamic *Behaviour* Assessment Paradigm (DBAP)' to assess relatively-enduring dynamic adaptive motivational characteristics in this age group.

Many experimental studies with children have focused on the effect of personality variables on activity. Samples of activity derived under *varying conditions* have frequently been used to measure personal task-oriented behaviour such as attention, persistence, and motivation. Activity derived in these studies however, does not appear to have been used to assess relatively-enduring personality characteristics in this age group.

5.5 BACKGROUND TO USE OF DYNAMIC BEHAVIOUR ASSESSMENT PARADIGM

My interest in deriving objective measures with adequate *psychometric* properties of personality facets from a sample of activity had resulted from my early work with Dr H. Reuning. Reuning, who has *been engaged* for many years in cross-cultural research on Continuous Work Tests with adults (1957, 1972, 1973, 1978, 1981, 1983), confirmed the views of *one* of the original proponents (Pauli, cited by Reuning, 1957) that continuous performance on a simple task in a situation of challenge had the potential to reflect not only current affective characteristics, but also underlying personality characteristics (Reuning, 1957, 1983). *My early empirical* findings with a group of adults, relating personal characteristics to their performance on the continuous Pauli Test, confirmed *and* expanded *some* of Reuning's early findings (Shoul & Reuning, 1957). This initial encouraging background with Continuous Work Tests had led me to consider *adapting this Dynamic* Behaviour Assessment Paradigm to measure dynamic adaptive motivational and functional characteristics in preschool children.

5.6 THEORETICAL BASE FOR ADAPTIVE MOTIVATION

Many investigators and theoreticians have been concerned with the link between attitudes, control expectancies or locus of causality, and performance or action tendencies (e.g. Atkinson & Raynor, 1978; Barling, 1978; Lefcourt, 1976; Weiner, 1984). De Charms & Muir (1978), reviewing social approaches to motivation, highlighted as an important theoretical issue the struggle to include the person's reaction to the situation through constructs such as self attribution and perceived locus of causality. They noted that the "old theory of motivation" had been revised during the 1960's, culminating in a marked theoretical revision by Atkinson & Birch (1970) concerning the dynamics of action.

As my interest was in relating behaviour or action tendencies in an experimental situation to relatively-enduring motivational characteristics, I selected the reconstructed theories of Atkinson & Birch (Atkinson & Raynor, 1978) regarding the "dynamics of action" (p. 143). Their comprehensive theory integrated diverse personality facets with situational variables, interrelating these variables dynamically *with ongoing achievement-oriented* activity. Attitudes (incentives and expectancies) were viewed as a function of relatively-enduring motivational characteristics and continuous interaction with the ongoing situation.

In the discussion below, relevant aspects *from four chapters* of the book, Personality, Motivation, & Achievement will be considered. Three chapters by Atkinson deal with "the mainsprings of achievement-oriented activity", "strength of motivation and efficiency of performance" and "intellective performance and cumulative achievement". Atkinson & Birch's combined chapter deals with "the dynamics of achievement-oriented activity".

5.7 THE DYNAMICS OF ACHIEVEMENT-ORIENTED ACTIVITY

5.7.1 Behaviour: A Continual Stream of Thought and Action

Atkinson & Birch (p. 197) described their theory of motivation as "a theory of an active individual, one whose behaviour is a series of actions which express his constantly changing inclinations and not merely his reactions to a constantly changing pattern of stimulation". Their theory was based on the premise that the "behavioral life of an individual is a continual stream of thought *and action*, characterized by change from one activity to another, from birth to death (p. 143)."

They maintained (p. 188) that the brief episodes in experiments have rarely been seen for what they really are, namely 'short segments in the continuing stream of an *individual's activities, his life.*" The authors viewed achievement-oriented activity as dynamically related to constantly-changing "instigatory" and "inhibitory" forces within the individual to engage in that particular activity" (p. 166). They considered that selective attention was "often the very first behavioral symptom of the initiation of an activity." Pointing out that "any activity involves a particular *kind of commerce* with the environment", they viewed selective attention as providing "a more continuous exposure" to instigating and inhibiting forces (p. 190).

5.7.2 Excitatory and Inhibitory Tendencies

Atkinson, in his discussion of the "mainsprings of achievement-oriented activity", postulated that performance on an achievement-oriented activity reflected the *strength of* the *individual's tendency* being expressed in that activity. He postulated that two contrasting tendencies of the individual had, respectively, an excitatory effect or an inhibitory effect on the achievement-orientated *activity*. These tendencies were the excitatory Tendency to Achieve Success, expressed in the tendency to undertake achievement-oriented activities, and the inhibitory Tendency to Avoid Failure, which "*functions to oppose* and dampen the *tendency* to undertake achievement-oriented activities" (p. 15). Atkinson maintained that their research had "finally caught up with the relatedness of 'anxiety' and need for *achievement* as determinants of activities when performance is evaluated" (p. 38).

He considered that the individual's achievement-oriented activity expressed relatively-enduring facets of personality (motivational *dispositions*) as well as those generated by the specific situation and task demands.

Each of these tendencies were viewed as "multiplicative functions" of a motive, an *expectancy*, and an incentive (p. 12). They were, therefore, functions of relatively-enduring characteristics (fundamental motivational dispositions) and situation-related attitudes (*expectancies and* incentives *representing* the *effect* of the immediate environment).

The Motive to Achieve Success was regarded as a relatively general and relatively stable disposition of personality, and the

Motive to Avoid Failure regarded as "a disposition which is separate and distinct from the achievement motive" (p. 15). Atkinson described the latter as follows: "It might be thought of as a capacity for reacting with humiliation and shame when one fails. This is considered the source of individual differences in the anticipatory emotional reaction called anxiety or fear of failure." (p. 15)

5.7.3 Facets of Activity Related to Strength of Motivation

5.7.3.1 Intensity

Atkinson & Birch maintained that the intensity of activity depended upon how strongly motivated the individual was, his degree of involvement in the activity. It would correspond to the strength of the tendency being expressed in the activity at the time. They concluded that the individual who is strong in motive to achieve should be more intensely involved, generally more efficient, and more persistent in his achievement activities. They maintained that "*the positively motivated individual will initiate the achievement-oriented activity and become more completely involved in it sooner than his more anxious peer*" (p. 175).

5.7.3.2 Level of Performance and *Persistence*

Considering the motivational determinants of intellective performance and cumulative achievement, Atkinson maintained that the level of performance was a function of ability and efficiency. He concluded (p. 236) that motivation influenced the level of performance by influencing "efficiency in the execution of an activity" as well as persistence, regarded as "time spent on an endeavour".

5.7.3.3 Summary

In essence, these theories postulated that personality facets, fundamental motivational forces within the individual and situation-related attitudes and expectancies, served to instigate or inhibit action. Aspects of achievement-oriented activity (intensity, efficiency, and persistence) were viewed as reflecting aspects of the individual's personality, attitudes, and inclinations, dynamically interrelated with the ongoing situation.

The strength of motivation to perform the particular activity was *viewed as a function of* relatively-enduring motivational dispositions and other active personality aspects (attitudes) related to the situation. Motivational strength was viewed as

generating or inhibiting activity which then influenced the level of intellective performance and cumulative achievement.

5.8 EXISTING MEASURES OF NEED FOR ACHIEVEMENT: *THOUGHT SAMPLING*

There *has been criticism* of techniques of measuring motives with the modified Thematic Apperception Test (i.e. by the use of "thought sampling"). There have allegedly been several attempts to devise other methods but none of *them have* been considered satisfactory (Atkinson & Raynor, 1978). Corsini & Marsella (1983) have pointed out that there was no measuring instrument sensitive to socio-economic differences.

Atkinson (Atkinson & Raynor, 1978) claimed that the theory of motivation clearly justified the use of the traditional need for Achievement Score (nAch) derived from the Thematic *Apperception Test* (*TAT*). *He said*, "*We* merely need to view the traditional TAT nAch score as a rough but reasonably accurate index of clock time engaging in imaginative achievement activity to account for its obvious validity *and heuristic* value since 1949." He concluded, "Just as the behaviour of mercury in a thermometer is explained by the theory of heat, the content of operative imaginative thought is explained by the theory of *motivation*" (p. 197). Despite this justification, Atkinson himself had expressed the view that the "challenging task of developing a valid objective test of
n Achievement still lies ahead (Atkinson & Raynor, 1978, p. 21).

5.9 *ALTERNATIVE* ASSESSMENT METHOD: SAMPLING ACTION

In Atkinson & Birch's theory (Atkinson & Raynor, 1978), activity had been the core effective resource in determining achievement. The notion that *generation of* imaginative activity was related to strength of motivation had formed the basis for deriving measures of need for Achievement.

My interest was in using *the theoretical* perspective of Atkinson & Birch from which to view a sample of motivated action instead of a sample of operant thought. I was interested in relating strength of motivation to the generation of overt *adaptive activity* rather than *imaginative activity*.

5.10 ACHIEVEMENT-ORIENTED ACTIVITY REFLECTING PERSONALITY

I wanted to determine whether the sample of *achievement-oriented* activity, *derived* from preschool children in an experimental situation of challenge, would reflect strength of adaptive personal motivational characteristics. I considered that this sample of

activity, mobilized to confront a situation of challenge, would represent characteristic strength of relatively-enduring adaptive action tendencies, reflecting the strength of relatively stable and general motivational dispositions.

5.11 DYNAMIC ADAPTIVE CHARACTERISTICS INFLUENCING STYLE OF ACTION

I was interested in deriving specific theoretically-based measures from this sample of achievement-oriented activity in order to enhance understanding of the dynamic adaptive personality factors which influence its generation, regulation, and persistence. As the specific theoretically-based measures linked activity with personality facets, it should be possible through this view to understand this activity in terms of these characteristic personal determinants. I aimed to view aspects of this sample of achievement-oriented activity in the light of the theoretical views of Atkinson and his colleagues (Atkinson & Raynor, 1978) in order to derive objective measures of the underlying characteristic motivational dispositions and of the effective motivational *manifestations*. *This view* should facilitate understanding of the dynamic interaction between motivational dispositions and tendencies and the resulting adaptive functional manifestations of the individual child.

5.11.1 Objective *Measurement of n-Ach Manifested in Action*

I hypothesized that both the Motive and Tendency to Achieve Success as well as the Motive and Tendency to Avoid Failure would be reflected in independent adaptive action mobilized in a specific situation of challenge (i.e. Performance on the achievement-oriented task, the sample of environmental interaction). The strength of the need for Achievement should be reflected by its expression in action ('ambition manifested in action', Murray, 1943). As performance was a behavioural measure, it should reflect more than the need for Achievement; it should also reflect the individual's tendency to confront and pursue achievement-related environmental challenges energetically.

Lamberth et al. (1978) highlighted behavioural factors related to n-Ach, suggesting that individuals high in n-Ach preferred achieving situations and seemed to enjoy testing their own competence. According to these authors, such individuals appeared to find it relatively easy to delay immediate gratification and to work energetically in order to achieve a standard of excellence.

5.11.2 Advantages of Using a Behavioural Measure of n-Ach

Although it seemed that the need for Achievement could be reflected both in measures of operant thought and of behaviour, measures of independent adaptive action should have additional significance and value. These measures would reflect not only the underlying attitudinal/motivational facets (internal antecedents), but also the final effective manifestations (behaviour-environment interaction) in response to "the demands and resources of the environment" (Sundberg et al., 1978, p. 196). In addition, the use of a DBAP, viewed through a comprehensive theory of motivation, could provide a comprehensive model of assessment of ecological competence. Finally, the possibility of deriving specific quantitative measures of aspects of adaptive activity should facilitate precise measurement of individual differences in achievement-directed behaviour.

By examining intensity, efficiency, and persistence of this achievement-oriented activity, I aimed to measure individual differences in the tendency to mobilize and sustain energy in pursuit of goals. Measures would be derived of the individual's tendency to mobilize and sustain energy adequately when confronted with achievement-related opportunities, demands or challenges. I aimed to investigate (measure and understand) "adaptive action style", which I conceived as "the tendency, in the face of motivating opportunity, demand or challenge, to mobilize, focus, and sustain energy intensely and efficiently towards the fruition of a valued goal".

The need for Achievement has been described as a complex social motive (Lamberth et al., 1978). Some of the complexities appear to have been meaningfully interrelated in Atkinson & Birch's theory (Atkinson & Raynor, 1978). *By linking fundamental* motivational dispositions, and characteristic situation-related attitudes, to overt ongoing adaptive behaviour (achievement-oriented activity), these authors have promoted some understanding of the expression of this motive. The use of a sample of ongoing achievement-oriented activity (the DBAP) should provide simple and direct quantitative measurement of the expression of this complex social motive.

5.12 ADDRESSING SOME LIMITATIONS IN EARLY INTERVENTION RESEARCH

In Chapter 3, I suggested a double failure in Early Identification studies: (a) the failure to enhance understanding of

the unique dynamic personal factors which influenced the interaction between the child and instructional conditions or requirements, and (b) the failure to enhance understanding of how this dynamic interaction influenced subsequent achievement and adaptation. I concluded that without this understanding it was difficult to facilitate intervention decisions. In addition, I noted the lack of adequate motivational and interactive assessment in Early Intervention efficacy research when evaluating significant gains for individuals.

The use of this DBAP, viewed through the motivational theories of Atkinson and his colleagues, had the potential to enhance understanding of dynamic causal factors in the child influencing adaptive interaction. A child's ongoing effective action (performance) would be understood in terms of some of the underlying unique personality aspects (active evaluation and fundamental motivation) interacting continuously with the situation.

It would first be necessary to verify that these measures did reflect characteristic tendencies with some trans-situational consistency. If verified, objective measurement of performance, representing the dynamic integration of two sets of relatively-enduring adaptive personal resources (attitudinal/motivational and functional), enabling a separate theoretically-based focus on each, should facilitate research in many spheres of child development.

Direct measurement of characteristic use of environmental opportunities and challenges (reflecting characteristic attitudes and fundamental motives) could serve as predictors or criteria of adaptation and achievement, serving research needs for Early Identification and earlier preschool Intervention. Ultimately, if adequately validated and standardized, these measures might facilitate decisions for preschoolers concerning the need for intervention, direction of intervention if needed, and the effects of intervention.

5.13 FINAL HYPOTHESIS

5.13.1 Dynamic Paradigm for Personality Assessment

In accord with the trend to use Interactionism in personality assessment, I hypothesized that a Dynamic Behaviour Assessment Paradigm (DBAP) could be used to assess dynamic adaptive personality resources in 5-6 year old children. Personality characteristics or

adaptive personality style would be measured by a sample of achievement-oriented activity derived in an experimental situation of achievement-oriented challenge.

5.13.1.1 Dynamic Adaptive Motivational Characteristics

Specifically, I hypothesized that a sample of achievement-oriented activity, derived from a situation of challenge, could be used to obtain objective quantitative measures with adequate psychometric properties reflecting core dynamic adaptive motivational characteristics. Viewed from different perspectives (aetiological or current), these dynamic characteristics would be those which influence or represent adaptive action style. As this relatively enduring and general style of action would be measured in a challenging achievement-oriented situation, the measures would also specifically reflect "achievement-oriented action style" determined by "strength of need for Achievement" and "strength of anxiety".

6 VOLUNTARY COGNITIVE ACTIVITY

My analysis of the limitations of Early Identification studies had revealed the failure to examine the underlying determinants of the dimensions selected as predictors of achievement, and the failure to show <u>how</u> these selected dimensions related to achievement and adaptation. In the previous chapter, I viewed specific measures of achievement-oriented activity, considered to *influence achievement* and adaptation, in terms of their characteristic motivational determinants. A theoretically-based view was provided to enhance understanding of the relevant characteristic personal motivational *determinants of this activity*.

My interest was not only in measuring independent adaptive action tendencies mobilized in an achievement-oriented situation of challenge, and understanding the nature and effect of the underlying motivational characteristics. The selection of cognitively-oriented adaptive action as the DBAP aimed to provide an additional sphere of interest. I aimed to consider, from an additional theoretical base, the specific <u>nature</u> of the motivated action tendencies and how they might influence subsequent achievement. The previous chapter dealt with the personality factors influencing the generation and preservation of achievement-oriented activity. This chapter will deal with the psychoneurological nature of the underlying achievement-oriented activity expressed by performance, and its potential effect on achievement.

6.1 *THE COGNITIVE NATURE OF THE DBAP*

The DBAP was performance on a simple pencil-and-paper continuous cognitive task, carried out, in response to a challenge, after a period of teaching and *practice*. *Independent performance* thus provided a view of an ongoing stream of thought and action. (Division of this sample of continuous activity into ten consecutive time periods enabled graphic representation of independent application.) As I aimed to highlight the role of activity in cognitively-oriented performance, deriving measures of intensity, efficiency, and persistence, the design of the task and the challenge emphasized the need for unflagging action. The task and challenge demanded continuous energetic focused cognitive activity

expressed by continuous selective marking with a pencil on the work sheet. Adequate mobilization, preservation, and regulation of energy was required to sustain intense and efficient independent attention, thought, and action.

6.2 SELECTION OF LURIA'S PSYCHONEUROLOGICAL THEORIES

The selection for the present study of activity or affective motivational characteristics as the essential adaptive resource for adequate cognitive functioning (and adjustment) appeared to have logical, empirical, and theoretical backing. Atkinson and Birch's theory of action (Atkinson & Raynor, 1978) explained how personality facets (relatively enduring and situation-related) influenced intensity, efficiency, and persistence of achievement-oriented activity. Atkinson claimed that motivational strength influenced achievement-oriented activity, thus influencing level of intellective performance, and cumulative achievement. Luria's psychoneurological theories (1973) asserted that adequate sustained achievement-oriented activity was essential for the fulfilment of any plan.

Luria emphasized the voluntary and conscious nature of higher mental functions and cited experimental evidence of the link between goal-related aspects (intentions and plans) and the generation and regulation of activity. (This provided psychoneurological confirmation of the hypothesized link between attitudinal and affective aspects of behaviour.)

As I was interested in how characteristic motivated action tendencies related to higher mental functions, I selected Luria's Theory of Action (1973) as an additional complementary theoretical base from which to view these tendencies. Action tendencies derived in the specific situation of challenge, (i.e performance on the continuous cognitive task) were thus viewed alternatively as reflecting (a) motivational dispositions and forces (Atkinson & Raynor, 1978), and (b) characteristic effectiveness of voluntary independent conscious cognitive and executive activity (Luria, 1973).

6.2.1 Psychoneurological Focus on Performance

Luria's psychoneurological perspective would explain the nature of the higher mental functions underlying performance on this cognitive task or any other cognitively-oriented achievement. This view would enhance understanding and enable well-defined constructs

(Sundberg et al., 1978) to be derived for specific performance measures.

This perspective would enable an integrated psychoneurological view of the individual child in action in a cognitively-oriented situation, independently using his unique dynamic adaptive psychoneurological resources. Specific measures would reflect manifest functional efficiency of the child's fundamental psychoneurological prerequisites for adequate cognitive and executive functioning. Consideration of psychoneurological efficiency influencing performance should readily enable consideration of its potential influence on the child's future achievement and adaptation.

6.3 ESSENTIAL PSYCHONEUROLOGICAL CONSTRUCTS

Luria considered that activity was the core resource for achievement of a goal. He stressed (1973, p. 13), "It has become abundantly clear that human behaviour is active in character, that it is determined not only by past experience, but also by plans and designs formulating the future , and that the human brain is a remarkable apparatus which cannot only create these models of the future, but also subordinate its behaviour to them." He emphasized, "The fulfilment of a plan or the achievement of a goal requires a certain amount of energy, and they are possible only if a certain level of activity can be maintained." (1973, p. 27)

6.3.1 Active and Voluntary Nature of Conscious Activity

Luria referred to an earlier publication in which he described the higher human mental functions as "complex reflex processes, social in origin, mediate in structure and conscious and voluntary in mode of function" (1966a, p. 32). He maintained (1973, p. 99) that "each form of conscious activity is always a complex functional system and takes place through the combined working of all three brain units , each of which makes its own contribution."

The " first functional unit of the brain" was described as "an apparatus maintaining cortical tone and the waking state and regulating these states in accordance with the actual demands confronting the organism" (pp. 46-47). Intentions and plans were considered to be one of the three sources of activation. The other two sources were metabolic and external stimuli.

The primary function of the " second functional unit of the brain" was " reception, analysis and storage of information "

(p. 67). This unit was regarded as the most important for integrating information. Luria postulated that there were two basic modes of information processing, simultaneous and successive.

The third functional unit was concerned with the "organization of conscious activity" (Luria, 1973, p. 79). Luria concluded that neuropsychological analysis has shown that the frontal lobes were the essential apparatus for organizing intellectual activity as a whole. He described the active nature of conscious activity, saying (pp. 79-80):

> Man not only reacts passively to incoming information, but creates intentions, forms plans and programmes of his actions, inspects their performance, and regulates his behaviour so that it conforms to these plans and programmes: finally he verifies his conscious activity, comparing the effects of his actions with the original intentions and correcting any mistakes he has made.

He stated that the "prefrontal cortex plays an essential role in regulating the state of activity, changing it in accordance with man's complex intentions and plans formulated with the aid of speech" (p. 86). Luria considered this role to constitute one of the most important contributions to the organization of human behaviour. He stated that the prefrontal regions of the cortex "do not mature until very late in ontogeny, and not until the child has reached the age of four to seven years do they become finally prepared for action" (p. 87). He cited the work of Grey Walters & Livanov (1964, 1967) as demonstrating "conclusively that the frontal cortex participates in the generation of activation processes " (p. 94).

6.3.2 Voluntary Movement and Conscious Action

Luria emphasized the importance fo. voluntary movement and action of adequate frontal lobe activity. He referred to "the constant inspection system, continually analyzing the feedback signals and comparing them with the original plan" (p. 250). He said this was "the last, but an absolutely essential component of the voluntary movement, and without it the performance of the required task is extremely unlikely to succeed" (1973, p. 250).

He concluded that the frontal lobe system was the foundation for the construction of voluntary movement or conscious action, as it not only maintains and controls the general tone of the cortex, but

also "formulates the intention or motor task , ensures its preservation, and also its regulatory role , enables the performance of the action programme , and keeps a constant watch over its course" (p. 250). In sum, frontal lobe activity was considered essential for programmed goal-directed activity making voluntary movement and purposive action possible.

6.3.3 Attention and Voluntary Attention

Attention was defined (p. 256) as "the directivity and selectivity of mental processes , the basis on which they are organized". Luria described it as "the factor responsible for picking out the essential elements for mental activity, or the process which keeps a close watch on the precise and organized course of mental activity". He maintained that the " orienting reaction may be highly selective in character thus creating the basis for directive and selective, organized behaviour " (p. 259).

Voluntary attention, most relevant to the present study, was described (p. 262) as "a mental act " which "can be interpreted as the introduction of factors which are the product, not of the biological maturing of the organism, but of forms of activity created in the child during his relations with adults into the organization of this complex regulation of selective mental activity". (This view, Luria said, had been originally proposed by the Soviet psychologist, Vygotsky [1956, 1960]. Vygotsky's ideas were also incorporated into Feuerstein's theories concerning the role of mediated learning in the development of adequate cognitive functioning.)

Luria said, "From an external, socially organized attention develops the child's voluntary attention , which in this stage is an internal, self-regulating process." (1973, p. 262) He maintained that the "child acquires an efficient and stable, socially-organized attention only shortly before he is due to start school" (p. 263). Luria asserted that evoked potential, physical signs which arise through the " mobilization of active attention " have been shown to be "a definite and objective sign of voluntary attention" (p. 268).

Voluntary attention, he maintained, required the "possibility of selective recognition of a particular stimulus and inhibition of responses to irrelevant stimuli" (1973, p. 271). It is claimed that the essential role of the frontal lobes in inhibiting responses

to irrelevant stimuli and in preserving goal-directed programmed behaviour had been experimentally demonstrated. Results, he claimed, suggested that the " frontal lobes play an important role in raising the level of vigilance of a subject when performing a task, and they thus participate decisively in the higher forms of attention " (p. 278).

6.3.4 Motivated Nature of Thinking

Finally, Luria pointed out that experimental psychologists concurred that suitable motivation was necessary for thinking: 'Thinking arises only when the subject has an appropriate motive which makes the task urgent and its solution essential, and when the subject is confronted by a situation for which he has no ready-made (inborn or habitual) solution " (p. 327).

6.3.5 Conclusion

In his exposition, Luria demonstrated conclusively that motivation was necessary at each stage of the mental act and that activity was the essential adaptive resource for the achievement of one's goals.

6.4 COMPLEMENTARY THEORIES OF ACTION

Both comprehensive theories of action (Atkinson & Raynor, 1978; Luria, 1973) facilitate understanding of how personal motivational facets would influence the sample of action. Atkinson and his colleagues provide a view of some of the relatively-enduring dynamic motivational determinants of this achievement-oriented activity. Luria's theories explain that voluntary, conscious, motivated intentions and plans would generate and regulate some of the activity necessary for the higher mental functioning underlying this sample of cognitively-oriented action. Luria maintained that intentions and plans were one of three sources of activation of the first functional unit of the brain which maintains and regulates cortical tone and the waking state in accordance with the demands confronting the individual.

Pencil-and-paper performance on the Continuous Cognitive Task, the miniature sample of behaviour derived in an effort-demanding situation of challenge, should thus reflect achievement-oriented action style influenced by strength of relatively enduring and stable motivational dispositions (Atkinson & Raynor, 1978). Performance should also provide a gauge of manifest style of higher mental functioning and purposive action (Luria, 1973). The

motivational perspective would explain the dynamic determinants of achievement-oriented performance, viz. motivational dispositions generating and sustaining or opposing this activity. The psychoneurological perspective would view performance as the final expression of the integrated functioning of all three functional units. Incorporating Luria's terms, performance would reflect efficiency of voluntary attention, information processing, as well as intensity, efficiency, and persistence of goal-directed voluntary action.

These integrated behavioural measures viewed from the dual theoretical perspectives would allow an aetiological or current view of the interaction between affective and cognitive aspects (feelings, attitudes, needs, and fundamental motivational dispositions) influencing effective aspects (higher mental functioning and expression) in response to the opportunities and demands of the environment. The important conclusion would be that all these aspects influence performance, and the potential effect of all these aspects should be considered in understanding and evaluating measures derived from performance.

5.5 UNDERSTANDING PREREQUISITES FOR ADEQUATE COGNITIVE FUNCTIONING

An important similarity between my study and Feuerstein's approach (1979) was the notion that understanding of individuals was mandatory to guiding appropriate intervention. The interaction between affective, cognitive, and effective aspects of the child's functioning was stressed by both approaches. Feuerstein maintained that it was necessary to understand prerequisite characteristics and their effect on cognitive functioning within a particular individual in order to plan appropriate intervention. He claimed that the affective-motivational factor "had a pervasive influence on all three phases of the mental act" (p. 58), the major resistance to learning occuring at the input and output phases (p. 276). He emphasized "the heavy weight of peripheral (input and output) and attitudinal factors in the sum total of the behaviours leading to failure" (p. 129).

Stressing the central importance for adequate cognitive development of appropriate "attitudinal characteristics", Feuerstein emphasized the need for "an attitude toward thinking and problem solving that is actively and efficiently involved in organizing the world of stimuli impinging on the individual from both internal and

external sources" (pp. 71-72). He drew attention to the "restricting, attitudinal, motivational characteristic ... of the retarded performer" (p. 81), an attitude ultimately manifest by deficiency in "effective, independent, and autonomous use of environmental stimuli" (p. 71). This characteristic attitude, he maintained had been selected as a "target of attack" in their intervention programmes "because of its central position in the sum total of determinants" (p. 86).

Feuerstein's assertions about the central importance of attention, motivation, and energy deployment for adequate cognitive functioning reinforced my own conclusions based largely on observations during intellectual assessment of diverse children highlighted as "problematic". The common focus (in Feuerstein's work and the present study) was on the importance of understanding characteristic dynamic adaptive resources (attitudinal and functional prerequisites) facilitating or impeding adequacy of cognitive functioning and adaptation.

6.6 COGNITIVE PREREQUISITES MEASURED BY THE DBAP

As mentioned in Chapter 4, Feuerstein had highlighted attitudes, work habits, and modes of thinking as the adaptive prerequisites for adequate cognitive functioning. In Chapter 5, I focussed on the first two prerequisites, considering the relationship between characteristic motives and attitudes, and achievement-oriented action tendencies (work habits). I suggested that objective measures of these characteristics could be derived by means of a Dynamic Behaviour Assessment Paradigm (DBAP). Having selected performance on a cognitive task as the DBAP, a view could be derived of the adequacy of the final product of the interaction between affective/attitudinal and "peripheral" effective aspects (input and output related to conscious voluntary cognitive activity and its expression.) This integrated view would allow consideration of the adequacy, not only of characteristic cognitively-oriented affect, attitudes and application, but also of some of the modes of thinking, aspects of Feuerstein's third prerequisite characteristic (Feuerstein et al., 1979).

6.7 METHODOLOGICAL SIMILARITIES AND DIFFERENCES: LPAD AND DBAP

Although my interest in assessing adaptive prerequisites of cognitive functioning within a dynamic assessment situation had not arisen from the work of Feuerstein, there were some similarities in focus and method. The present study contained several features similar to Feuerstein's dynamic approach, although there were marked differences in focus, procedure, measurement, and selection of an assessment paradigm.

Feuerstein's innovative approach, the Learning Potential Assessment Device (LPAD), had been an outgrowth of his dissatisfaction with conventional psychometric methods to meet assessment needs. Defining intelligence as the "capacity of an individual to use previously acquired experience to adjust to new situations" (Feuerstein et al., 1979, p. 76), he concluded that conventional test design was inadequate as it allowed only a survey of the individual's present cognitive skills. He said it did "not permit assessment of his capacity to apply acquired skills, strategies, and operations in new situations with which he is confronted in the course of assessment" (p. 90). He concluded that the major failure of conventional methods was the failure to provide tests with a learning element to assess the individual's potential to learn or to be modified by learning. He also queried the reliability of conventional assessment of cognitive functioning, noting the failure of conventional methods to consider functional efficiency.

Feuerstein cited the work of several investigators supporting "the effectiveness of a dynamic training assessment system", a "new philosophy of assessing cognitive potential" (p. 54). The three essential features of Feuerstein's "dynamic approach" (p. 94) were (a) its use to seek modifiability in the child, and thereby derive a measure of the individual's learning potential, (b) the fact that this search for modifiability was carried out by providing a focused learning experience, and (c) the provision of data for intervention by this approach.

The test design of the present study included "a focused learning experience" (p. 56) as the first stage of the assessment procedure. Whereas Feuerstein used ongoing training, testing, and observation over a considerable period of time as the assessment paradigm, my condensed dynamic assessment situation of teaching,

practice, and application provided a miniature sample of behaviour (task performance) as the dynamic behaviour assessment paradigm. Aspects of task performance would reflect the child's independent application over a fifteen-minute period, independent application of the skills and strategies he had recently acquired or practised within this situation.

This focus might be of supplementary value in Feuerstein's approach, providing an objective quantitative baseline or criterion measure of characteristic "affective, independent, and autonomous use of [cognitive] environmental stimuli." As regards measurement, another *difference was the fact that my condensed assessment* paradigm had the potential to yield quantitative measures of performance with adequate psychometric properties, whereas Feuerstein's measures were based on observation and "evaluation".

6.8 FINAL PURPOSE OF THE STUDY

I aimed to facilitate research with 5-6 year old children by providing quantitative measures, considered to reflect or represent relatively enduring dynamic adaptive prerequisites for adequate cognitive functioning and adaptation, and viewed from motivational and psychoneurological perspectives.

The objective focus on characteristic adaptive action style, cohesive with the views of the cognitive theorists supporting the notion of Early Intervention, should serve research needs arising from these practices.

If intervention was aimed at enriching the child's opportunities, it seemed logical first to examine the child's tendency to use opportunities. My long-term practical goal was on preventive diagnosis by seeking to identify those individuals who were currently not using their own potential resources adequately, individuals who might need assistance in developing prerequisite characteristics for adequate cognitive and adaptive functioning. (I also hoped to identify children with highly affective adaptive resources, the gifted or those who might compensate for other areas of deficit.) I hoped, ultimately, to contribute towards the provision of specific valid and meaningful theoretically-based measures of dynamic adaptive characteristics to facilitate decisions about individuals.

I regarded the most important decision to be determining whether or not individual children required any special intervention. I

aimed to assess individuals along adaptive motivational/functional dimensions in order to evaluate their current desire and tendency to utilize their own resources effectively. Measures would be derived of both interindividual and intraindividual variation, both aspects having potential value and relevance in determining the need for intervention or for further clarificatory assessment.

To this ultimate purpose, I aimed (a) to provide a valid means of measuring adaptive prerequisites for adequate cognitive functioning in 5-6 year old children, (b) to provide a theoretically-based integrated intraindividual view of these prerequisites, (c) to provide a theoretically-based view of their effective manifestations related to higher mental functioning, and (d) to determine their effectiveness in predicting achievement and classroom adjustment.

By using performance (a sample of voluntary cognitive and motor activity) as the DBAP for 5-6 year olds, I hoped to provide objective measures, not only of appropriate attitudes (the essential cognitive/affective resource), but also of the consequent action tendencies (the essential effective resource). Not only should it be possible to measure "an attitude that is actively and efficiently involved in organizing the world of stimuli impinging on the individual" (Feuerstein, 1979, p. 71-72), but it should also be possible to measure active and efficient organization and application.

6.9 SUMMARY

6.9.i Dynamic Paradigm to Assess Active Adaptive Cognitive Functioning

The use, as a DBAP, of a sample of achievement-oriented activity on a simple but effort-demanding cognitive task, viewed through the psychoneurological theories of Luria (1973), should enable an integrated view of the child's characteristic active adaptive functioning in response to a cognitive achievement-oriented challenge. This integrated view should include the child's affective/motivational resources and his effective resources (for higher mental functioning and purposive motor action).

6.9.1.i. Focus on Adaptive Prerequisites

Described in terms of adaptive prerequisites (Feuerstein et al., 1979), performance on this continuous cognitive task should provide an integrated measure of the effectiveness of the child's

characteristic attitudinal and functional adaptive prerequisites for adequate cognitive functioning (appropriate attitudes, work habits and [some of his] modes of thinking).

6.9.1.2 Focus on Effective Aspects

These effective resources will represent functional efficiency, efficiency of higher mental functioning in all three phases of the mental act, influenced by affective-motivational factors. Performance will represent "effective, independent, and autonomous use of environmental [cognitive] stimuli" (Feuerstein et al., 1979).

Specifically, performance on this continuous cognitive task should provide measures of synthetic mental activities, reflecting characteristic intensity of voluntary commitment as well as functional efficiency. Facets of these mental activities are characteristic efficiency and stability of voluntary attention, information processing, and intensity, efficiency and persistence of purposive goal-directed voluntary action.

7 METHODOLOGY OVERVIEW

The study was divided into two stages. Original assessment instruments were devised, used, and investigated in Stage One; established assessment tools were investigated and used as criteria in Stage Two.

7.1 STAGE ONE: ORIGINAL ASSESSMENT DEVICES

7.1.1 The Continuous Cognitive Task (CCT)

7.1.2 The Teachers' Checklist (Appendix A)

7.1.3 Criterion Readiness Groups

7.2 STAGE TWO: ESTABLISHED ASSESSMENT INSTRUMENTS

7.2.1 The Wide Range Achievement Test (WRAT) (Jastak & Jastak, 1978 edition), presented in Appendix B.

7.2.2 The Devereux Elementary School Behaviour Rating Scale (DESB) (Spivack & Swift, 1967), presented in Appendix C.

7.3 SAMPLING ISSUES

I was interested in assessing characteristic adaptive prerequisites for meeting the demands and requirements of a "conventional" Grade One class at school. These requirements seemed generally to be that the child masters the early basic scholastic skills and that he is able to regulate his behaviour adequately in order not to become seriously disruptive in the classroom situation. Additional child-centred goals (not always actively considered) are that the individual grows and develops through this school experience.

I aimed to measure these prerequisites at a stage when educationalists generally make decisions regarding the child's "readiness" for formal school, or about whether he shows any signs of being "at risk" for learning disability. As a experimental design required active cooperation and assistance from the nursery school teachers, I selected nursery schools mainly on the basis of the interest, willingness, and cooperation of the nursery school staff. (The supervisor at one of the three schools was particularly interested in having the children assessed, saying that she had far more children in this age group presenting problems than she had ever had before.)

The pilot study (N = 20) was carried out at a private Greek nursery school, and the main study (N = 108) at three separate nursery schools. One of these was private, run by a specific cultural group (Hebrew), and the other two, municipal. At two of the nursery schools, I tested every child who was "eligible", in terms of age, to attend school the following year. As I planned to include only about twenty more children in the study, I selected the additional children from the third school, using as sole criterion the need to balance the ratio of males to females. Fifty eight per cent of the final sample were of Hebrew descent.

The test sample was not fully representative of South African 5-6 year old children. It comprised white, middle to upper-middle class children, whose teachers were willing to participate in this study. The findings therefore do not necessarily have general applicability, and the present conclusions can only be made regarding this particular cultural and socio-economic group.

Children's ages ranged from 5 years 3 months to 6 years 3 months when they were first tested. (There were two pairs of twins in the sample.) Because of the prevailing practice of holding several children back from attending Grade One, the test sample included not only those children who would soon be eligible for school, but also those who had been considered "unready although eligible" the previous year. This practice might well have increased the number of children in the present sample who were manifesting difficulties.

It did appear (from the background data and teachers' comments) that there were an unusually large number of children with problems in this sample. At the parents' or teachers' instigation, professional advice had been sought for 32,4% of the children, almost a quarter of whom (i.e eight children) having experienced problems of sufficient severity to warrant neurological opinion. (Of these, one child had undergone surgery to remove a brain tumour, two were taking Ritalin for "hyperactivity", one had been diagnosed as cerebral palsied, and the remaining four had experienced other "cerebral episodes".) An interesting finding was that there were an unusually high number of left-handed children in this test sample (18,5% of the children, as opposed to the usual 10% in the population).

7.4 EXPERIMENTAL DESIGN

7.4.1 Subjects

7.4.1.1 Pilot Sample

Twenty children attending a private nursery school for Greek children were used in the pilot study. Their ages ranged from 5 years 1 month to 6 years 6 months.

7.4.1.2 Experimental Sample (Stages One and Two)

The Experimental nursery school sample, tested several months before they were due to attend Grade One, comprised 108 children. This was the Stage One Sample. Ninety six of the 108 children (88,9%) were reassessed in Grade One the following year, forming the Grade One, Stage Two Sample.

Seven of the children from the Stage One Sample, who had remained at nursery school, were reassessed on both these tests, The Wide Range Achievement Test and the Devereux Elementary School Behaviour Rating Scale. They formed the Pregrade, Stage Two Sample. Their test results were not included in the final predictive analyses: they were used merely to support the formation of a de facto Low Achievement group.

7.4.2 Test Development for Examining Hypotheses

My major hypothesis was that facets of adaptive action (derived in a relevant life-like situation and reflecting relatively enduring motivational characteristics) would predict scholastic achievement and classroom adjustment.

In order to examine this hypothesis, it was first necessary to establish that facets of adaptive action, derived in a relevant life-like situation, did reflect relatively enduring characteristics. I proposed, therefore, first to devise a valid and objective means of measuring relatively enduring personal adaptive action tendencies in 5 and 6 year old children.

My initial hypothesis was that performance on a challenging continuous cognitive task could be used as a Dynamic Behaviour Assessment Paradigm (DBAP) to measure personality (viz. relatively enduring adaptive motivational characteristics).

7.4.3 Test Development and Evaluation: Overall Design

The initial hypothesis was investigated in Stage One and the major hypothesis in Stage Two.

Stage One was thus devoted to devising the means of deriving appropriate measures of adaptive motivational characteristics and

investigating the construct validity of these measures. In Stage One, Phase One, I designed and used the Experimental Situation, the challenge and the Continuous Cognitive Task (CCT). The purpose was to derive quantitative performance measures with adequate psychometric properties of motivational characteristics, attitudinal and affective.

In Stage One, Phase Two and Three, I devised the means of deriving independent measures (teachers' observations and "readiness" judgements) in a different situation, in order to examine the construct validity of the CCT performance measures. If the theoretically-based hypotheses relating CCT performance measures to teachers' observations were substantiated, I would derive valid, specific, theoretically-based performance measures of "well-defined [motivational] construct" (Lundberg et al., 1978).

In Stage Two I investigated the predictive validity of the CCT performance measures. In Stage Two, Phase One, I assessed the structure of the Wide Range Achievement Test (Jastak & Jastak, 1978 edition), one of the two valid assessment devices selected as appropriate criteria. The major hypothesis was then investigated in terms of these scholastic achievement criteria.

Stage Two, Phase Two was devoted first to assessing the structure of the behavioural criteria (The Devereux Elementary School Behaviour Rating Scale, [Spivack & Swift, 1967]), and then investigating the integrated structure of both sets of criteria (scholastic and behavioural). Integrated criteria measures (derived from the WRAT and the DESB) were then used to investigate the major hypothesis.

7.4 Procedure

The Stage One Sample was assessed in a small group situation at the three nursery schools shortly before the end of the school year. The entire Stage Two Sample (i.e. all available children from the Stage One Sample) were reassessed individually a year later when ninety-six of the children were in Grade One (at fifteen different primary schools) and seven of the children were still in a Pregrade environment (at three different schools). Discussions were held with all the teachers at both stages of the study.

7.4.4.1 Preliminary Discussions with Teachers for Stage One

The rationale of the study was outlined to the nursery school teachers concerned and their assistance requested in completing the Teachers' Checklist for each child in their group. The items of this Checklist were read and discussed to clarify any queries. The teachers were advised that the assessments would be discussed with them, if they so wished, after the assessments, observational scales, and interviews had been completed.

7.4.4.2 Continuous Cognitive Task within Experimental Situation

In the Experimental Situation, a group of four children were taught, tested, and observed during the preparatory period for the Continuous Cognitive Task (CCT). I taught and tested each group, and a professionally-trained assistant observed the children and helped with the testing. The children were then closely observed during the performance period of the CCT. A maximum of two groups were conducted early in the school day to minimize fatigue in the children and teacher/testers.

7.4.4.3 Individual Teacher Interviews to Discuss Readiness Groups

Before the assessment results were disclosed, I interviewed each teacher individually to obtain her global judgement of the child's "readiness" for Grade One. When this was completed, the assessment results were presented, with words of caution regarding the essentially tentative nature of these, as yet unvalidated, findings.

7.4.4.4 Preliminary Teacher Discussions for Stage Two

In the second stage of the study, interviews were carried out with the Grade One and Pregrade teachers. They were asked to rate the child on the Devereux Elementary School Behaviour Rating Scale (DESB). The Rating Guide was read and discussed to ensure that each teacher gave these instructions her full attention and was clear about the requirements.

7.4.4.5 Wide Range Achievement Test

I tested each child in the Stage Two Sample individually on the Wide Range Achievement Test (WRAT).

7.4.4.6 Final Meeting With Stage Two Teachers

During the final meeting with the Grad One and Pregrade teachers, the completed rating scales were submitted and a brief discussion ensued concerning the child's present progress.

7.5 DATA ANALYSIS

7.5.1 Original Instruments in Stage One

Analysis of structure of the CCT was carried out by means of factor analysis. The structure of the Teachers' Checklist was also investigated (reliability, and then data-reduction by cluster analysis, preliminary to factor analysis). The construct validity of each CCT performance measure was then examined by means of multiple regression analysis, using the Teachers' Checklist factors as the independent variables.

Construct validity of the CCT performance measures was also investigated in terms of three-division and two-division Teachers' Readiness groups. Graphic presentation of the results was provided in terms of comparative group Curves of Work (CCT performance) and frequency distributions.

7.5.2 Criteria Measures Used in Stage Two

The structure of each of the established criteria measures (WRAT and DESB) was examined by preliminary factor analyses. A further principal component analysis was carried out to examine the structure of both sets of factors derived from these preliminary analyses in order to derive final integrated criteria.

7.5.3 Hypothesis Testing

The major hypothesis was first tested by multiple regression analysis, investigating the CCT performance measures in terms of Scholastic Achievement (WRAT). (Because of a design problem which became apparent in Stage Two when seven children were found to be still in Pregrade classes, Scholastic Achievement groups were formed to included a focus on these Pregrade children as a de facto Low Achievement group.)

Finally, the major hypothesis was tested in terms of the integrated criteria (WRAT and DESB). Comparative group Curves of Work and frequency distributions were drawn for selected criterion groups.

8 PERFORMANCE: THE DYNAMIC BEHAVIOUR ASSESSMENT PARADIGM

8.1 TEST DEVELOPMENT: THE CONTINUOUS COGNITIVE TASK

8.1.1 Rationale

My first goal was to derive specific theoretically-based objective measures, with adequate psychometric properties, of adaptive action style manifest in a significant situation. A theoretically-based pencil-and-paper task, the Continuous Cognitive Task (CCT), was designed and a challenge formulated. It was proposed that performance on this task, after a period of tuition and practice, would provide the Dynamic Behaviour Assessment Paradigm for measuring adaptive action tendencies mobilized in response to environmental demands and challenges.

Consistent with findings from other Continuous Work Tests (Reuning, 1983), I hypothesized that productivity, accuracy, and patterns of application, objective quantitative measures of performance on the CCT, mobilized in a situation of challenge for maximal effort, would reflect individual differences in adaptive motivational characteristics, attitudinal and effective.

I considered that these relatively-enduring characteristics would be motivational dispositions including need for Achievement, adaptive motives, and attitudes (e.g. Motive to Achieve Mastery; Motive to Confront Experience; Motive to Achieve Success and Motive to Avoid Failure [Atkinson & Raynor, 1978]). Effective characteristics, reflecting the strength of the Tendency to Achieve Success and the Tendency to Avoid Failure (Atkinson & Raynor) would be the child's independent tendency to apply himself energetically and efficiently in achievement-oriented activities requiring persistent commitment (i.e sustained voluntary attention and purposive, goal-directed voluntary action).

8.1.1.1 Nature of the Task

As the main focus was on deriving measures reflecting individual differences in motivated action tendencies, it was necessary to design a task which minimized the role of ability and maximized the role of application of independent voluntary effort and sustained attention. The task therefore had to comprise "work" which was well

within the ability of the majority of 5-6 year old children. This approach was consistent with Reuning's emphasis (1983, p. 305) that it was "an essential characteristic of a Continuous Work Test that the task it demands should not be difficult because of unfamiliarity or complexity".

As I also wanted to view functional efficiency (input, integration, and output), the task was designed to measure simple but energetic visual-perceptual-motor activity. It would thus provide measures of intensity, efficiency, and persistence of voluntary attention, information-processing, and voluntary action. The CCT required rapid organized matching and marking over an appreciable period of time, fifteen minutes of simple but effort-demanding continuous self-paced performance. The nature of the task would enable measures to be derived of adequacy of simultaneous synthesis, considered to be one of the two basic modes of information-processing (Das, Kirby, & Jarman, 1973; Kamphaus & Kaufman, 1986; Luria, 1973).

The child was required to identify, from a group of four symbols, the one which matched a standard symbol, and then to draw a line through it. These five symbols constituted a single unit of work. Each page comprised twenty-two work units presented in two columns. Each standard symbol was presented between red columns on the left side of the page, and between blue columns on the right (see Appendix D). The child was required to complete the column of work on the left side of the page before proceeding to the top of the column on the right. In addition, he was required to underline his last response when a specified signal was given, marking the end of each one-and-a-half minute work period. Detailed instructions are included in Appendix E.

8.1.1.2 Nature of the Task Demands

As with other Continuous Work Tests, Performance on the CCT was primarily designed to measure motivational characteristics (intensity of arousal, effective drive, effort, and persistence). By selecting performance as the Dynamic Behaviour Assessment Paradigm, I hoped to provide precise measures of individual differences in facets of characteristic adaptive action. An important feature of Continuous Work Tests is the fact that they are open-ended with no ceiling. This feature would thus facilitate the measurement of all gradations between minimal and maximal use of

achievement opportunities.

To maximize the expression of individual differences, and to derive measures of intensity of volitional drive aspects related to adaptive or achievement motivation, it was necessary, as in other Continuous Work Tests, to introduce a challenge into the situation. By this means I proposed not only to measure effectiveness or competence, but also the desire and tendency to strive for something more than competence, involving self-defined motives, commitment, and a sense of satisfaction (Lamberth, Rappaport & Rappaport, 1976). I aimed to measure the child's characteristic desire and tendency to confront opportunities and to strive energetically to meet standards of excellence and satisfy his needs for Achievement and Mastery.

I considered it important to present this challenge in a way that would interest, motivate, and encourage each child to try and use his resources fully. An essential aspect was that each child would first be shown that he could do this work adequately (thus maximizing his expectancy of success) before he responded to the challenge for maximum effort. In this way I attempted to control or reduce initial individual differences in situation-related attitudes, expectancies, and incentives representing the effect of the immediate environment (Atkinson & Raynor, 1978). This was done in order to maximize the expression of differences in relatively-enduring fundamental motivational tendencies.

Features emphasizing volitional aspects were thus the challenge for maximum effort, the attempt to maximize each child's expectancy of success in this situation, and the fact that the task had no ceiling. This last feature clearly maximizes individual differences allowing the full range of voluntary activity to be expressed.

8.1.2 Pilot Study

In order to investigate whether the intrinsic task demands were realistic for this age group, a pilot study was carried out on twenty children attending a Greek nursery school. Geometric designs, varying in range, number, size, complexity, and presentation, were administered to the first eight children in groups of four. Eight simple geometric shapes were selected for administration to the remaining twelve children; this format was retained in the final study.

It was established that all twenty children in the Pilot Study were able to master the basic task requirements and almost all

(nineteen) were able to endure (i.e. continue working until the end of) the fifteen minute period. The childrens' reactions varied notably but the majority appeared to enjoy the challenge. The average number of work units completed on the Continuous Cognitive Task was 150, ranging from 107 to 244. Graphic representation of the amount of work completed in each consecutive period ("Curve of Work") revealed notable variation in patterns of application during this continuous work period.

The Pilot Study established the feasibility of using this task with the relevant age group (and, incidentally, with children whose home language was not English). It also established the possibility of deriving measures depicting appreciable individual differences. Performance facets were selected from the Continuous Cognitive Task for measurement.

8.1.3 Procedural Aspects

The Continuous Cognitive Task was designed to provide, in a simulated classroom situation, a sample of achievement-oriented activity related to higher mental functioning. Children were taught, observed, and tested (by a teacher/tester and assistant) in groups of four within the Experimental Situation. The simulated classroom situation included a preparatory period of teaching, training, and practice on the matching and marking task, and a subsequent period of performance on *this task in response to a challenge*. The sample of achievement-oriented activity comprised fifteen minutes of <u>self-paced performance</u> on the Continuous Cognitive Task carried out within the Experimental Situation.

The preliminary or preparatory teaching session was an important feature of this assessment. Each child was required to demonstrate understanding and mastery of the task requirements, as well as the ability to perform the task independently during a practice trial. The teaching was carried out with the aid of a blackboard, and each child had several opportunities to match and mark symbols on the board. Each child was praised for mastery and competence after learning to carry out the basic matching/marking task, and demonstrating adequate competence in completing the practice trial comprising twenty-two work units.

The challenge was then presented to the entire group regarding their performance on the ensuing fifteen minute Continuous Task. (As in other Continuous Work Tests, the children were not told

exactly how long they would be required to continue working.) The group were challenged to work as hard as possible in order to see how much work they could do. They were told to keep on working even if they were tired and felt like stopping. They were challenged to continue working even if there were distractions, such as someone making a noise or walking into the room. The continuous work period then commenced, interrupted only by the intermittent signal which marked the end of each one-and-a-half minute period. As a child completed a page, he was immediately given an additional work sheet. (There were five different work sheets containing figures in an order generated at random by a computer. If a child required more than five sheets, further sheets were repeated at random.)

6.1.3.1 Supplementary Continuous Work Checklist

As this miniature teaching and working situation provided an opportunity for close observation of the child's behaviour and overt reactions, a three-item Yes/No Checklist was devised for completion by the observer in order to assess behavioural aspects. The assistant/observer recorded, during the entire learning period whether or not the child showed any difficulty with the requirements, displayed noisy disruptive behaviour, signs of anxious uncertainty.

In addition, a six-item forced-choice Checklist was devised in order to assess the child's personal thoughts, feelings, attitudes, and reactions related to the work situation. After the fifteen minute period had ended, each child was questioned privately in order to obtain these situation-related self-report measures. While asking the forced-choice questions, equal emphasis was given to each of the contrasting options with the intent of making each option sound equally prominent and "acceptable".

6.1.4 Psychometric Aspects of Performance Measures

The major facets represented quantitative and qualitative aspects of performance on The Continuous Cognitive Task, as well as shape aspects, patterns of application derived from an analysis of work output throughout the entire work period. A graphic presentation, or "Curve of Work" could be derived for each individual child.

Quantitative psychometric performance measures were obtained in the following way: The fifteen minute continuous task had been demarcated (by means of the dividing signals) into ten

one-and-a-half minute Work Periods. The number of completed work units was obtained for each period. These ten sub-totals, Work 1 to Work 10, were used to plot the Curve of Work, and to calculate measures depicting relevant shape aspects. Quantitative measures were also derived for qualitative aspects of performance, viz. number of errors, corrections, displacements, and extraneous markings.

Individual Curves of Work for selected children, illustrating the marked variation (and occasional similarity) between children are presented in Figure 1. (It was interesting to note the similarity between the Curves of Work of a pair of identical twins, both of whom were presenting notable problems. These children had formerly been diagnosed as hyperactive with attentional deficits). The Curves of Work illustrating the minimum work output and maximum work output derived in this sample belonged, respectively, to a child subsequently diagnosed as apraxic, and a child who had been attending a programme for gifted children.

8.1.4.1 Deriving Quantitative Measures of Performance

Eight objective measures, as outlined below, were utilized. Measures representing shape aspects of the Work Curve were devised, in consultation with Dr Reuning, by using or adapting techniques used in other Continuous Work Tests (Reuning, 1978).

Total Work Output: The total number of work units completed during the entire fifteen minute work period.

Errors : The total number of uncorrected errors.

Corrections: The total number of corrected errors.

Displaced Responses: The total number of Displaced Responses, defined as those that were marked in the wrong place. These included the omission of rows of work, working in the wrong column, or marking the standard symbol instead of (or as well as) the matching symbol.

Extraneous Markings: The total number of Extraneous Markings, defined as elaborated marking on the matched symbols, or other irrelevant scribbling or drawing on the work sheets.

Increase over Time: This refers to the average increase in work units during the course of the task. It was derived by subtracting the average work output during the first half of the task from the average work output during the second half of the task, i.e.

(Work 6 + ... + Work 10)/5 - (Work 1 + ... + Work 5)/5

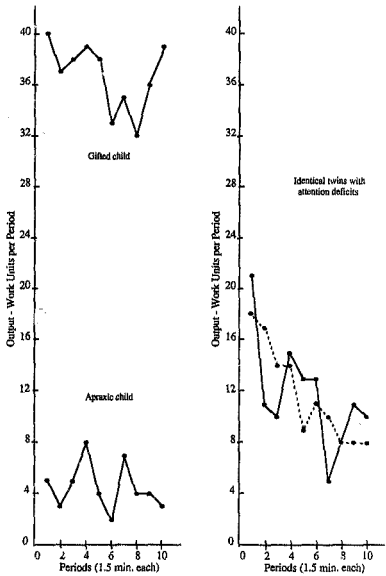

Figure 1. Individual Curves of Work for Selected Children.

Convexity/Concavity: This measure depicts the degree of Convexity/Concavity of the Curve of Work. It was derived from the following computation:

Convexity/Concavity = (Work 1 + Work 2 + Work 3 + Work 8 + Work 9 + Work 10)/6 - (Work 4 + Work 5 + Work 6 + Work 7)/4

Fluctuation or Variability: This refers to fluctuations in output over the total fifteen minute work period. It was calculated in the following way: First the sum of the differences (Sigdiff) was calculated. The work output for each period was subtracted from the work output of the previous period to derive these differences.

Sigdiff = (Work 10 - Work 9) + (Work 9 - Work 8) .... (Work 2 - Work 1) = Work 10 - Work 1

The second step in the calculation was finding the sum of the absolute differences (Sigabdiff) between the output of consecutive work periods.

Sigabdiff = |(Work 10 - Work 9)| + ... + |(Work 2 - Work 1)|

Fluctuation, the measure of variability, was then derived by subtracting the absolute value of the sum of the differences Abs(Sigdiff) from the sum of the absolute differences (Sigabdiff).

Fluctuation = Sigabdiff - Abs(Sigdiff)

In this way, eight objective performance measures were derived from the sample of Continuous Work. They reflected level of performance or productivity (Total Work Output), qualitative facets (number of Errors, Corrections, Displaced Responses and Extraneous Markings), and shape aspects of the Curve of Work (Increase, Convexity and Fluctuation).

8.1.4.2 Test Reliability

Test-retest reliability of performance measures derived from the Continuous Cognitive Task was not determined due to the nature of the Experimental Situation. The task was preceded by a preliminary teaching and training situation, followed by a period of practice. The subsequent prolonged period of continuous performance would clearly have a marked practice effect and therefore change the nature of performance on a future occasion.

8.1.4.3 Factor Analysis of CCT Performance Measures

A principal components analysis by varimax rotation was carried out in order to assess the structure of the performance measures derived from the Continuous Cognitive Task.

Table 1

Varimax Rotated Factors derived from

CCT Performance Measures (N=108)

	Factors		
	1	2	3
CCT Performance			
Total Work Output	-209	791	022
Increase over Time	-135	460	-605
Convexity	070	-133	645
Fluctuation	-092	278	688
Errors	613	-175	045
Corrections	756	-160	019
Extraneous	747	047	011
Displaced Responses	035	-763	069
Eigenvalue	2,124	1,238	1,057
Percentage Variance	26,5	15,5	13,2
Cumul. Percentage	26,5	42,0	55,2

8.1.4.3.1 Interpretation/Description of Table 1

In terms of Kaiser's criterion, the data were characterized by a three-factor structure. A loading was considered to be significant if it exceeded the critical value of Pearson's r at the .001 level (that is r_{crit} = .3211), with N = 108. Significant loadings have been underlined.

Factor 1. The qualitative measures, Errors, Corrections, and Extraneous Markings, loaded on the first factor which accounted for 26,5% of the variation. These three variables reflected inaccuracies and untidy digression or irrelevant responsiveness, and thus the factor was labelled Lack of Controlled Precision.

Factor 2. The three measures which loaded on the second factor, Total Work Output, absence of Displaced Responses, and Increase in work output during the fifteen minute work period, accounted for 15,5% of the variation. These measures reflected the ability to work quickly with a high degree of sustained attention and effort. The factor was therefore labelled High Level of

Sustained Efficiency.

Factor 3. The measures reflecting shape aspects of the Curve of Work, viz. Fluctuation, Convexity, and Increase in work output loaded on the third factor, which accounted for 13,2% of the variation. These measures reflected both variability and declining test performance, and, therefore, the factor was labelled Lack of Sustained Voluntary Action.

8.1.4.3.2 Discussion

The structure derived appeared to be logically consistent with constructs from the major theoretical views relevant to the present study. Factor 1, Lack of Controlled Precision, appeared to reflect a deficient attitude to this task or lack of impulse control. Viewed in terms of deficient attitude, it was reminiscent of Feuerstein's factor, "Impaired Need for Precision, Accuracy" or "an attitude toward thinking and problem solving that is [not] actively and efficiently involved in organizing the world of stimuli impinging on the individual from both internal and external sources" (Feuerstein et al., 1979, p. 71-72).

Factor 2, High Level of Sustained Efficiency, appeared to portray a pattern consistent with the syndrome described by Atkinson (Atkinson & Reynor, 1978). This syndrome associated a high level of performance with efficient, persistent involvement in the achievement-oriented activity. Viewed through the theories of Luria (1973), this factor reflected a high level of achievement explained by adequate generation, preservation, and regulation of activity.

Factor 3, Lack of Sustained Voluntary Action, reflected inadequate purposive action (shown by a high level of fluctuation and decreasing work output). Viewed through the relevant motivational theory (Atkinson & Reynor, 1978), this would imply a change in motivational forces during the work period, resulting in erratic decreasing achievement-oriented activity.

These three factors represented the three major dimensions of the Continuous Cognitive Task: the qualitative, quantitative, and shape aspects. The condensation of variables from eight to three, however, accounted for just over half of the total variance (55.2%) and was considered to represent too great a loss of information (i.e. some 44.8% of the variance remained unaccounted for). As an alternative, a complete principal components solution was derived, the varimax rotation of which produced eight orthogonal factors.

Orthogonalization of predictors has been endorsed (Kerlinger & Pedhazur, 1973) as the optimal procedure for use in Multiple Regression Analysis.

Table 2

Eight Orthogonal Factors From Complete Principal Components Solution for CCT Performance Measures (N=108)

	Factors							
	1	2	3	4	5	6	7	8
CCT Performance								
Total Work Out.	-187	-066	-010	-092	070	162	-099	**955**
Errors	076	078	062	**977**	-014	-016	145	-086
Corrections	064	156	-003	151	-022	-088	**965**	-096
Increase	-089	-049	-135	-017	-075	**966**	-088	156
Convexity	044	021	**989**	059	022	-126	-002	-009
Fluctuation	-004	-030	022	-013	**995**	-068	-020	062
Displaced. R.	**974**	017	046	077	-004	-087	063	-175
Extran.Mark.	016	**982**	021	077	-031	-046	148	-069

8.1.4.3.3 Description of Table 2

Factors 1 - 8 represent the derived orthogonal factor scores of each variable and were labelled: Factor score of (F.) Displacements, Extraneous Markings, Convexity, Errors, Fluctuation, Increase over Time, Corrections, and Total Work Output.

8.1.4.3.4 Final Psychometric Indices for CCT Performance

These eight orthogonal factor scores were used when the performance measures derived from the Continuous Cognitive Task were used as predictors in the multiple regression analyses (Stage One, Phase Three: and Stage Two). The original performance measures, however, were used in the multiple regression analyses, when these measures served as criterion variables (Stage One, Phase Two).

8.2 PERSONAL MEASURES FROM SUPPLEMENTARY CCT CHECKLIST

Three of the nine personal items of the Supplementary Continuous Work Checklist involved observed behaviour. The observers endorsed 'Yes' or 'No'.

Did the child show any initial difficulty in mastering the task requirements?
Did the child show signs of uncertainty or anxiety in this situation?
Was the child noisy, calling out frequently during the period of teaching, practice or continuous performance?

Six self-report items referred to the child's personal thoughts, feelings, attitudes, and reactions related to the work task:

Did you like doing this work or not like doing it?
Did you feel well today or not well?
Did you try some of the time or all the time?
Did you feel a little bit tired or very tired?
Did anything worry you while you were working?
Did you think about any other things while you were working?

8.2.1 Correlations: CCT Performance and Personal Measures

The Continuous Cognitive Task yielded eight objective quantitative performance measures, hypothesized to measure (a) manifestations of characteristic voluntary attention and action, and (b) underlying relatively-enduring personal adaptive motivational characteristics or dispositions, achievement-oriented motives, attitudes, and action tendencies. In order to take a brief preliminary view of the interaction between cognitive, affective, and effective facets of the child in this situation, his feelings, thoughts, attitudes, and behaviour (i.e. Personal measures manifest within the Experimental Situation) were correlated with the CCT Performance measures.

Only intercorrelations significant at or above the .01 level were included in Table 3 in order to view only the most striking features of the interaction within the situation of cognitive, affective, and effective aspects of adaptive action.

Table 3

Significant Intercorrelations ($p < .01$) Between
CCT Performance and Personal Measures (N=108)

Personal Meas.	CCT Performance Measures			
	Total Output	Displ Error	Corre	Extra Inore Conve Fluct
Observations				
Diff.Mastery	-268	295		
Anxious Uncer.				
Noisy	-293	404		
Self-Report				
Disliked	-309	241		
Not Well		236		
Part.Effort	-248	271	-261	
Disturbed	-436			
Oth.Thoughts			287	

Note. Decimal points omitted. Each correlation coefficient is significant ($p < .01$).

6.2.1.1 Interpretation/Description of Table 3.

This table showed clearly that observational, self-report, and performance measures were significantly interrelated. All correlations in this table were significant ($p < .01$). Two of the performance measures, Total Work Output and Corrections, were significantly related to two of the behavioural observations, and to three self-report measures of feelings, thoughts, and attitudes (cognitive/affective evaluation of the situation).

The main measure, Total Work Output, had a significant negative relationship with observations of initial difficulty in mastering the task requirements (Diff.Mastery) and observations of uncontrolled (or Noisy) behaviour ($r=-.268$ and $r=-.293$, respectively). The appreciable positive correlation ($r=.436$) with Not Disturbed, the endorsement of not having been 'worried by anything while working', suggested that productivity was associated with feelings of undisturbed involvement and focused commitment.

This notion was reinforced by the significant positive association (r=.268) with the child's endorsement of having "tried all the time" (Total Effort vs. Partial Effort), and having enjoyed the task (Liked vs. Disliked) (r=-.309). In sum, low productivity was associated with difficulties of mastery and control: high productivity was associated with intense involvement, commitment, and enjoyment.

In contrast, the tendency to make many Corrections, a manifestation of inefficiency, was positively associated with initial difficulty in task mastery (Diff.Mastery) and Noisy behaviour (r=.295 and r=.404, respectively). It was also related to negative attitudes (endorsement of disliking the task [r=.261], not feeling well [r=.236], and having "tried only some of the time" [Partial Effort, r=.271]).

The acknowledgement of Partial Effort also had a significant negative relationship (r=-.261) with a third performance measure, Increase, showing that a lack of sustained performance was related to the child's endorsement of not having sustained effort all the time.

A final interesting correlation, (r=.287) between the child's endorsement of having thoughts unrelated to the work task, and his tendency to make Extraneous Markings on the work sheets, suggested active digression (mind wandering and doodling).

8.2.1.2 Conclusions

This brief view of the interaction between Personal and Performance measures within the Experimental Situation appeared to have many interesting implications. The main relevance to the present study, however, was that these relationships were logically consistent in relation to four performance measures. The correlations reflected the significant association between current motivational attitudes, feelings, and adaptive behaviour, manifest within the Experimental Situation, and motivated (or voluntary) performance on the Continuous Cognitive Task. Multiple regression analysis was not carried out between Personal and Performance measures as independent measures within a different situation were necessary in order to investigate construct validity in terms of the hypothesized motivational characteristics.

8.3 TEST DEVELOPMENT FOR INVESTIGATING CONSTRUCT VALIDITY

The next two chapters will deal with test development in relation to my second goal, viz. providing a way of establishing construct validity of the quantitative CCT performance measures and of deriving well-defined constructs. This was attempted in two ways.

In order to test the theoretically-based hypothesis that achievement-oriented activity would reflect relatively-enduring adaptive motivational characteristics, an independent Teachers' Checklist of the child's adaptive characteristics manifest in the nursery school environment was devised. In Chapter 9 (Stage One, Phase Two) measures derived from this Teachers' Checklist were used to examine construct validity of the Continuous Cognitive Task.

The concurrent validity of the CCT performance measures was also viewed by examining their efficacy in discriminating between groups of children, independently considered by their teachers to be "Ready" or "Not Ready" to cope with the opportunities and demands of Grade One. In Chapter 10 (describing Stage One, Phase Three) criterion groups, formed on the basis of independent "Readiness" judgements, were derived and used to examine the discriminative ability of aspects of CCT performance.

9 TEST DEVELOPMENT FOR EXAMINING CONSTRUCT VALIDITY

My major hypothesis was that measures of characteristic adaptive action style (conceived as a core adaptive prerequisite for intentional learning and adaptation), derived in a life-like situation, would predict scholastic achievement and classroom adjustment. My initial hypothesis was that performance on the Continuous Cognitive Task, used as a Dynamic Behaviour Assessment Paradigm representing a significant life-like situation, would provide quantitative measures of these relatively-enduring and general adaptive motivational characteristics.

I hypothesized that CCT performance would provide integrated measures reflecting (a) characteristic strength of adaptive motives and needs (e.g. competence, mastery, control, autonomy, need for Achievement, Motive to Achieve Success, and Motive to Avoid Failure [Atkinson & Raynor, 1978]), (b) characteristic attitudinal factors related to adaptation and achievement (e.g. "beliefs and conceptions" [Atkinson & Raynor, 1978], or a fundamental adaptive attitude that is "actively and efficiently involved in organizing the world of stimuli impinging on the organism from within and without" [Feuerstein et al., 1979, p. 71-72]), and (c) characteristic adaptive action tendencies (e.g. Attention and Behavioral Control [Feshbach & Adelman, 1977], Task Orientation [Schaefer, 1970], "effective, independent, and autonomous use of environmental stimuli" [Feuerstein et al., 1979, p.71], Tendency to Achieve Success, and Tendency to Avoid Failure [Atkinson & Raynor, 1978]).

In short, performance on the CCT would provide integrated behavioural measures of dynamic adaptive motivational characteristics, defined as those that influence or represent adaptive action tendencies. Dynamic characteristics postulated were the child's desire and tendency to apply himself energetically in activities requiring independent persistent commitment (i.e. his voluntary active adaptive style in response to environmental opportunities and/or demands). As the situation was achievement-oriented, measures of individual differences in

intensity, efficiency, and persistence of activity derived from the CCT were also considered to measure the child's unique "achievement style". Performance would reflect the child's characteristic desire and tendency to strive energetically to meet standards of excellence and satisfy his needs for mastery and achievement.

I hypothesized thus that performance on the CCT would reflect not only the child's general adaptive motivation, but also his motive to achieve mastery, conceived as more than being competent, involving self-defined motives, commitment, and a sense of satisfaction (Lamberth et al, 1978). Viewed in terms of need for Achievement (nAch), I hypothesized that performance would reflect the child's tendency "to do things as rapidly and/or as well as possible" ... "to work at something important with energy and persistence" ... "ambition manifested in action" (Murray, 1943, p.9).

Atkinson (Atkinson & Raynor, 1978) viewed achievement-oriented activity as dynamically related to "fundamental motives" or relatively-stable "motivational dispositions" (motives and "cognitive structure"). He postulated that performance would reflect the intensity of activity, which depends upon how strongly motivated the individual is, and how involved he is in the activity.

Thus, in terms of the Motive to Achieve Success, performance on the CCT would reflect the strength of the child's desire to "engage in activities that involve evaluation of one's performance in relation to standards of excellence" (Atkinson & Raynor, p. 152). In terms of the Motive to Avoid Failure, on the other hand, performance would reflect the strength of resistance to achievement-related activity. Performance would represent the strength of the tendency being expressed in the activity at the time. Atkinson suggested that motivational strength would influence the level of performance "by influencing efficiency in the execution of an activity as well as persistence, regarded as time spent on an endeavour" (p. 236).

9.1 EXISTING MEASURES OF HYPOTHESIZED CCT CHARACTERISTICS

In order to examine validity of the CCT in terms of these dynamic adaptive constructs, it was necessary to select or devise adequate alternative theoretically-based measures of relatively-enduring adaptive motivational characteristics, manifest in a different significant situation.

A review of the literature failed to provide an adequate means of evaluating the construct validity of the CCT performance measures, although several of the available rating scales, checklists, conceptual models, and construct definitions (Anderson & Messick, 1974; Behar & Stringfield, 1974; Kohn & Rosman, 1972a, 1972b; Nykelbust, 1971; Schaeffer, 1970) contained facets with some conceptual relevance.

9.2 STAGE ONE, PHASE TWO: DEVELOPMENT OF THE TEACHERS' CHECKLIST

I considered it necessary, therefore, to devise original measures of characteristics with specific relevance to facets hypothetically measured by performance on the Continuous Cognitive Task. I aimed to derive independent measures of these adaptive motives, needs, attitudes, and action tendencies in a different situation, affective measures of adaptive action tendencies and achievement style, as well as some of the underlying affective/attitudinal characteristics which I considered would influence these tendencies. I sought another significant situation in which these facets could be independently evaluated.

9.2.1 Dynamic Adaptive Interaction Tendencies

The nursery school (preschool) environment, providing preacademic stimulation, preparation, and opportunity for productive purposive action, appeared to be appropriate for assessing the child's characteristic dynamic adaptive interaction tendencies. I therefore designed the Teachers' Checklist (Appendix A) to depict these relevant constructs, incorporating, with modification, a few selected items from some of the existing scales. (These items were distinguished by an *.)

In this significant situation, dynamic adaptive characteristics included the child's voluntary attention ("interaction with instructional conditions" [Torgesen, 1986, p.404]), purposive action in independent activities and in set tasks, as well as other affective, attitudinal tendencies considered to underly adaptive interaction in achievement-oriented and other situations.

The affective focus included positive and negative task-related tendencies. These were interest, enthusiasm, pride in work, positive affective attitudes assumed to be related to need for Achievement, and anxiety manifestations related to the Motive and Tendency to Avoid Failure [Atkinson & Raynor, 1978]). Other affective tendencies, considered relevant to characteristic adaptive

activity (not necessarily achievement-related), were generalized anxiety, tension, distress, and interpersonal withdrawal. The Teachers' Checklist comprised 34 Yes/No statements delineating behavioural manifestations which could be readily observed at nursery school.

9.2.1.1 Hypothesized Syndromes of Adaptive Style

The underlying theme guiding the design of the Teachers' Checklist was the identification of facets or syndromes influencing or depicting characteristic effectiveness of dynamic adaptive interaction in this significant situation, viz. appropriate and effective energy mobilization and regulation in interaction with the opportunities and demands of this environment. Five hypothesized syndromes were defined by means of these 34 behavioural descriptions. These were Attention, Persistent Commited Action (in set tasks), Persistent Commited Action (in independent activities), Achievement-related Anxiety, and General Maladjustment.

Attention deficits were defined by nine behavioural manifestations observed during interaction with the teacher, incorporating poor auditory and visual selective attention, *hyperkinesis, impulsivity, and distractibility.*

Persistent Commited Action was assessed and defined by five statements in each of two sets of conditions. These were set tasks and organized activities, contrasted with self-initiated and independent activities. Statements encompassed interest in active participation, high performance standards, purposeful action, frustration tolerance, and persistence.

Achievement-related Anxiety, included nine statements incorporating overt signs of anxiety clearly counterproductive to efficient adaptive action. These included inhibitory reactions to new task demands, avoidance tendencies, confusion and undermined comprehension or performance, as well as dissatisfied destruction of achievement-oriented efforts. Most of these items were based on my personal clinical experience of manifestations which appeared to interfere with test performance during psychometric evaluation.

The six items constituting General Maladjustment were conceptually mixed, modelled on two of the items defining Behar & Stringfield's factor, Fearful-Anxious (1974), and two items incorporating Kohn & Rosman's concept of apathetic withdrawal from activities (1972a). The remaining items depicted anxious self-focus

and emotional withdrawal.

9.2.2 Psychometric Aspects of the Teachers' Checklist

9.2.2.1 Reliability

The reliability coefficient for 33 of the items was calculated with a resulting Alpha equal to .79955. (One item was omitted from this calculation as it had been overlooked by a teacher while evaluating seventeen of the children in the sample.) This reliability coefficient indicated that the entire scale provided a reliable measure of a unitary conceptual dimension. This would appear to be Dynamic Adaptive Interaction Style, (i.e. factors influencing or portraying adaptive energy mobilization and regulation), the underlying theme used in devising and selecting the items. It appeared therefore that this construct depicted a global "adaptive action style" (incorporating "achievement style" and style of adapting to other situations), reflecting characteristic adaptive needs, motives, attitudes, and affect. As most of the items (24/33) portrayed maladaptive interaction, the remaining nine items portraying adaptive interaction were modified (subtracted from 1). (Each item of the Checklist had been scored as 0 or 1.)

The composite score, reflecting an inadequate Dynamic Adaptive Interaction Style (derived by summing each of the 24 original Checklist items and the nine modified variables thus depicted an overall lack of adaptive activity in interaction with opportunities and demands of the preschool situation.

9.2.2.2 Rationale for Examining the Structure of the Checklist

Although the results demonstrated that the 33 items were all facets of a unitary dimension which could serve adequately as a criterion of lack of characteristic adaptive activity, the Teachers' Checklist had also been designed to provide a separate focus on each syndrome. I considered this separate focus to be of theoretical interest and of potential utility in deriving well-defined constructs for the CCT performance measures. I considered that this focus might also have future diagnostic value. Further statistical analysis was therefore undertaken to analyze the structure of the Teachers' Checklist.

9.2.2.3 Data Reduction (Cluster Analysis)

In order to reduce the number of items, a preliminary cluster analysis was undertaken. Eleven composite variables were derived

for twenty-six items, combining two or three items according to the clusters obtained (see Appendix F). The intercorrelations within these clusters ranged from .52 to .85 ($p < .01$). The following composite variables were derived by adding the items within each cluster. They were labelled according to conceptual similarity.

Flitting Attention, Distractibility.

Attention wanders frequently when directions or instructions are given to the class

Often restless, fidgety, or unable to sit still

Easily distracted by outside stimuli (objects or sounds) which are not related to the task at hand

Inadequate Voluntary Attention (Auditory).

Attention wanders frequently when a story is read or told to the class

Often fails to focus on important aspects when a story is read or told to the class

Inadequate Voluntary Attention (Visual).

Attention wanders frequently when a series of pictures, shapes or numbers are shown to the class

Often fails to focus on relevant aspects when a series of pictures, shapes or numbers are shown to the class

Purposeful Engagement.

Usually shows interest in taking part in organized tasks or activities

Eager to be actively engaged in constructive play

Generally able to pursue meaningful or purposeful independent activities

Standards of Excellence.

Cares about the quality of his/her work

Takes pride in what (s)he does and cares about how well (s)he does it

Persistent Effort.

Tends to become easily frustrated, often wanting to quit if efforts are not immediately successful or when encountering obstacles

Generally sticks to and finishes a set task which requires effort or practice

Patience and perseverance generally shown even in the face of difficulties or obstacles

Achievement-related Tension.

Tends to fear a new or challenging achievement-related activity, showing signs of tension

In a new task, tension and uncertainty frequently appear to undermine his/her understanding of what (s)he must do

Intolerance of Failure.

Tends to avoid attempting any new or challenging task, often saying, "I can't" or "That's too hard" or simply avoiding the entire situation

Often unsure, seeking reassurance: asks frequently, "Is that right?"

Tends to become easily discouraged and upset by errors and difficulties

Generalized Anxiety (cf factor found by Reher & Stringfield, 1974)

Tends to be fearful or afraid of new situations or people *

Frequently miserable, unhappy, tearful or distressed *

Anxious Self-Focus.

Shows overt signs of tension (e.g. thumb-sucking, fidgeting, smiling excessively, etc.)

Frequently tries to direct attention to self, e.g. by numerous personal anecdotes or complaints about "minor" wrongs or ailments

(The latter item was subsequently omitted from the statistical analyses as the endorsements were missing for seventeen children. Thus the cluster, Anxious Self-Focus, was excluded and only the first of the two items in this cluster retained as a single variable).

Withdrawal.

Tends to be emotionally unresponsive or withdrawn, looking solemn, serious and seldom smiling

Shows very little interest in ongoing activities, looks around, wanders around aimlessly or daydreams * (cf. Kohn & Rosman, 1972a)

9.2.2.4 Factor Analysis

Ten of the eleven composite variables together with the remaining nine single item variables were used in a principal components analysis with Varimax Rotation.

Table 4

Varimax Rotated Factors From Teachers' Checklist (N=108)

	Factor					
Checklist Measure	1	2	3	4	5	6
Attention 2	.643	-.101	.385	.065	.250	.195
Attention 8	.614	-.229	-.220	.084	.090	.390
Persist.(set) 2	-.302	.816	-.092	-.020	-.191	-.081
Persist.(ind.) 5	-.156	.672	-.266	.073	-.179	-.451
Ach.Anxiety 3	.734	-.083	.407	.440	.442	-.023
Ach.Anxiety 5	.132	-.135	.065	.034	.894	.138
Ach.Anxiety 6	.194	.032	.486	.509	.265	-.038
Ach.Anxiety 9	.120	-.062	.070	.198	.070	.805
Gen.Anxiety 5	.227	.094	.251	.545	-.033	.314
Distractibility	.851	-.222	.050	.195	.118	.151
Inad.Atte.(Aud.)	.853	-.198	.098	.097	.098	.045
Inad.Atte.(Vis.)	.709	-.456	.209	.160	-.039	-.111
Purpos.Engagement	-.114	.877	.001	-.218	.088	.001
Standards Excell.	-.465	.631	.322	-.312	-.060	.114
Persistent Effort	-.305	.679	-.212	.234	-.198	-.127
Achieve.Tension	.133	-.175	.598	.298	.523	.027
Intolerance Fail.	.168	-.293	.511	.244	.236	.460
Withdrawal	.089	-.156	.053	.789	.065	.157
Fundamental Anx.	.014	-.076	.853	.087	-.068	.092
Eigenvalue	6.919	2.460	1.477	1.081	1.070	0.953
Percentage Var.	36.4	12.9	7.8	5.7	5.6	5.0
Cum. Perc.Var.	36.4	49.3	57.1	62.8	68.4	73.4

Note. Decimals omitted from the loadings. Loadings of .32 or greater (underlined), used as criterion of acceptance.

9.2.2.4.1 Interpretation/Description of Table 4

Factor 1. Three composite variables, Inadequate Voluntary Attention (Auditory), Distractibility, and Inadequate Voluntary Attention (Visual) loaded on this first factor, as did two single variables. These described difficulty in following directions (Attention 2) and impulsivity (Attention 8). This factor accounted for 36.4% of the variation. These variables reflected poor control of attention in a situation of interaction with instructional conditions, and therefore the factor was labelled Characteristic Uncaptured Attention vs. Voluntary Focused Receptivity. The fact that the variable portraying Standards of Excellence loaded negatively on this factor was consistent with a syndrome associating an inadequate need for Achievement with inadequate voluntary receptivity.

Factor 2. The second factor accounted for 12.9% of the variation. The composite variables Purposeful Engagement, Persistent Effort, and Standards of Excellence loaded on this factor, as did two single measures reflecting independent, persistent, goal-directed behavioural tendencies (Persistence in set tasks 2) and Persistence in Independent activities 5). In addition, the composite variable, Inadequate Voluntary Attention (Visual), loaded negatively on this factor. These variables reflected both characteristic affective/attitudinal aspects (need for Achievement) and effective aspects (sustained effort in pursuit of achievement or mastery). The factor was therefore labelled Achievement Motivation.

Factor 3. The composite measures depicting Generalized Anxiety, Achievement-related Tension, Intolerance of Failure, as well as the single measures suggesting deteriorating performance and withdrawal under scrutiny (Achievement Anxiety 3, and 6), loaded on the third factor. Two other variables loaded significantly on this factor, portraying difficulty in following instructions (Attention 2) and Standards of Excellence. The syndrome reflected generalized anxiety and excessive ego-involvement or vulnerability in both achievement-oriented and other situations and was therefore labelled Pervasive Anxiety. It accounted for 7.8% of the variation.

Factor 4. The measures depicting anxiety and withdrawal tendencies, viz. Withdrawal, anxious self-focus (General Anxiety 5), deteriorating performance and withdrawal under scrutiny (Achievement

Anxiety 3, and 6), loaded on the fourth factor which accounted for 5,7% of the variation. These variables, reflecting the overall tendency to deal with stress by withdrawing, gave rise to the factor label Characteristic Defensive Withdrawal.

Factor 5. The variables depicting achievement-related anxiety in a situation of challenge, viz. the tendency to become flustered when questioned (Achievement Anxiety 3) and Achievement-related Tension, loaded on the fifth factor which accounted for 5,6% of the variation. This factor was labelled Characteristic Confrontation Anxiety.

Factor 6. Variables with the highest loadings on this final factor, which accounted for 5,0% of the variation, portrayed a general lack of tolerance or the ability to endure. Achievement Anxiety 9 and Intolerance of Failure depicted low tolerance of perceived failure, or even the possibility of failure. Lack of persistence shown in self-initiated activities requiring effort or practice (Persistence in independent activities 5), depicted low tolerance or endurance of effort-demanding situations, and impulsivity (Attention 8), depicted an inability to tolerate or brook delay. The factor was therefore labelled Low Tolerance.

9.2.2.4.2 Summary and Discussion

The main factor, Characteristic Uncaptured Attention vs. Focused Receptivity, accounted for a large percentage of variation (36,4%). It depicted either a developmental lag in sustaining voluntary attention efficiently under instructional conditions, or an attitudinal factor in interaction with the teacher, characteristic unwillingness and/or resistance to directed intellectually-oriented activities. An insignificant correlation with age favoured the latter interpretation.

This factor was defined by a syndrome incorporating distractibility, impulsivity, as well as the failure to sustain attention adequately in order to derive meaning from the auditory or visual material presented by the teacher in a nursery school. This lack of sustained voluntary attention is clearly counterproductive to achievement, and non-adaptive to the demands of directed learning within the nursery school situation. This syndrome thus portrayed a deficit in an important prerequisite characteristic for "intentional learning" (Torgesen, 1977) and could be regarded as a maladaptive style of confronting and interacting with or using instructional

opportunities, reflecting an inadequate need for Achievement or active resistance.

The second factor, Achievement Motivation, accounted for 12,9% of the variation. It demonstrated a fundamental independent need to pursue purposive activity, whether self-initiated or presented as set tasks. This behaviour was associated with self-determined standards of excellence, and clearly reflected need for Achievement. It also showed affective correlates of need for Achievement, a characteristic capacity and willingness to maintain independent effort towards the fulfillment of a plan, and to persist in the face of difficulties and frustrations. This pattern could be regarded as an active adaptive style of independent voluntary commitment to achieving self-determined goals. This syndrome suggested a strong need for Achievement, or Motive to Achieve Success (Atkinson & Raynor, 1978), expressed in an active adaptive "achievement style".

These two factors accounted for almost half of the total variation and clearly reflected need for Achievement expressed in a voluntary active adaptive learning style (i. interaction with the teacher) and a voluntary active adaptive, independent, achievement style (in interaction with set tasks or self-determined activities). These factors thus portrayed characteristic dynamic adaptive prerequisites, attitudinal and affective, for learning and achieving in the preschool environment.

Three of the four remaining factors incorporated undermining anxiety, manifest in different ways. Pervasive Anxiety portrayed the most widespread factor of undermining generalized anxiety, overt distress and feelings of insecurity. It appeared to incorporate concepts underlying The Motive To Avoid Failure, described as "a capacity for reacting with humiliation and shame when one fails" (Atkinson & Raynor, 1978, p. 15). It was manifest in everyday preschool situations as well as in a variety of achievement-related situations. Characteristic Defensive Withdrawal represented possibly the most maladaptive manifestation of anxiety, anxiety which had resulted in an established pattern of both defensive interpersonal withdrawal and generalized apathy, or lack of interest. Characteristic Confrontation Anxiety suggested a tendency to "panic" and become temporarily disrupted or overwhelmed when "under the spotlight" (being tested or evaluated).

The final factor, Low Tolerance, suggesting inadequate control,

pervaded many facets. It was shown to influence attention, persistence, and tolerance of failure.

In sum, these statistical analyses provided alternative component measures of the global construct Dynamic Adaptive Interaction Style manifest in the nursery school situation. These component factors, providing a way of focusing separately on dimensions of theoretical and diagnostic interest, were used to investigate construct validity of the Continuous Cognitive Task in an attempt to establish well-defined constructs (Sundberg et al., 1976).

9.3 CONSTRUCT VALIDITY (CCT IN TERMS OF CHECKLIST FACTORS)

My initial hypothesis had been that performance on the CCT could be used as a Dynamic Behaviour Assessment Paradigm to measure relatively-enduring dynamic adaptive personality characteristics. The use of this paradigm would produce objective quantitative measures with adequate psychometric properties of individual differences in core dynamic adaptive motivational characteristics, effective and attitudinal.

Although the main integrated CCT measure, Total Work Output or Productivity, showed a highly significant relationship with the global Teachers' Checklist factor, Dynamic Adaptive Interaction Style ($r=.521$, $p<.001$), I aimed to examine the initial hypothesis by explaining CCT performance measures in terms of the separate Teachers' Checklist syndromes.

Multiple regression analyses were carried out using as independent variables the six Teachers' Checklist factor scores, representing syndromes of dynamic adaptive characteristics influencing or depicting different spheres or facets of interaction. These were: Characteristic Uncaptured Attention vs. Voluntary Focused Receptivity, Achievement Motivation, Pervasive Anxiety, Characteristic Defensive Withdrawal, Characteristic Confrontation Anxiety, and Low Tolerance. Age was included as a control variable in the multiple regression analyses.

9.4 RESULTS OF THE MULTIPLE REGRESSION ANALYSES

Tables 5 - 12 provide summaries of the most important results of these analyses.

Table 5

Summary Table of Multiple Regression on Total Work (CCT) (N = 105)

Source	R Square	RSQ Change	F
Achievement Motivation	.134	.134	15.901**
Uncaptured Attention (-)	.247	.113	15.325**
Pervasive Anxiety (-)	.290	.043	6.111*
Defensive Withdrawal (-)	.310	.020	2.886
Age	.319	.009	1.321
Confrontation Anxiety (-)	.321	.002	.295

Note. (-) This notation was used to denote a negative value for Beta. ** p <.01; * p <.05

9.4.1 Description of Table 5

The results of this multiple regression analysis indicate that characteristic Achievement Motivation, Voluntary Focused Receptivity vs. Uncaptured Attention, and absence of Pervasive Anxiety, syndromes of dynamic adaptive personal characteristics derived from the Teachers' Checklist, predict (affect or explain) Total Work Output, or level of CCT performance. As these factors explained an appreciable percentage of the variance (29%), level of CCT performance or productivity was moderately well explained in terms of these dynamic adaptive characteristics.

Table 6

Summary Table of Multiple Regression on Displaced Responses (N=105)

Source	R Square	RSQ Change	F
Pervasive Anxiety	.104	.104	11.951**
Uncaptured Attention	.172	.068	8.428**
Age (-)	.231	.058	7.677**
Achievement Motivation (-)	.265	.034	4.649*
Defensive Withdrawal (-)	.295	.030	4.296*
Low Tolerance (-)	.297	.002	.251

Note. (-) This notation was used to denote a negative value for Beta. ** p <.01; * p <.05

9.4.2 *Description of Table 6*

The tendency to Displace Responses, suggesting disrupted visuo-spatial orientation, was moderately well explained (29,5% of the variance) by characteristic Pervasive Anxiety, Uncaptured Attention, younger age, Inadequate Achievement Motivation and Overt Reactivity (the opposite of Defensive Withdrawal).

Table 7

Summary Table of Multiple Regression on Errors (CCT) (N=105)

Source		R Square	RSQ Change	F
Pervasive Anxiety		,050	,050	5,430*
Achievement Motivation	(-)	,093	,042	4,775*
Age	(-)	,115	,022	2,551
Unnaptured Attention		,119	,004	,504
Confrontation Anxiety	(-)	,121	,002	,233
Low Tolerance		,123	,001	,164
Defensive Withdrawal	(-)	,123	,000	,019

Note. (-) This notation was used to denote a negative value for Beta.

* p <,05

9.4.3 Description of Table 7

A low percentage of the variance of the tendency to make uncorrected Errors on the CCT (9,3%) was explained by characteristic Pervasive Anxiety and inadequacy of Achievement Motivation.

Table 8

Summary Table of Multiple Regression on Increase (CCI) (N = 105)

Source		R Square	RSQ Change	F
Achievement Motivation		.037	.037	4.002*
Pervasive Anxiety	(-)	.046	.028	3.103
Age	(-)	.096	.030	3.342
Low Tolerance	(-)	.109	.013	1.443
Defensive Withdrawal	(-)	.114	.005	.607
Confrontation Anxiety	(-)	.118	.004	.490
Uncaptured Attention	(-)	.122	.004	.434

Note. (-) This notation was used to denote a negative value for Beta.

* $p < .05$

9.4.4 Description of Table 8

Increasing or sustained persistent *performance on the* CCT was only slightly explained (3.7% of the variance) by Achievement Motivation tendencies.

Table 9

Summary Table of Multiple Regression on Corrections (CCI) (N = 105)

Source	R Square	RSQ Change	F
Low Tolerance	.017	.017	1.782
Age (-)	.033	.016	1.645
Uncaptured Attention	.041	.008	.842
Pervasive Anxiety	.047	.006	.647
Defensive Withdrawal	.053	.006	.631
Confrontation Anxiety	.054	.002	.161
Achievement Motivation	.055	.000	.048

9.4.5 *Description of Table 9*

The tendency to make Corrections on the CCT was not explained in terms of observed dynamic adaptive *characteristics*.

Table 10

Summary Table of Multiple Regression on

Extraneous Marks on CCT) (N=105)

Source	R Square	RSQ Change	F
Low Tolerance	,016	,016	1,647
Uncaptured Attention	,025	,009	,936
Confrontation Anxiety	,032	,007	,720
Achievement Motivation (-)	,037	,005	,547
Pervasive Anxiety	,039	,002	,195
Age (-)	,040	,001	,104
Defensive Withdrawal (-)	,041	,001	,084

9.4.6 Description of Table 10

The tendency to make Extraneous Markings on the CCT was not explained by observed dynamic adaptive characteristics.

Table 11

Summary Table of Multiple Regression on

Convexity/Concavity (CCT) (N=105)

Source	R Square	RSQ Change	F
Low Tolerance	,032	,032	3,450
Uncaptured Attention	,049	,017	1,829
Pervasive Anxiety	,060	,010	1,082
Achievement Motivation (-)	,061	,002	,207
Defensive Withdrawal	,063	,002	,173
Age	,064	,000	,049

9.4.7 Description of Table 11

None of the observed dynamic adaptive characteristics explained *the Convexity/Concavity* of the CCT Curve of Work.

Table 12

Summary Tables of Multiple Regression on Fluctuations (CCT) (N=105)

Source	R Square	RSQ Change	F
Confrontation Anxiety	.024	.024	2.489
Achievement Motivation	.039	.024	1.632
Defensive Withdrawal (-)	.046	.007	.740
Age	.049	.003	.281
Uncaptured Attention (-)	.050	.001	.153
Pervasive Anxiety	.052	.001	.123

9.4.8 Description of Table 12

The measure of fluctuations or variability on the CCT was not explained in terms of the observed dynamic adaptive characteristics.

9.5 DISCUSSION

These results demonstrated that four of the six factors of personal dynamic adaptive characteristics derived from the Teachers' Checklist were found to be significant predictors of four of the eight quantitative performance measures from the Continuous Cognitive Task. The construct validity of Total Work Output, Displaced Responses, Errors, and Increase over Time was established (to varying degrees) in terms of these four Teachers' Checklist factors.

Two of these performance measures (Total Work Output and Displaced Responses) were moderately well explained by these observed characteristics (29% and 23.7% of the variance, respectively). These two objective measures thus reflected characteristic dynamic adaptive attitudes, feelings, attention, and interaction tendencies, independently observed in the preschool situation.

The four CCT measures that were not explained in terms of the teachers' observations might measure characteristics that are more subtle, covert, and difficult to observe, or manifestations that were transient or situation-specific.

9.5.1 Significant Findings

9.5.1.1 Total Work Output: The Quantitative Measure

An appreciable percentage of the variance of Total Work Output or Productivity on the [illegible]inuous Cognitive Task was explained by need for Achievement and [illegible]s associated characteristics. Need for Achievement and the characteristic associated attitudes, affect, attention, and action tendencies, manifest in the preschool situation (viz. Achievement Motivation, in interaction with independent purposive activities, and Voluntary Focused Receptivity vs. Uncaptured Attention, in interaction with instructional *opportunities presented* by an educationally-intentioned adult) thus explained level of achievement on the CCT. Achievement level was also explained by characteristic Pervasive Anxiety.

Total Work Output or Productivity could thus be defined as an integrated measure of intensity of activity efficiently utilized in pursuit of achievement (i.e. in the CCT situation), partially explained by dynamic adaptive characteristics observed in the preschool situation (viz. characteristics influencing or depicting an active adaptive independent achievement style and an active adaptive receptive attention style, as well as freedom from characteristic pervasive anxiety.)

9.5.1.2 Theoretically-Based Motivational View

In terms of motivational theory (Atkinson & Raynor, 1978), level of CCT performance reflected the strength of the individual's fundamental Motive to Achieve Success, which functioned as a determinant ... of instigating forces to "engage in activities that involve evaluation of one's performance in relation to standards of excellence" (pp. 151-152). It reflected, in addition, characteristic efficiency of receptive selective attention, a function facilitating "commerce with the environment" (p. 190). Level of performance also reflected inhibition of achievement-oriented activity, predicted by observations of characteristic Pervasive Anxiety, incorporating the Motive to Avoid Failure or the "capacity for reacting with *humiliation and shame* when one fails" (p. 15). Thus, level of CCT performance reflected both the Motive and Tendency to Achieve Success and the Motive and Tendency to Avoid Failure.

It was interesting to note from my findings that it was not only achievement-oriented anxiety that opposed achievement-oriented

activity. The results suggested that the Motive to Avoid Failure was a relatively-general and pervasive motive, associated with the "capacity for reacting with humiliation and shame when one fails" in a variety of situations, not confined to a situation of performance evaluation.

9.5.1.3 Displaced Responses: A Qualitative Measure

The tendency to Displace Reponses was a composite measure of the general tendency to lose one's place or become disoriented while working, omitting rows, columns, or marking the standard symbol within the column instead of the matching symbol outside the column. This measure was moderately well explained in terms of Pervasive Anxiety, Characteristic Uncaptured Attention, and immature development (younger age). It was additionally explained in terms of characteristic inadequacy of Achievement Motivation, consistent with the notion of *inadequate task involvement*. The negative relationship with Defensive Withdrawal suggested that children regarded as not withdrawn from environmental interaction, may have been those who were overtly reactive and susceptible to distraction by extraneous stimuli.

The tendency to Displace Responses appeared to be an interesting performance measure, showing the child's susceptibility to readily disrupted attention, whether due to generalized anxiety, a characteristic attitude of resistance to adult's attempts to direct attention, insufficient independent achievement motivation and task involvement, immature development, or generalized distractibility or hyper-reactivity. The strong association with characteristic Pervasive Anxiety and other affective, attitudinal factors, was of clinical interest.

Displaced Responses could be defined as a gauge of readily disrupted visuo-spatial orientation in an achievement-oriented situation (CCT) partially explained by dynamic maladaptive characteristics, viz. pervasive anxiety, a maladaptive style of interacting in achievement-oriented situations (inadequacy of *directed attention* and independent achievement motivation), immaturity (age), and characteristic hyper-reactivity.

9.5.1.4 Theoretically-based View

The notable influence of Pervasive Anxiety and characteristic resistance on Displaced Responses, *a seemingly sensitive gauge of* disrupted input and output, was in line with Feuerstein's views on

note that the inclusion in the multiple regression *analysis of a measure of* auditory memory [digit span], reflecting successive synthesis, the other major mode of information processing [Luria, 1973] increased the predicted variance of *Global* Scholastic Achievement from 14,8% to 23,7%, and the predicted variance of Reading from 7,1% to 18,2%.)

Table 20

Summary Table of Multiple Regression on Spelling in Grade One
(*N*=95)

Source	R Square	RSQ Change	F
F.Corrections	.120	.120	12,662**
F.Total Work O.	.244	.124	15,043**
F.*Errors* (-)	.273	.029	3,632
F.Displaced Rs. (-)	.298	.026	3,297
F.Fluctuations (-)	.305	.007	.836
Age	.307	.002	.295
F.Increase over Time	.309	.002	.234
F.Extrane.Ms. (-)	.310	.001	.117
F.Convexity	.310	.001	.092

Note . The notation F. is used for "Factor score of".
** p <.01

11.5.2.2 Description/Interpretation of Table 20

Spelling was moderately well predicted (24,4% of the variance) by the *factor scores* of the CCT performance measures. The tendency not to have many Corrections on the CCT predicted 12% of the variance of efficient written Spelling (p <.01). *Intensity, efficiency,* and persistence of activity related to higher mental functioning, expressing adaptive achievement-related characteristics and generalized anxiety, (viz. Total Work Output) (p <.01), added 12,4% to the predicted variance.

The factor score of Corrections, a moderately effective predictor of Spelling, had not been defined in terms of teachers' observations of characteristic adaptive behaviour at nursery school.

the pervasive *influence of the affective-motivational* factor on the mental act, and his observation that "the major resistance to learning occurs at the input and output phases" (p. 276).

9.5.1.5 Predicted Variance of Errors and Increase over Time

Only a small percentage of variance of Errors and of Increase over *time were* explained by the characteristic factors. Well-defined constructs, could not therefore be derived for these performance measures in terms of personal characteristics.

9.6 CONCLUSIONS

9.6.1 Achievement-Oriented Activity: The Stream of Action

9.6.1.1 Total Work Output Reflects Personality

The results showed that level of performance on the Continuous Cognitive Task reflected core dynamic adaptive personality characteristics, manifest in a different, relevant *life-like* situation. Intensity of sustained efficient activity on the CCT, (a sample or stream of action) could be moderately well explained by personal characteristics which influence or represent dynamic adaptive interaction.

CCT performance thus represented the *integration of several* dynamic motivational characteristics, viz. an attitude of active involvement and voluntary commitment (or "an attitude towards thinking and problem solving that is actively and efficiently involved in organizing" impinging stimuli [Feuerstein et al., 1979, p. 71-72]). It also reflected an *active adaptive achievement* style, related to strength of need for Achievement and to the strength of the general motive to avoid failure (achievement-related and interpersonal). Performance level reflected strength of fundamental adaptive motives.

Thus performance on the Continuous Cognitive Task, used as a Dynamic Behaviour Assessment Paradigm, yielded an integrated, objective quantitative measure of fundamental motivational dispositions expressed in characteristic adaptive action tendencies. These findings lent further empirical support to Atkinson's theories of *motivation* (Atkinson & Raynor, 1978). The integrated measure of intensity, efficiency, and persistence of achievement-oriented activity, measured by a sample of action, was moderately well predicted by characteristic achievement-oriented attitudes, needs, motives, and affective tendencies.

In my terms, level of performance provided a final measure of

effectiveness of the child's unique adaptive and achievement style, his characteristic desire and tendency, opposed by his characteristic pervasive anxiety, to confront environmental opportunities and demands and to strive energetically, efficiently, and with persistence, to meet standards of excellence and satisfy his need for effectiveness, mastery, and achievement.

9.6.1.2 Displaced Responses Reflects Personality

A specific CCT measure of inefficiency, Displaced Responses, reflecting the child's tendency towards disrupted attention and spatial disorientation, also reflected personality characteristics, viz. pervasive anxiety and the tendency to actively resist, or merely not to respond adequately to, the teachers' attempts to direct his attention. It also reflected characteristic inadequacy of interest and involvement in sustained purposive activities.

9.6.2 Conclusions: CCT Performance, a DBAP for Personality Assessment

The initial hypothesis appears to have been adequately confirmed. Performance on a simple but effort-demanding continuous cognitive task, carried out within a life-like significant situation, provided a sample of characteristic adaptive interaction influenced by relatively-enduring dynamic adaptive motivational characteristics, justifying the use of a DBAP for personality assessment in this sample of the 5-6 year old population.

Relatively-enduring, motivational, personality characteristics were measured in 5-6 year olds and objective quantitative measures with adequate psychometric properties derived. These findings lent support to the use of Interactionism for the assessment of personality. Specifically, performance on the CCT provided a global objective measure of "intensity, efficiency, and effectiveness of achievement style", reflecting strength of need for Achievement and pervasive anxiety. It provided an additional quantitative gauge of characteristic susceptibility to attentional disruption, related to generalized anxiety, resistance or inadequate motivation, and hyper-reactivity.

10 CONSTRUCT VALIDITY IN TERMS OF READINESS GROUPS

In the previous chapter construct validity was moderately well established for two of the eight CCT performance measures (Total Work Output and Displaced Responses) and minimally established for two other measures (Errors and Increase over Time) in terms of the nursery school teachers' observations. Moderately well-defined constructs were derived for Total Work Output or Productivity, and Displaced Responses in terms of their intrinsic effective nature and in terms of dynamic adaptive motivational characteristics.

10.1 STAGE ONE, PHASE THREE

I was also interested in examining the ability of CCT performance measures to discriminate at a significant level between specific groups. In order to investigate discriminative ability it was necessary to form suitable criterion groups based on independent measures derived in a different situation. Again I considered that teachers' resources would be suitable.

I considered that global judgements concerning "school readiness", obtained from the teachers who had worked for an extended period with the children, would serve as a valuable basis for forming criterion groups. I planned to investigate whether CCT performance measures, reflecting characteristic dynamic adaptive interaction tendencies, could form the basis for discriminating between these "readiness" groups..

I hypothesized that characteristic effectiveness would be the underlying basis (not necessarily conscious) on which teachers judged whether or not a child was ready to learn and adjust adequately in Grade One. If this hypothesis was correct, children placed in these "readiness" groups would differ significantly in dynamic adaptive characteristics as measured by both the Teachers' *Checklist and by CCT performance*.

10.1.1 Procedural Aspects

Teachers' global predictions or judgements were obtained in the following way: After the CCT testing had been carried out and the Teachers' Checklist completed for each child, a brief interview was conducted with each teacher. This interview took place before any

indication of test results had been divulged. The teacher was asked, by means of simple forced choice (Yes/No) questions, to judge the child's general school adjustment, peer relationships and work adjustment. A final global prediction about school readiness was requested. The teacher was asked whether she thought the child was "ready for school or not ready". Her response was recorded verbatim.

As the teachers rarely confined themselves to "Yes" or "No" ("Ready" or "Not Ready") the verbatim responses were subsequently categorized into the following four groups: Definitely Not Ready, *Doubtful*, *Ready but ... , and* Well Ready.

(Nineteen of the twenty-three children categorized as Definitely Not Ready had already been singled out by the teachers prior to my study for professional assessment, fifteen of them regarding school readiness and the other four for "problem areas".) The second category, Doubtful, comprised those children whom the teachers regarded as unlikely to cope adequately at school. The third category, Ready but ... , was formed to group together the children who were considered to be basically ready for school, but with some qualification. Children were placed into this category whenever the teacher said they were ready, but added 'negative' qualifying comments (e.g. about work attitudes, uneven areas of functioning regarding specific skills, or tendencies to disrupt the group). The final category, Well Ready, included those children who were given a very positive endorsement by the teachers, *in terms of* how well they would function in Grade One.

10.1.2 Psychometric Aspects

10.1.2.1 Deriving Groups for Multiple Regression Analysis

There were twenty-three children in the Definitely Not Ready group, twelve in the Doubtful group, forty-two in the Ready but ... group, and thirty-one in the Well Ready group. In order to derive a two-group categorical variable for Readiness, the first two categories, Definitely Not Ready and Doubtful, were combined to form the Not Ready group (n=35). The remaining groups, Ready but ... (n=42), and Well Ready (n=31), were combined to form the Ready group (n=73). The two-group division, Not Ready/Ready, was then used as a categorical criterion variable for multiple regression analysis.

10.1.2.2 Relationship Between Teachers' Checklist and Judgements

The relationship between the categorical variable Not Ready/Ready formed from the teachers' judgements, and the global measure Dynamic Adaptive Interaction Style, derived from the Teachers' Checklist, was examined. The product moment correlation coefficient was ,71213. The hypothesized conceptual link between these two measures was thus fully corroborated: the global construct measured by the Teachers' Checklist was very closely related to the teachers' concepts of school readiness.

10.1.2.3 Multiple Regression Analysis

Although multiple regression analysis with a dependent categorical variable is not an optimal analysis, Kerlinger & Pedhazur (1973, p. 337) presented the following argument: "With only two groups, discriminant function analysis amounts to multiple regression analysis with the dependent variable taking the values of 1 and 0." In the present analysis, the predictor variables were the orthogonal factor scores derived from the eight original CCT performance measures. Age was used as a control variable. A summary of the results is presented in Table 13

Table 13

Summary Table of Multiple Regression on Not Ready/Ready (N = 108)

Source	R Square	RSQ Change	F
F.Total Work Output (-)	,204	,204	27,111**
F.Displaced Reponses	,275	,071	10,325**
F.Increase over Time(-)	,317	,042	6,356*
F.Convexity	,335	,018	2,763
F.Extran.Markings	,349	,015	2,288
F.Errors	,357	,008	1,303
F.Corrections	,363	,006	,883
Age (-)	,365	,002	,264

Note. The notation (-) is used to denote a negative Beta value.

** $p < .01$; * $p < .05$

10.1.2.3.1 Description of Table 13

Teachers' judgements that the children were "Not Ready" for commencing Grade One were moderately well predicted or explained (31,7% of the variance) by low level of CCT performance (Total Work Output, $p < .01$) and by the specific measure of inefficient and unstable visuo-spatial attention (Displaced Responses, $p < .01$), both manifestations found to reflect relatively-enduring motivational characteristics. Lack of Readiness was additionally explained ($p < .05$) by Decreasing work output during the CCT. This variable (Increase over Time) had been only minimally validated in terms of observed motivational characteristics.

10.1.2.3.2 Graphic Representation of Results

Comparative Curves of Work were drawn for the two criterion Readiness groups (see Figure 2) to illustrate the significant differences between two of the three performance measures, Total Work Output and Increase over Time. Frequency distributions of Total Work Output and Displaced Responses, variables which discriminated between the groups at the higher level of significance ($p < .01$), were also drawn for these Readiness groups (Figures 3 and 4), and favourable areas examined. Favourable areas, obtained from an inspection of the graphs, determined a cutoff point below or above which the maximum number of the group of interest were correctly identified without including more than about 16% of the entire group as false positives.

10.1.2.3.3 Favourable Areas in Figures 3 and 4

Data derived from cutoff points resulting from an inspection of favourable areas for the Not Ready group, together with the corresponding data derived for the remaining group, were tabulated in Figures 3 and 4. From an inspection of favourable areas it was seen, that the integrated CCT performance measure, Total Work Output, accurately identified 74,3% of the children in the Not Ready group (including 12% of the entire sample as false positives), and 82,2% in the Ready group (including 8,3% of the entire sample as false negatives). Likewise, Displaced Responses, the specific measure of disrupted attention or orientation, accurately identified 54,3% of the children judged as Not Ready (including 16,7% false positives) and 75,3% of the Ready group (including 14,8% false negatives.) The detection utility of these measures is presented in greater detail in Appendix G. The overall hit rate for Total Work Output was found

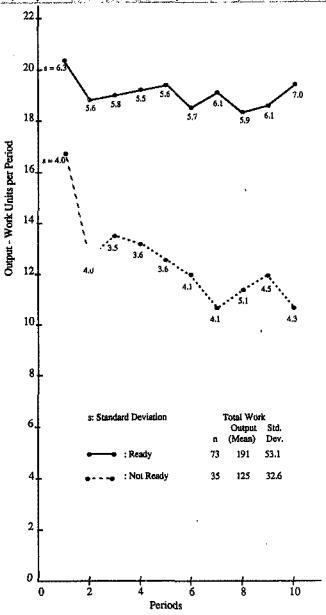

Figure 2. Group Curves of Work for Two Readiness Groups.

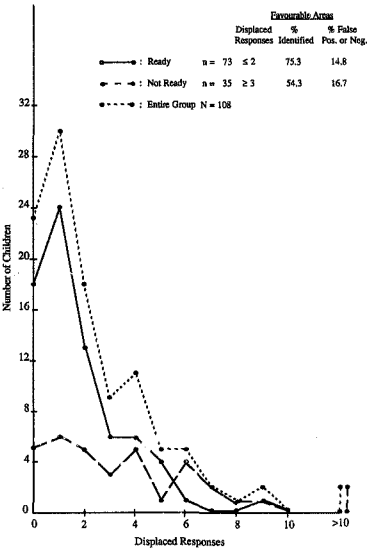

Figure 4. Displaced Responses Frequency Distributions for Two Readiness Groups (Stage One Sample).

to be 79.6% and for Displaced Reponses, 68.5%.

In sum, inspection of favourable areas showed that Total Work Output not only discriminated effectively between the Readiness groups, but also accurately identified a very high percentage of individual children in both these groups. Displaced Responses were shown to be more effective in accurately identifying children in the Ready group.

10.1.2.4 Analysis of Variance

I was also interested in viewing the ability of Total Work Output to discriminate between, not only those groups who were deficient in using environmental opportunities and those who used their opportunities adequately, but also those who were making maximal use of these opportunities. I investigated this discriminative ability by using three of the Readiness groups in an analysis of variance, Not Ready (n=35), Ready but ... (n=42), and Well Ready (n=31).

Analysis of variance was performed using the original CCT performance measures. The means and standard deviations are presented in Table 14, and a summary of the results presented in Table 15.

Table 14

Means and Standard Deviations: Total Work Output (CCT) and Three Readiness Groups (N=108)

	Total Work Output	
	Mean	Standard Deviation
Readiness Group		
Not Ready	125	32.6
Ready but ...	171	42.0
Well Ready	217	56.5

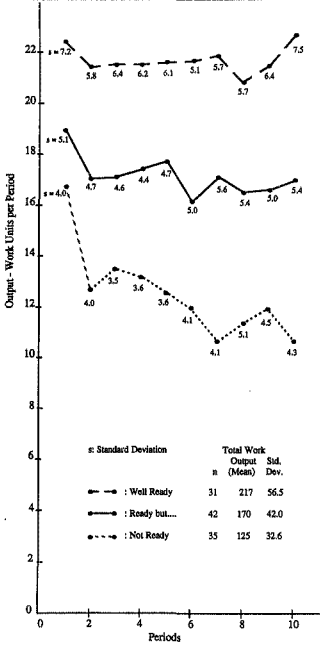

Figure 5. Group Curves of Work for Three Readiness Groups (Stage One Sample).

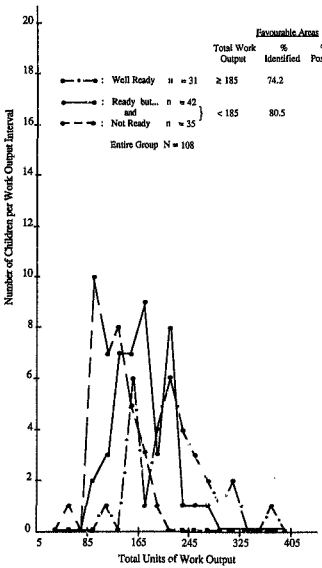

Figure 6. Total Work Output Frequency Distributions for Three Readiness Groups (Stage One Sample).

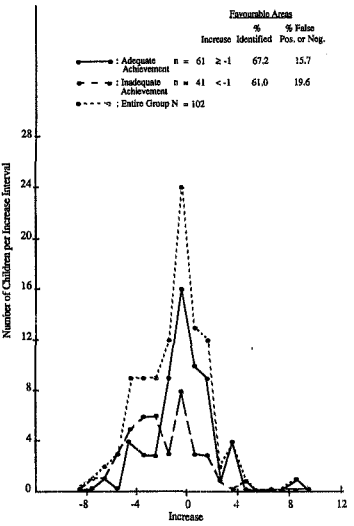

Figure 12. Increase Frequency Distributions for Two Achievement Groups (Entire Stage Two Sample).

Table 15

Summary of Results From Analysis of Variance:
Total Work Output and Three Readiness Groups

Source	D.F	F Ratio	F Prob
	2	35,883	0,0000
	105		
Total	107		

10.1.2.4.1 Description of Table 15

The main quantitative measure, Total Work Output, reflecting level of performance on the Continuous Cognitive Task, discriminated at a very high level of significance (p <.001) between all three Readiness groups, Not Ready, Ready but ... , and Well Ready.

10.1.2.4.2 Graphic Presentation of the Findings.

The graphs in Figure 5 represent the group Curves of Work for each of the three Readiness categories (Not Ready, Ready but ... and Well Ready). Comparative frequency distributions were also drawn and favourable areas inspected (see Figure 6). It was shown that Total Work Output accurately identified an appreciable percentage of children in the Well Ready group (74,2%), including fewer than 13,9% of the sample as false positives. As there was no specific favourable area for identifying children in the middle group, Ready but ... , it was combined with the Not Ready group. Inspection of the remaining area, below the cutoff point, revealed that 80,5% of all those considered Not Well Ready were accurately identified, with only 7,4% of the sample included as false negatives. More detailed detection utility calculations, presented in Appendix G, showed an overall hit rate of 78,7%.

10.2 DISCUSSION

Findings in terms of these criterion Readiness groups appeared to have a double significance: Construct definitions were confirmed and expanded by the very close correspondence between the main CCT performance measure, Total Work Output, and teachers' concepts of school readiness. This lends considerable theoretical support to the notion that Total Work Output provides a measure of characteristic effectiveness or adaptive action style and that it is this effectiveness (dynamic adaptive interaction with the demands,

opportunities, and challenges of the preschool environment) which forms the basis for the teachers' global readiness judgements. The finding, from the analysis of variance, that Total Work Output could distinguish not only between the Not Ready and Ready groups, but also between the Well Ready group and the other two, was of particular interest as there also seemed to be considerable potential value in focusing on highly effective adaptive motivational resources.

Secondly, the provision of a single valid quantitative CCT performance measure reflecting characteristic Dynamic Adaptive Interaction Style, with the potential to discriminate between criteria groups and accurately identify a large percentage of individual children in these groups, was clearly of value. It emphasized a future possibility of using specific measures derived from the Continuous Cognitive Task (theoretically-based, measured in a life-like situation, and reflecting adaptive personal characteristics) in order to facilitate decisions about individual children (Sundberg et al., 1978).

10.3 OVERALL CONSTRUCT VALIDITY CONCLUSIONS FOR CCT PERFORMANCE

10.3.1 Moderately Well Defined Constructs

Stage One, Phase Two and Three, resulted in the provision of two moderately well-defined CCT performance measures (Total Work Output and Displaced Responses) with clearly established construct validity in terms of dynamic adaptive motivational characteristics. A third measure, Increase, was partially defined in terms of characteristic dynamic adaptive interaction tendencies and judgements of school readiness. A fourth measure, Errors, was only minimally explained in terms of these characteristics.

Corrections, Extraneous Markings, Convexity, and Fluctuations, were not found to be valid measures of dynamic adaptive motivational characteristics, either as measured by the Teachers' Checklist or by the teachers' judgements concerning "readiness".

10.3.2 Discriminative Potential of Performance Measures

Three of the CCT performance measures were found to discriminate at a significant level between Readiness groups, based on the teachers' judgements. The main CCT measure, Total Work Output, appeared to be highly effective ($p < .001$) in discriminating between these criterion groups (a two-group division and a three-group division). Total Work Output also accurately identified an

appreciable percentage of individual children in each of the Not Ready and Ready groups, as well as in the Well Ready and Not Well Ready groups.

10.4 PERFORMANCE MEASURES INVESTIGATED AS PREDICTORS IN STAGE TWO

Despite the fact that construct validity had only been established (to varying degrees) for four of the eight CCT performance measures, the orthogonalized factor scores of all eight performance measures derived from the Continuous Cognitive Task were nevertheless used in the final predictive analyses. It remained possible that these measures assessed relevant facets, not included in The Teachers' Checklist or in the teachers' judgements of readiness.

11 RESULTS IN TERMS OF SCHOLASTIC CRITERIA

In chapters 9 and 10, I have shown that two performance measures derived from a sample of achievement-oriented activity (performance on the Continuous Cognitive Task) clearly reflected dynamic adaptive personality characteristics.

Total Work Output and Displaced Responses were moderately well defined in terms of characteristic functioning in a preschool environment. These characteristics were achievement-oriented motivation and interaction, or more generally, effectiveness motivation and interaction.

As the nature of the sample of activity was cognitive, these CCT performance measures could also be viewed as a gauge of characteristic functional efficiency related to higher mental functioning. In this chapter I will view these effective characteristics (CCT measures) in terms of higher mental functioning.

11.1 THEORETICALLY-BASED VIEW OF HIGHER MENTAL FUNCTIONING

Activity was viewed as the core adaptive resource for adequate higher mental functioning (Luria, 1973). Thus a specific intellectually-oriented focus on effective dynamic adaptive characteristics (measured by two validated CCT performance measures) could be derived by viewing them as reflecting characteristic efficiency of cognitive and executive functioning.

Performance on the Continuous Cognitive Task would thus provide two objective quantitative measures reflecting characteristic activity used for higher mental functioning, the child's core resource for achievement of a cognitively-oriented goal. These performance measures would be viewed as the expression of characteristic generation, preservation, and regulation of activity underlying voluntary attention, motivated thinking, and sustained purposive intellectually-oriented action. They would reflect the child's characteristic effectiveness in maintaining an appropriate level of activity, necessary "for the achievement of s[n] [intellectually-oriented] goal" (p. 57).

Total Work Output, measuring level of performance on the CCT,

would be an integrated measure of functional efficiency in all three phases of the mental act (input, integration, and output) and would reflect individual differences in characteristic *intensity* and efficiency of cognitive functioning and *expression*. Specifically, it would reflect characteristic efficiency and stability of voluntary attention, speed and efficiency of information-processing (simultaneous synthesis), and speed and adequacy of sustained voluntary action in pursuit of cognitively-oriented achievement (Luria, 1973). Displaced Responses while *working on* the CCT would provide a specific *measure of* characteristic inefficiency, frequency of disrupted voluntary visuo-spatial attention or orientation.

The other CCT performance measures were not adequately established in terms of characteristic functioning, but nevertheless represented manifestations of efficiency in relation to higher mental functioning in an achievement-oriented situation.

11.2. *STAGE TWO, PHASE ONE*

11.2.1 Rationale for Selection of Criteria

My major hypothesis was that characteristic adaptive action style measured in a significant life-like situation would *predict* scholastic achievement and classroom *adjustment*. In order to test this hypothesis *adequately*, *my* challenge was first to derive *adequate and appropriate* criteria of achievement and adjustment. I aimed to broaden the generally limited criteria of successful achievement (viz. scholastic only) by including measures of the child's characteristic feelings and active adaptive functioning in the relevant classroom situation.

I assumed that dynamic adaptive motivational characteristics (measured by the Continuous Cognitive Task) would influence not only scholastic achievement but also classroom adjustment, both, seemingly, facets of adaptation. Scholastic *achievement* would represent some of the individual's "achievements having adaptive payoffs in *significant environments*" (Sundberg et al., 1978, p. 196). Classroom adjustment would reflect the effectiveness of the child's personal dynamic adaptive resources in meeting the demands, opportunities, and challenges of the significant *learning* environment. I considered that personal behavioural manifestations in the Grade One *classroom* situation would reflect characteristic *independent* effectiveness in interacting with (or making maximal use of) the appropriate achievement opportunities.

I selected two widely-used scales in order to establish relevant criteria of both scholastic achievement and characteristic classroom adjustment (adaptation). Criteria measures were derived from the Wide Range Achievement Test (Jastak & Jastak, 1978 Edition), and the Devereux Elementary School Behaviour Rating Scale (Spivack & Swift, 1967).

In this chapter I planned first to view the predictive findings in terms of scholastic achievement only. In the next chapter I planned to investigate the integrated structure of both sets of criteria (scholastic and behavioural) in order to derive integrated criteria measures for the final predictive analyses.

11.3 THE WIDE RANGE ACHIEVEMENT TEST (WRAT)

11.3.1 Justification/Description

I sought a brief scholastic achievement test reflecting Reading, Spelling and Arithmetic attainments. The well-known Wide Range Achievement Test (WRAT), first standardized in 1936, was said to provide "validity studies to extract the essential adjustment factors underlying the learning of the basic media of communication" (Jastak & Jastak, 1978, p. 1). The authors described it as a "useful tool for the study of progress in coding aspects of basic school subjects".

Since 1965 it has comprised two levels printed on the same form. (Level I for ages 5 through 11 years, 11 months, and Level II for ages 12 through adulthood.) Each level of the WRAT has 3 subtests, "with emphasis on decoding, transcoding and encoding" of Reading ("recognizing and naming letters, pronouncing printed words"), Spelling ("copying marks resembling letters, writing name, printing or writing words to dictation") and Arithmetic ("counting, reading number symbols, oral and written computation"). The total testing time is 15 to 30 minutes, depending on age. Spelling and Arithmetic may be administered to groups or individuals but Reading must be administered individually. This test appeared to satisfy my requirements for providing reliable, valid measures of scholastic attainment in the first grade.

11.3.2 Procedural Aspects

I administered the WRAT individually to children in the Stage Two Sample, i.e. each available child from the original Stage One Sample. The majority were tested during their last term in Grade One; a small "problem" group of seven children who had not proceeded

to Grade One, were tested in their Pregrade environments.

11.3.3 Psychometric Aspects

11.3.3.1 Established Measures

Each WRAT subtest yields a raw score, standard score, percentile, and grade levels. Only the raw scores were utilized in this study. In validating the test the authors had used intercorrelations between subtests as criteria of internal consistency rather than as a way of deriving a global composite score of scholastic achievement.

11.3.3.2 Correlations Between Subtests

In the Manual (Jastak & Jastak, 1978 edition, p. 51), intercorrelations between subtests were presented for 200 children at each age level. A comparison between correlations derived for 5 and 6 year old children, and those derived in the present study is presented in Table 16.

Table 16

Intercorrelations Between WRAT Skills Obtained by Jastak & Jastak (N=200 for each age)

Age	Reading with Spelling	Reading with Arithmetic	Spelling with Arithmetic
5 year olds	.799	.745	.752
6 year olds	.838	.794	.777

Intercorrelations Obtained in Present Study with the Grade One Sample (N = 96)

	Reading with Spelling	Reading with Arithmetic	Spelling with Arithmetic
6 to 7 year olds	.649	.412	.381

Although these correlations were all highly significant ($p < .001$), those between Arithmetic and the other two skills in the present sample were far lower than those obtained in the authors'

validation. This might be a feature of the particular sample, or of cultural differences in educational practice between the two countries (United States and South Africa).

11.3.3.3 Factor Analysis: WRAT Subtests

Factor analysis of the three subtests, derived for the Grade One Sample, yielded only one significant factor, accounting for 65,7% of the variance. The Eigenvalue of this factor was 1,972 and that of the second factor only ,677. The resultant Factor Matrix using Principal Factor, no iterations, is presented in Table 17.

Table 17

Factor Matrix (WRAT) (N=95)

WRAT Subtests	Factor Matrix
Reading Raw Score	,867
Spelling Raw Score	,853
Arithmetic Raw Score	,702

11.3.3.4 Deriving Criterin Measures from the WRAT

As the three subtests yielded a significant factor, the raw scores were summed to provide a global score of Scholastic Achievement (Gorsuch, p. 237, 1974). Despite the unitary global dimension obtained, I was interested in deriving a view of each component skill used as a separate criterion in order to ascertain which were best predicted by CCT measures of voluntary attention, simultaneous synthesis, and action tendencies. Thus four measures were derived for use in the predictive study. These were the total raw score reflecting the global composite measure, Scholastic Achievement, and the raw scores for each component skill, Reading, Spelling and Arithmetic.

11.4 INVESTIGATING THE MAJOR HYPOTHESIS IN TERMS OF SCHOLASTIC ACHIEVEMENT

11.4.1 Design Problem

In Stage Two, when all available children were retested in Grade One, a design problem became apparent due to the fact that a small number of children (n=7) had been "held back" at nursery school by teachers and parents who had considered them totally "unready" to

cope with the demands of Grade One. The consequence was that a large proportion of the group in which I was most interested did not go through the same experiences as the rest of the children. This resulted in an unbalanced design.

Although reassessed on the same criteria measures as the Grade One children, and still clearly non-achievers, these children could not justifiably be included in the predictive studies. Although they had undergone therapy and/or tuition, it could be argued that their tuition had not been comparable to that of the Grade One Sample. As a result of this exclusion, there will be a potential underestimation of Beta weights in the multiple regression analyses carried out with the Grade One Sample.

11.5 MULTIPLE REGRESSION ANALYSIS (GRADE ONE SAMPLE, N=95)

11.5.1 In Terms of Global Scholastic Achievement (WRAT)

Table 18 provides a summary of the most important results of the main multiple regression analysis. The orthogonalized factor scores of CCT performance measures were used. Age was included as a control variable.

Table 18

Summary Table of Multiple Regression on Global Scholastic Achievement (WRAT) in Grade One (N=95)

Source	R Square	RSQ Change	F
F.Total Work O.	,107	,107	11,174**
F.Displaced Re. (-)	,148	,040	4,352*
F Errors (-)	,168	,021	2,251
F. Corrections (-)	,177	,009	1,015
Age (-)	,187	,010	1,074
F.Extrane.Mo (-)	,195	,008	,839
F.Fluctuations (-)	,198	,007	,325

Note. The notation F. is used for 'Factor score of'.

** $p < .01$; * $p < .05$

11.5.1.1 Description/Interpretation of Table 18

The results indicate that a moderate percentage of the variance of global Scholastic Achievement (14.8%) was predicted by Total Work Output and Displaced Responses ($p < .01$ and $p < .05$, respectively). *Total Work Output* measured level of performance, and Displaced Responses provided a specific measure of inefficiency, disrupted visual-spatial attention or orientation. Both measures had been found to reflect dynamic adaptive and/or maladaptive characteristics (Chapter 9). The results will be described in terms of the moderately well defined constructs derived from these two performance measures.

11.5.1.2 Discussion

Scholastic Achievement was explained by Total Work Output, Manifest intensity, efficiency, and stability of voluntary attention, speed and efficiency of information-processing (simultaneous synthesis), and intensity and efficiency of sustained voluntary action (i.e. visuo-spatial-motor orientation and output), expressing characteristic strength of need for Achievement (Voluntary Focused Receptivity vs. Uncaptured Attention, and Achievement Motivation) as well as Pervasive Anxiety. It was additionally explained by Displaced Responses, portraying inefficiency and instability of visuo-spatial-motor orientation (voluntary attention and action), reflecting, over and above the aforementioned characteristics, immature development and characteristic overt reactivity.

Thus, *Scholastic Achievement* was predicted and explained by aspects of activity related to higher mental functioning, influenced by and expressing *relatively-enduring* dynamic adaptive achievement-related characteristics (Chapter 9). The results suggested a functional relationship between efficiency of synthetic mental functions measured by the CCT and subsequent Scholastic Achievement. They showed that characteristic *energy mobilization*, preservation, and regulation, in pursuit of cognitively-oriented effort-demanding achievement, influenced subsequent *academic* achievement. This supported Luria's assertion (1973, p. 57) that "the fulfillment of a plan or the achievement of a goal requires a certain amount of energy, and they are possible only if a certain level of activity can be maintained."

11.5.1.3 Conclusions

In terms of the first part of my major hypothesis, CCT performance measures, reflecting dynamic adaptive characteristics influencing and representing adaptive action style measured in a significant life-like situation, were found to be significant predictors of scholastic achievement. This part of the hypothesis was confirmed despite potential attenuation of the results due to the design problem.

11.5.2 In Terms of Component WRAT Skills

A summary of the most important results are presented in Tables 19, 20, and 21.

Table 19

Summary Table of Multiple Regression on Reading in Grade One

(N=95)

Source		R Square	RSQ Change	F
F.Total Work O.		.071	.071	7,074**
Age	(-)	.086	.016	1,568
F.Displaced Re.	(-)	.103	.016	1,673
F.Extrane.Ms.	(-)	.114	.011	1,112
F.Errors	(-)	.124	.010	1,019
F.Fluctuations	(-)	.127	.003	.286
F.Increase	(-)	.128	.001	.142
F.Corrections	(-)	.128	.000	.043
F.Convexity	(-)	.129	.000	.030

Note . The notation F. denotes "Factor score of." ** p <.01

11.5.2.1 Description/Interpretation of Table 19

Level of performance (Total Work Output), the main integrated CCT performance measure, predicted and explained a low percentage (7.1%) of the variance of Reading (p <.01). Thus Reading was only partially explained by intensity and efficiency of voluntary attention, information processing by *simultaneous synthesis*, and voluntary action (verbal response), expressing characteristic achievement-related motivation and general anxiety. (Although not included in the original design of the study, it was interesting to

This measure had, however, been found to be significantly correlated with the Personal measures derived within the Experimental Work situation (discussed at the end of Chapter 8). Corrections had been found to be significantly related ($p < .01$) to observations of noisy behaviour, difficulty in mastering the task requirements, as well as self-report measures of dislike, discomfort, and partial effort in this situation (manifestations clearly counterproductive to sustained conscientious systematic analysis and organized voluntary action).

As Corrections did not reflect any characteristics observed in the nursery school environment, it can only be described as a manifestation of inefficiency, reticence to manifestations of inadequate self-regulation and aggressive attitudinal/affective aspects within a particular achievement-oriented situation (CUT). The possibility still exists, however, that this measure was related to characteristic control or attitudinal factors not observed by means of the Teachers' Checklist at nursery school.

Thus Spelling was predicted and explained by the factor score of Corrections, a manifestation of performance inefficiency related to higher mental functioning, viz inadequate inhibition of responses to irrelevant stimuli" (Luria, 1973, p. 271) associated with observed deficits in self-regulation and motivation in an achievement-oriented situation. Spelling was additionally explained by Total Work Output, representing efficiency related to higher mental functioning, reflecting characteristic achievement-related motivation, attention, and action, and general anxiety.

It appeared that the processes required by written Spelling were closely related to the demands of the Continuous Cognitive Task. Written Spelling would appear to rely heavily on functions facilitating sustained efficient voluntary attention and independent self-regulated voluntary action as it seemed to require sustained achievement motivation and commitment, as well as systematic analytic sequenced controlled organization of conscious mental activity and purposive action. (The inclusion of digit span in the multiple regression analysis did not add to the predicted variance).

Table 21

Summary Table of Multiple Regression on Arithmetic in Grade One

(N=95)

Source	R Square	RSQ Change	F
F.Displaced Rs. (-)	.091	.091	9.258**
F.Total Work O.	.176	.085	9.512**
F.Errors (-)	.189	.013	1.502
F.Corrections (-)	.192	.003	.285
F.Extrane.Ms. (-)	.193	.002	.180
F.Increase over Time	.195	.002	.173
F.Fluctuation	.197	.002	.200
F.Convexity	.197	.000	.045

Note . The notation F. is used for "Factor score of"

** $p < .01$

11.5.2.3 Description/Interpretation of Table 21

Arithmetic was moderately well predicted (17.6% of the variance) by the factor scores of Displaced Responses and Total Work Output ($p < .01$). It appeared to be primarily explained (9.1% of the variance) in terms of Displaced Responses portraying instability of voluntary visuo-spatial orientation and attention, reflecting characteristic anxiety, uncaptured attention, reactivity to external stimuli, and immature development. An additional 8.5% of its variance was explained by Total Work Output, representing functional efficiency and reflecting characteristic achievement-related motivation and general anxiety. (The inclusion of digit span in the analysis did not add to the predicted variance).

11.5.3 Integration of these Results

A moderate percentage of the variance of global Scholastic Achievement (WRAT) (14.8%) was predicted at a significant level ($p < .01$ and $p < .05$) by factor scores of specific CCT performance measures, Total Work Output, Displaced Responses, and Corrections. Whereas the first two measures had been found to reflect characteristics, Corrections could only been defined in terms of the specific CCT situation.

Viewing the component skills separately, an appreciable percentage of the variance of Spelling was predicted (24.4%), followed by Arithmetic (17.6%) and finally Reading (only 7.1%). F.Total Work Output, measuring level of performance, predicted global Scholastic Achievement and *each* of the component skills (p <.01). It was the only significant predictor of Reading. The two specific measures of inefficiency (F.Corrections and F.Displaced Responses) were significant predictors (p <.01) of Spelling and Arithmetic, respectively. F.Displaced Responses, a manifestation of disrupted visuo-spatial attention, contributed to the predicted variance of global Scholastic Achievement (p <.01). Its main influence, however, was on Arithmetic, predicting 9.1% of the variance (p <.01). F.Corrections, the other specific measure of inefficency, predicted Spelling (p <.01).

11.5.3.1 Discussion and Speculation

Although higher mental functioning involves the integrated functioning of all three units of the brain, it would seem that certain activities depend more heavily on efficiency of particular functional units than others. Spelling was the best predicted of the WRAT component skills: Reading the least well predicted.

Patterns of academic performance have been used as a method of subtyping learning disabled children (Fisk & Rourke, 1983), and The Wide Range Achievement Test has been used in subtype analysis (Rourke, 1985). (Although subtype analysis was not a focus in the desi- of the present study, it appeared that CCT performance and a brief measure of successive synthesis [digit span] might provide a moderately effective sample of cognitive functioning for this age group, of possible value in subtyping.)

11.5.3.2 Rationale for Graphic Presentation of Major Result

I was interested in viewing the potential of significant CCT predictors of global Scholastic Achievement to identify individuals placed in specific achievement groups. Children whose scores on Scholastic Achievement (WRAT) were below the 34th percentile (n=34) were grouped together for comparison with the *rest of the Grade One* Sample (n=61).

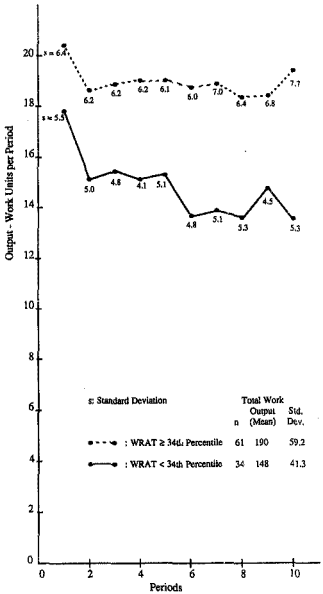

Figure 7. Group Curves of Work for Two Achievement Groups (Grade One, Stage Two Sample).

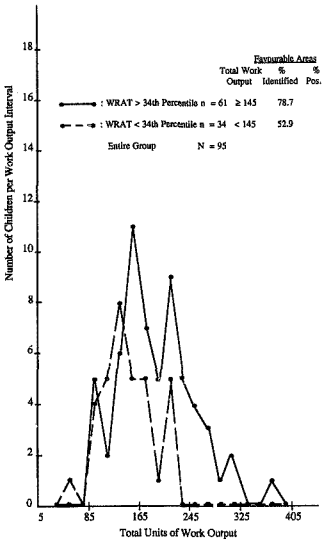

Figure 8. Total Work Output Frequency Distributions for Two Achievement Groups (Grade One, Stage Two Sample).

Comparative group Curves of Work are shown in Figure 7. As before, for ease of graphical presentation, a comparative frequency distribution was drawn (Figure 8) only for the *variable that entered* into the predictive equation at the higher level of significance ($p < .01$). The favourable area for identifying the low achievers and the remaining area were examined to portray accuracy of individual identification.

From an inspection of favourable areas, it was found that Total Work Output accurately identified 52,9% of the low achievers (WRAT 43rd percentile), including 13,7% of the sample as false positives. The remaining area accurately identified 78,7% of the other group, including 16,8% of the sample as false negatives. The detailed predictive utility findings, presented in Appendix H, revealed an overall hit rate of 69,5% (This percentage of accuracy was encouraging for a single quantitative measure but by no means adequate to justify decision-making on the basis of this measure *only*.)

11.6 STAGE TWO PHASE TWO: NEED TO FOCUS ON PREGRADE PROBLEM GROUP

The exclusion of the "problem" group from the multiple regression *analysis caused potential attentuation* in the predictive findings. Despite adequate confirmation of the first part of my major hypothesis, the presentation of only the predictive validity results of those children who had proceeded to *Grade One*, would be both inadequate and misleading. From reassessment nine to ten months later, it was apparent that six of these seven children who had been prevented from attending Grade One, were still presenting notable areas of difficulty. None of the children had made significant scholastic gains despite having had individual remedial assistance.

11.7 FORMATION OF ACHIEVEMENT GROUPS INCLUDING ENTIRE STAGE TWO SAMPLE

In an attempt to portray the results in a more comprehensive manner, this small group of "problem" children, who would otherwise have been lost to the study, were used as an actual or de facto Low Achievement group ($n = 7$). This group was one of four used to illustrate group differences in the Curve of Work. The other three Achievement groups ($n = 34$, 33, and 28), were formed on the basis of equal-interval percentile scores derived from the global WRAT Scholastic Achievement scores.

As the inclusion of the group of interest, the *de facto* Low Achievement, caused a vast difference between the cells, *analysis of* variance could *not* be carried out. Comparisons were made therefore by use of illustrative graphs as shown in Figure 9.

Finally the *de facto* Low Achievement group was combined with the WRAT < 34th *percentile group* to form an Inadequate Achievement group (n = 41) for comparison with the other two groups, representing Adequate Achievement (n = 61). The resulting categorical variable was *used as a* dependent variable in multiple regression analysis, not to investigate prediction, but to view discriminative ability of the CCT performance measures. Despite recognition that this was not an optimal *procedure, the argument, cited in* Chapter 10 (Kerlinger & Pedhazur, 1973, p. 337) appeared to justify this procedure.

11.7.1 Description and Discussion of Figure 9

The *de facto* Low Achievement group appeared to be characterized by a low level of performance on The Continuous Cognitive Task, tending to decrease during the [illegible]. It seemed thus that the "problem *group*" was characterized by deteriorating performance, suggesting that the chi[illegible] group were unwilling to exert themselves appropriately [illegible] higher potential. The group Curves of Work for the other Grade One Achievement groups were merely consistent with the predictive findings, i.e. that level of CCT performance was a significant predictor of Scholastic Achievement.

11.8 *MULTIPLE REGRESSION* ANALYSIS WITH A TWO-GROUP ACHIEVEMENT CRITERION

The discriminative ability of the CCT performance measures was finally viewed in *terms of a* two-group division of achievement groups from the entire Stage Two Sample (N = 102). The categorical variable, Adequate/Inadequate Achievement was used as a dependent variable in a multiple regression *analysis*. *Age* was included as a *control* variable. The main results are presented in Table 22.

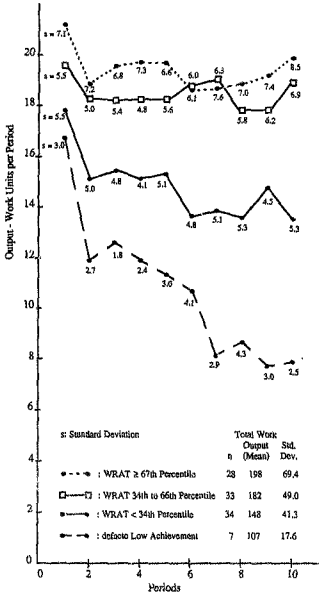

Figure 9. Group Curves of Work for Four Achievement Groups (Entire Stage Two Sample).

Table 22

Summary Table of Multiple Regression on

Adequate/Inadequate Achievement (N=102)

Source	R Square	RSQ Change	F
F.Total Work O.	.112	.112	12.626**
F.Increase over Time	.180	.068	8.240**
F.Errors (-)	.206	.026	3.196
F.Displaced Re.(-)	.220	.013	1.659
F.Extrane.Ma. (-)	.230	.010	1.305
F.Convexity (-)	.237	.007	.841
F.Fluctuation (-)	.238	.001	.171
Age	.239	.001	.135
F.Corrections (-)	.240	.000	.056

Note . The notation F. is used for "Factor score of"

** $p < .01$

11.6.1 Description of Table 22

Both the factored scores of Total Work Output and Increase over Time were found to discriminate ($p < .01$) between these two achievement groups. A moderate percentage of the variance (18%) was explained, not predicted by the factor scores of these two CCT performance measures. Level of performance explained placement into an Adequate Achievement group ($p < .01$); an increasing sustained performance on the Continuous Cognitive Task (Increase over Time) additionally explained this placement ($p < .01$).

11.6.2 Graphic Presentation of These Results

Comparative Group Curves of Work were drawn for the two achievement groups representing the entire Stage Two Sample (N=102). These results were graphically presented in Figure 10. Frequency distributions of each measure with significant discriminative ability ($p < .01$) were drawn and presented in Figures 11 and 12, and favourable areas examined.

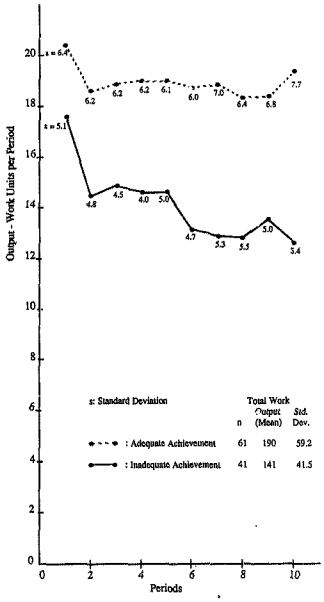

Figure 10. Group Curves of Work for Two Achievement Groups (Entire Stage Two Sample).

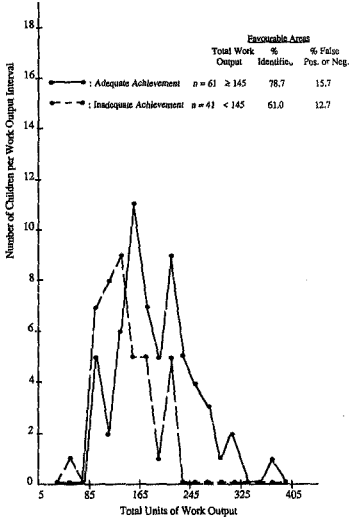

Figure 11. **Total Work Output Frequency Distributions for Two Achievement Groups (Entire Stage Two Sample).**

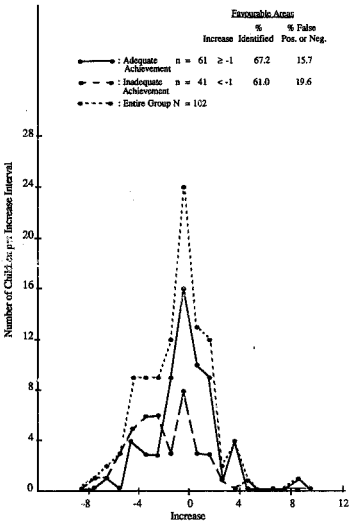

Figure 12. Increase Frequency Distributions for Two Achievement Groups (Entire Stage Two Sample).

11.8.3 Discussion

The factor scores of two CCT performance measures, Total Work Output and Increase over time, discriminated at a significant level ($p < .01$) between an Adequate and an Inadequate Achievement Group. The inclusion of the *de facto* Low Achievement group (Pregrade) with the lower third Grade One Achievers, showed the potential of Increase over Time to discriminate between achievement groups including the entire Stage Two Sample. Thus Scholastic Achievement was also explained, although not predicted, in terms of persistent sustained effort and work output throughout the duration of an effort-demanding achievement-oriented activity. Although Increase over Time had not been adequately explained in terms of Teachers' Checklist factors (characteristics observed at nursery school), the global measure, Dynamic Adaptive Interaction Style, derived from the Teachers' Checklist, did explain a low percentage of its variance (8,3% with a F value of 9,341 ($p < .01$). Comparable measures of Increase over Time, derived from one-hour Continuous Work Tests used with adults, were described by Reuning (1983, p. 314) as reflecting "perseverance, resistance to fatigue and boredom, ... 'staying power' or stepping up effort throughout the test." Some of these measures, he reported had been found to be significantly affected by an "energizing" drug, and to "heart pulse acceleration during the test period."

Increase over Time appeared to be an interesting CCT performance measure with limitations despite its apparent ability to distinguish significantly between criterion groups *in Stage One and in Stage Two* of the study. When the "problem" group was excluded from the sample (in the prediction of Grade One achievement [N = 95]), the attenuation was so marked that there was no longer a significant correlation between Increase over Time and Scholastic Achievement. IT appeared thus to be an unstable variable, with value only in selected regions. Perhaps an alternative measure with greater stability could be devised to measure declining performance?

11.8.4 Favourable Areas

An inspection of favourable areas showed that 61,0% of children were accurately identified in the Inadequate Achievement group, and 12,7% of the sample included as false positives. The remaining area accurately identified 78,7% of the Adequate Group, including 15,7% of the sample as false negatives. A nearly-favourable area for

Increase over Time accurately identified 61,0% of the Inadequate Achievement group, including 19,6% of the sample as false positives (more than the stipulated 16% maximum.) The remaining area identified 67,2% of the Adequate Achievement group, with 15,7% false negatives.

11.9 OVERALL CONCLUSION AND DISCUSSION

11.9.1 In Terms of Prediction

The major hypothesis that the CCT performance measures, reflecting characteristic adaptive action style, would predict scholastic achievement and classroom adjustment, was examined in this chapter only in terms of the first criterion, Scholastic Achievement (WRAT). This hypothesis was substantiated despite the potential underestimation of Beta weights.

In the Grade One Sample (N=95), three CCT performance measures (Total Work Output, Displaced Responses, and Corrections), depicting level of performance and two different manifestations of inefficient attention, were found to predict and explain global Scholastic Achievement and/or one of the component skills. Although a moderate percentage of the variance of global Scholastic Achievement (WRAT) was predicted, it appeared that the cognitive functions and/or motivational characteristics measured by the Continuous Cognitive Task were more strongly related to Spelling and Arithmetic, than they were to Reading.

The theoretical perspective of Luria (1973), can be used to explain characteristic efficient cognitive and executive functioning (measured by CCT performance) in terms of adequacy of sustained activity. This activity, shown, for this sample to be relatively enduring or characteristic, (Chapter 9), would logically influence subsequent scholastic achievement.

11.9.2 Subtyping Possibilities

The global measure Total Work Output, or Productivity, might be of value in considering severity of maladaptive cognitive functioning. CCT performance, shown to be differentially related to academic skills, and reflecting efficiency of information processing requiring simultaneous synthesis, might also be of some value (together with a single measure of successive synthesis [e.g. digit span]) in preliminary subtyping preschool learning disabled children.

As this Dynamic Behaviour Assessment Paradigm also provides

specific measures of inefficiency, disrupted voluntary attention (Displaced Responses) and impulsive responding (Corrections), the CCT *might also be of value in subtyping children in terms of attentional problems*. These specific measures might be of use in investigating attentional problems related to anxiety, development, attention deficit disorder, and impulsivity.

11.9.3 Inclusion of Pregrade "Problem" Group

The inclusion of the de facto Low Achievement group in graphs and a statistical analysis using the entire Stage Two Sample (N=102) was of interest. Of particular interest was the group Curve of Work for this "problem" group, characterized by a markedly deteriorating (decreasing) performance during the CCT. The multiple regression analysis, aimed to explain placement into two Achievement groups in terms of CCT measures, drew attention to unstable features of Increase. The discriminative ability of Increase over Time (found in Stage One with respect to Readiness groups), was again highlighted while the limitations of its general use were noted. The possibility of devising an alternative measure for declining performance was suggested.

An examination of favourable areas in the relevant frequency distribution graphs of the entire Stage Two Sample revealed that both Total Work Output and Increase over Time had accurately identified an appreciable number of individuals in the achievement groups.

11.9.4 Potential for Individual Identification

No single Continuous Cognitive Task performance measure showed adequate discriminative ability to form the sole basis for decisions about individuals related to future Scholastic Achievement. There did appear to be a possibility, however, that a combination of CCT performance measures might ultimately facilitate accuracy of individual identification.

12 RESULTS USING SCHOLASTIC AND BEHAVIOURAL CRITERIA

This chapter was concerned with investigating the possibility of deriving integrated criteria in order to examine the predictive validity and nature of characteristic adaptive action more fully. CCT performance provided measures of dynamic adaptive personality *characteristics measured by cognitive manifestations* (Chapter 9). Viewed differently, CCT performance provided measures of cognitive characteristics influenced by dynamic motivational characteristics. I considered that the performance measures derived from the Continuous Cognitive Task, depicting integrated characteristics (cognitive and motivational), would be most appropriately evaluated by means of integrated criteria.

I hypothesized that adaptive action tendencies (measured by performance on the CCT) were core characteristics that would influence both major spheres of adaptation in Grade One, scholastic and behavioural. The predictive validity for Scholastic Achievement was investigated in the last chapter. Stage Two, Phase Two was devoted to investigating the structure of the behavioural criteria (The Devereux Elementary School Behaviour Rating Scale) and then examining the integrated structure of scholastic and behavioural criteria.

12.1 THE DEVEREUX ELEMENTARY SCHOOL BEHAVIOUR RATING SCALE (DESB)

12.1.1 Description

The Devereux Elementary School Behaviour Rating Scale (DESB), developed within the framework of normal and special class programmes, was described by its authors as having "as many uses as there are reasons for knowing the problem behaviors that interfere with learning in the first six grades of elementary school" (p. 3). This included its use "as a means of *identifying and measuring those* classroom behaviors that may be interfering with achievement", and "as a research device for those who wish a reliable measure of behaviors that appear in the classroom setting and are related to learning". The scale was said to provide "a profile of 11 dimensions of overt problem behavior that experienced teachers have judged as being related to classroom achievement, and for which

there is research evidence to this effect" (Spivack & Swift, 1967, p. 3).

The DESB measures 47 behaviors which define 11 behaviour factors and three additional items. Factors consisted of between three and five items, "all items in a factor tapping a common dimension of classroom behavior that is relevant to academic achievement or adjustment" (Spivack & Swift, 1967, p. 8). Each factor has been clearly defined in the Manual. These behavioural factors are Classroom Disturbance, Impatience, Disrespect-Defiance, External Blame, Achievement Anxiety, External Reliance, Comprehension, Inattentive-Withdrawn, Irrelevant-Responsiveness, Creative Initiative, and Need for Closeness to the Teacher. The three single items portray difficulty in changing from one task to another when requested to do so, the tendency to quit in the face of difficulties or unusual demands, and slowness and the need for prodding in order to complete work. The DESB is presented in Appendix C.

12.1.2 Rationale for Selecting The DESB

Many of the factors and additional items encompassed by this scale appeared to have direct relevance to the measurement of independent self-regulated adaptive action (or interaction) tendencies manifest in a learning environment. Also, the inclusion of affective items should provide a means of viewing the interaction between personal affective, motivational facets and characteristic work-related behaviour.

12.1.3 Procedural Aspects

Teachers are instructed to rate the child on each of the 47 items of the scale on the basis of behaviour over the past month. There is space provided on the form for comments about any additional behaviour regarded as "striking or characteristic". The 5-point rating scale depicts the frequency with which the overt behaviour is manif :, ranging from "Never" to "Very frequently".

12.1.4 Psychometric Aspects

I examined the structure of the DESB ratings derived for the present sample by means of factor analysis. The eleven factor scores and three additional items were subjected to a principal components analysis.

Table 23

Varimax Rotated Factor Loadings of DESB

Factor Scores and Single Items (N=96)

DESB Measures	Factor 1	Factor 2	Factor 3
Classroom Disturbance	117	896	-074
Impatience	420	732	-145
Disrespect-Defiance	098	868	-032
External Blame	556	550	131
Achievement Anxiety	798	045	183
External Reliance	899	217	-115
Comprehension	-694	-278	454
Inattentive-Withdrawn	722	344	-221
Irrelevant-Responsiveness	361	779	122
Creative Initiative	-298	251	277
Need for Closeness to Teacher	-012	-153	874
Unable to change to new task	828	205	-230
Likely to quit	828	268	-109
Slow to complete work	630	175	-306
Eigenvalue	6,759	2,169	1,379
Percentage Variation	48,3	15,5	9,9
Cumulative Percentage	48,3	63,8	73,6

Note. Decimal points omitted. Loadings of 32 or greater (underlined) used as criterion of acceptance.

12.1.4.1 Interpretation/Description of Table 23

Factor 1. A fundamental second-order factor accounted for nearly half of the total variation (48,3%) of the DESB. The main dimensions that loaded on it were External Reliance, Achievement Anxiety, "difficulty in changing to a new task" and "Likely to quit or give up *when something is difficult or demands* more than usual effort". Inattentive-Withdrawn, inadequate Comprehension, and "slow to complete work without prodding" also loaded on this factor, as

Table 23

Varimax Rotated Factor Loadings of DESB

Factor Scores and Single Items (N=96)

DESB Measures	Factor 1	Factor 2	Factor 3
Classroom Disturbance	117	896	-074
Impatience	420	732	-.45
Disrespect-Defiance	098	860	-032
External Blame	556	550	131
Achievement Anxiety	798	045	183
External Reliance	899	217	-115
Comprehension	-694	-278	454
Inattentive-Withdrawn	722	344	-221
Irrelevant-Responsiveness	361	779	122
Creative Initiative	-296	251	727
Need for Closeness to Teacher	-012	-153	874
Unable to change to new task	828	205	-230
Likely to quit	828	268	-109
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did External Blame, Impatience, and Irrelevant-Responsiveness.

Three interrelated facets of this syndrome appeared to be (a) inadequate independent use of environmental opportunities in relation to demands or requirements, (b) attitudes associated with feeling out of control, and (c) manifestations of inadequate self control.

The first facet, depicting inadequate use of opportunities (or inadequate interaction), comprised External Reliance, inadequate Comprehension, Inattentive-Withdrawn, inability to change to a new task, and *likely to quit*. *The second facet included* Achievement Anxiety and External Blame. Achievement Anxiety was defined by the authors as 'the outward display of disturbance (worry and upset) concerning the inability to meet the *achievement demands of the* teacher and/or school situation' (p. 13). External Blame implied 'that the child does not feel capable of meeting the demands of the learning situation, and feels that success or failure is not *self* -determined, but completely a consequence of the external demands and the judgments of the teacher' (Spivack & Swift, p. 12). Both these factors involved attitudes of not feeling in control of the situation, i.e. feeling unable to meet environmental demands adequately. The third facet incorporated Impatience and Irrelevant-Responsiveness, reflecting inadequate self control.

These three interrelated facets, (a) inadequate independent interaction tendencies, associated with (b) feelings of being out of control, and (c) manifestations of inadequate self control, suggested a maladaptive pattern where the child does not actively *confront* and adapt to environmental demands and opportunities. This led to the label Maladaptive Inertia vs. Active Adaptive Behaviour. Factor 2. The main facets that loaded on the second factor were Classroom *Disturbance*, Disrespect-Defiance, Irrelevant-Responsiveness, Impatience, and External Blame. Another aspect that loaded significantly was Inattentive-Withdrawn. The main syndrome depicted defiant behaviour *with a lack of restra*' control. The factor was therefore labelled Unrestrained Defiance. It accounted for 15.5% of the total variation.

Factor 3. The facets which loaded on the *third factor were* Need for Closeness to the Teacher (the degree to which the teacher is 'positively valued as a person'. [Spivack & Swift, 1967, p. 18]), Creative Initiative ("the degree to which the child exhibits active

personal involvement in, and positive motivation to contribute to, the classroom learning situation" [p. 17]), and Comprehension (actively following and understanding the "day-to-day work demanded by the curriculum and teacher", [p. 14]). As these three facets involved positive motivation and active, relevant, interpersonal interaction (responding and contributing), it was labelled Co-operative Interaction. It accounted for 9.9% of the total variation.

12.1.4.2 Discussion

The main factor, Maladaptive Inertia vs. Active Adaptive Behaviour, appeared to be a fundamental factor reflecting a core adaptive failure, lack of active adaptation to the opportunities and demands of the significant environment. It represented a characteristic lack of independent effective action, associated with anxious feelings of *not being in control*, together with manifestations of inadequate self control. Feelings of anxiety about the "inability to meet the achievement demands of the teacher and/or school situation"(p. 13), together with feelings that "success or failure is no self determined" (p. 12) were thus found to be related to the fundamental failure to mobilize energy effectively. These findings provided additional for the hypothesized association between *cognitive/self* aspects (anxiety) and effective aspects (inhibition of ac) (Atkinson & *Raynor*, 1978).

This fundamental behavioural failure encompassed two important aspects, active adaptive use of environmental opportunities, and active adaptive control or self-regulation. Both facets seemed to be essential in order to achieve self-determined goals and to meet environmental demands. This *maladaptive syndrome would logically* thwart the child's fundamental psychological needs for *self-determination* and competence, two of the three major psychological needs postulated by Deci & Chandler (1986, p. 589).

The syndrome depicted an overall deficiency in adaptive action style, active voluntary attention, energy mobilization and preservation, and self-regulation, necessary for independent achievement-directed activity and purposive action. It included inability to plan or set achievement goals, orientate, master task requirements, *initiate* achievement-oriented activity, as well as the failure to organize and regulate behaviour appropriately in pursuit

of these goals. The characteristic failure of adaptive action is seen in the pattern of inertia, including passive dependence, inability to change, and ready capitulation. These manifestations, together with the associated anxiety, portrayed a pattern of anxious non-adaptation where the child neither feels in control nor acts with appropriate planning, action, or active self-regulation.

This factor was very *similar to one* of the two characteristic learning patterns which Spivack & Swift (1967) had found from an examination of the profiles of children *who were not learning* effectively. Spivack & Swift's pattern comprised "a trio of problems" describing "the youngster who needs much external direction and support in order to learn and to attend to the learning situation (p. 22)". This trio of problems included three of *the main factors* which loaded on this second-order factor, viz. External Reliance, Inattentive-Withdrawn, and Comprehension. (In their Manual Spivack & Swift *made no mention*, however, of an association between feelings of anxiety and this syndrome of non-adaptation.)

This non-adaptive pattern was also reminiscent of "Interest-Participation vs. Apathy-Withdrawal", one of the two *socio-emotional* dimensions considered by Kohn & Rosman (1972a) to represent fundamental adaptive characteristics within the preschool environment. *The syndrome* appeared to have value in that it not only represented characteristic ineffectiveness, but it also provided a comprehensive view of *failure to plan or act* effectively, associated with feelings of anxious inadequacy.

The second syndrome, Unrestrained Defiance, which *emerged from* the present factor analysis was virtually identical to Spivack & Swift's second characteristic pattern, describing "the youngster who *is* called 'acting out' or poorly self-controlled" (p. 22). The authors suggested that a syndrome which included all five of these dimensions *would depict* a youngster who "presents a serious management problem". They suggested that the child's "negative response to the classroom situation *suggests he feels* alienated from the learning situation, and at 'war' with it" (p. 22). Once again, there was a marked similarity to Kohn & Rosman's second *basic* socio-emotional dimension, "Cooperation-Compliance vs. Anger-Defiance".

The third factor, Co-operative Interaction, depicted a pattern of high overall motivation and positive interaction, combining enthusiastic interpersonal interaction with the teacher, active participation and involvement, and the tendency to contribute positively to the learning environment.

In sum, the principal components analysis resulted in the derivation of what seemed to be fundamental adaptive characteristics, the core resource of adaptive energy mobilization, and the other two adaptive resources, depicting the nature and quality of interpersonal interaction.

12.2 DERIVING INTEGRATED CRITERIA

The Devereux Elementary School Behaviour Rating Scale had been designed to portray behaviours related to scholastic achievement. I was interested in examining the integrated structure of scholastic and behavioural facets. The global Scholastic Achievement measure derived from the Wide Range Achievement Test, together and the three factor scores derived from the DESB, were subjected to a further principal components analysis. The Varimax Rotated Factors are presented in Table 24.

Table 24

Varimax Rotated Factors (DESB and WRAT) (N=95)

WRAT and DESB Factors	Factor 1	Factor 2	Factor 3
Scholastic Ach.(WRAT)	-821	265	-098
Maladaptive Inertia	883	131	-052
Unrestrained Defiance	023	009	997
Co-operative Interaction	-055	979	011
Eigenvalue	1,517	1,003	,991
Percentage of Var.	37,9	25,1	24,8
Cumulative Percen.	37,9	63,0	87,8

Note. Decimal points omitted from the loadings. Loadings of 32 and greater (underlined) were used as criterion of acceptance.

12.2.1 Interpretation/Description of Table 24

Global Scholastic Achievement, as measured by the Wide Range Achievement Test, and Maladaptive Inertia vs. Active Adaptive Behaviour loaded on Factor 1. Both dimensions portrayed inadequate adaptation, the specific failure to meet early academic environmental demands and expectations, associated with the characteristic failure to make adequate *independent use of* achievement opportunities. It was thus called Inadequate Mastery.

The two factors, Co-operative Interaction and Unrestrained Defiance, remained virtually the same as in the separate factor analysis of the DESB. Scholastic Achievement did not load significantly on either factor.

12.2.2 Discussion

An integrated criterion factor was thus derived from this analysis. Inadequate Mastery depicted the essential functional link between activity, the core personal adaptive resource for *interacting appropriately with the relevant environment*, and the acquisition of the required knowledge and academic skills. Maladaptive Inertia would logically preclude the pursuit of purposive effective achievement-oriented activity. This association demonstrated that the failure to learn or master academic *requirements was strongly* related to characteristic failure to achieve personal mastery necessary for dealing with opportunities and demands appropriately. Achievement of personal mastery would appear to involve mobilizing and regulating energy effectively and appropriately in interacting with instruction, work assignments, and other individuals in the classroom situation.

This concept is not new. It is obvious, logical, and theoretically substantiated. How often have teachers said that a child could do better if only he "concentrated", *"made more effort"*, or "applied himself?" The clear emergence of this general factor underlined the fact that the child who characteristically lacks independent active adaptive resources in a learning environment, cannot learn adequately.

Thus effective intentional *learning would seem to involve* the acquisition of the required knowledge and skills by active interaction with the learning environment, constituting the child's active constructive role. This role included attending, setting goals, striving, and sustaining energies independently. To repeat

Lurie's assertion: "The fulfilment of a plan or the achievement of a goal requires a certain amount of energy, and they are possible only if a certain level of activity can be maintained" (p. 57).

12.3 INTEGRATED CRITERIA FOR INVESTIGATING THE MAJOR HYPOTHESIS

12.3.1 Inadequate Mastery

In order to examine the major hypothesis fully, CCT performance measures were investigated as predictors of this integrated criterion factor, Inadequate Mastery. Inadequate Mastery clearly reflected both scholastic achievement and classroom adjustment or adaptation. Table 25 presents a summary of the most important findings from multiple regression analysis, using this integrated criterion. Age was included as a control variable.

Table 25

Summary Table of Multiple Regression on Inadequate Mastery (N=95)

Source	R Square	RSQ Change	F
F.Total Work O. (-)	.172	.172	19.329**
F.Displaced Re.	.247	.075	9.121**
F.Corrections	.261	.014	1.762
F.Extrane.Ms.	.269	.008	1.027
Age (-)	.272	.002	.298
F.Increase over Time	.274	.003	.314
F.Fluctuations	.276	.001	.159
F.Convexity (-)	.276	.001	.074
F.Errors	.277	.001	.069

Note. The notation F. is used for "Factor score of". The notation (-) is used for a negative value of Beta.

** $p < .01$

12.3.1.1 Description/Interpretation of Table 25

The factor scores of two CCT measures, Total Work Output and Displaced Responses, predicted a moderately substantial percentage of the variance (24,7%) *of Inadequate Mastery*, the integrated criterion measure combining Scholastic Achievement with Maladaptive Inertia vs. Active Adaptive Behaviour. It was predicted $p < .01$ by the factor score of Total Work Output, *representing characteristic* intensity, efficiency and persistence of activity related to higher mental functioning through all three phases of the mental act, and reflecting dynamic adaptive motivational characteristics. Inadequate Mastery was additionally explained ($p < .01$) by Displaced Responses, reflecting, over and above the aforementioned aspects, immature development and overt reactivity.

(A supplementary multiple regression analysis of potential importance, not related to the original design of the study, included the variable "digit span", a sample of information processing by successive synthesis, with the CCT measures. Digit span was entered third in the equation, adding 7,9% to the predicted variance ($F=10.645$ [$p < .01$]), thus increasing the total percentage of predicted variance of Inadequate Mastery from 24,7% to 32,6%.)

12.3.1.2 Discussion and Conclusion

The use of this fundamental integrated criterion factor (Inadequate Mastery) led to findings which fully supported *my major hypothesis*. Inadequate characteristic adaptive action style, measured in a significant life-like situation by the Continuous Cognitive Task, were found to predict Inadequate Mastery related to the demands *and opportunities of the classroom* environment. The global demands and opportunities appeared to be for active personal mastery, and for mastery of the basic scholastic skills. The achievement of Mastery appeared to require *independent striving* towards satisfying achievement-oriented goal and environmental requirements with appropriate energy mobilization and self-regulation.

Characteristic adaptive activity was thus found to be the child's core resource for satisfying his fundamental adaptive motivation, a prerequisite for achievement and for regulating behaviour appropriately in confronting and dealing with environmental opportunities and demands. This fundamental resource could be moderately effectively and objectively measured by

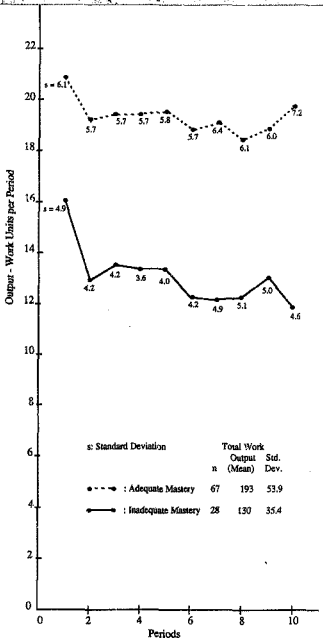
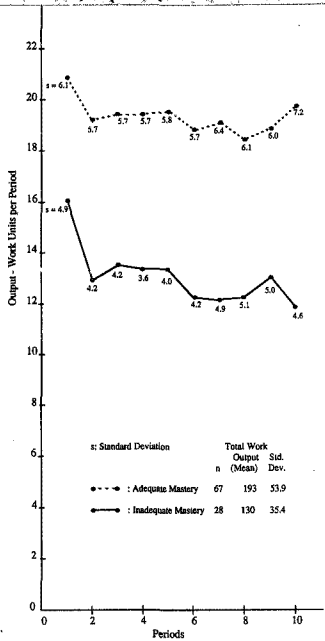


Figure 13. Group Curves of Work for Two Mastery Groups (Grade One).



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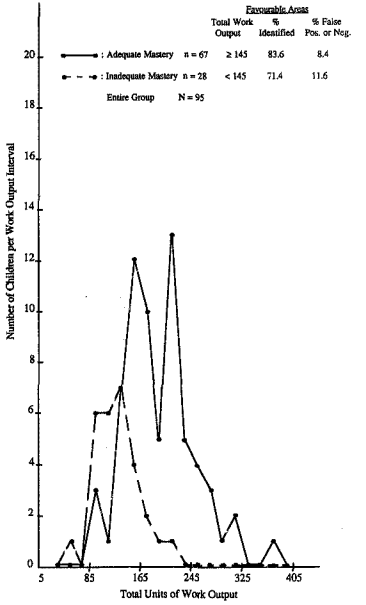

Figure 14. Total Work Output Frequency Distributions for Two Mastery Groups (Grade One, Stage Two Sample).

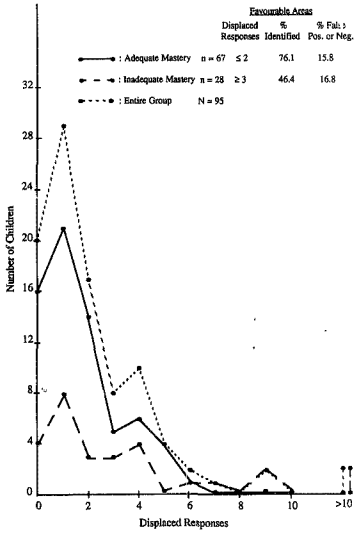

Figure 15. Displaced Responses Frequency Distributions for Two Mastery Groups (Grade One, Stage Two Sample).

performance on the Continuous Cognitive Task, used as a Dynamic Behaviour Assessment Paradigm.

12.3.1.3 Graphic Presentation

Percentile scores were used to group together children with factor scores for Mastery that were below the 34th percentile. An Inadequate Mastery group (n=28) was thus formed for comparison with the rest of the sample (Adequate Mastery [n=67]). Comparative Curves of Work were drawn for these Mastery groups (Figure 13). As before, for ease of graphical presentation, frequency distributions were only drawn for significant predictors ($p < .01$) (See Figures 14 and 15), and favourable areas examined.

12.3.1.4 Favourable Areas

An examination of favourable areas revealed that 71,4% of children were accurately identified by Total Work Output in the Inadequate Mastery group, while 11,6% of the sample were included as false positives. Total Work Output also accurately identified a high percentage of the children in the Adequate Mastery group (83,6% with 8,4% false negatives). The most favourable area for identifying the deficit Mastery group in terms of Displaced Responses, accurately detected only 46,4% of this group, while including 16,8% of the sample as false positives. The remaining area, however, accurately identified 76,1% of the Adequate Mastery group, including 15,8% of the sample as false negatives. Detailed predictive utility calculations, presented in Appendix I, revealed an overall hit rate of 80% for Total Work Output, and 67,4% for Displaced Responses. (An interesting finding, beyond the scope of this study, was that 28,6% of the children in the Inadequate Mastery group were left-handed.)

12.3.2 Co-operative Interaction

CCT performance measures were investigated as predictors of Co-operative Interaction, and Age included as a control variable. A summary of the most important results from the multiple regression analysis is presented in Table 26.

Table 26

Summary Table of Multiple Regression on

Co-operative Interaction (N=95)

Source		R Square	RSQ Change	F
F.Total Work O.		.028	.028	2.712
F.Extrane.Ma.		.056	.027	2.668
F.Errors	(-)	.084	.028	2.818
F.Increase		.099	.015	1.508
F.Convexity		.108	.009	.906
F.Displaced Re.		.117	.009	.888
F.Corrections	(-)	.127	.010	.955
Age	(-)	.127	.001	.060
F.Fluctuations	(-)	.128	.000	.041

Note. The notation F. was used for "Factor score of". The notation (-) used to denote a negative Beta value.

12.3.2.1 Description of Table 26

Co-operative Interaction was not significantly predicted by any of the CCT performance measures.

12.3.3 Unrestrained Defiance

CCT performance measures were examined as predictors of Unrestrained Defiance: Age was again included as a control variable. The summary of results of this multiple regression analysis is presented in Table 27.

Table 27

Summary Table of Multiple Regression

on Unrestrained Defiance (N=95)

Source		R Square	RSQ Change	F
F.Errors		,070	,070	6,956*
F.Total Work	(+)	,100	,031	3,124
F.Displaced Rs.		,124	,023	2,438
Age		,147	,023	2,462
F.Increase	(-)	,159	,012	1,319
F.Extrans.Ms.		,164	,004	,446
F.Convexity	(-)	,167	,003	,304
F.Corrections		,168	,002	,187
F.Fluctuations		,168	,000	,011

Note. The notation F. is used for "Factor score of", and the notation (-) denotes a negative Beta value.

* $p < .05$

12.3.3.1 Description/Interpretation of Table 27

Seven percentage of the variance of Unrestrained Defiance was predicted ($p < .05$) by the tendency to make uncorrected Errors during the Continuous Cognitive Task. Construct validity findings (Chapter 9) showed that the tendency to make uncorrected Errors on the CCT was minimally explained by characteristic anxiety and inadequate achievement motivation. This tendency, minimally associated with these achievement-opposing characteristics, could logically account for a small percentage of the variance of *Unrestrained Defiance against* an educationally-intentioned adult.

12.4 Significant Findings

Investigation of the structure and interrelatedness of the criteria selected for the *final analysis was of theoretical* interest and value, enhancing understanding of the basic constructs measured by CCT performance.

12.4.1 Fundamental Syndromes Highlighted in Examining Structure of DESB

Analysis of structure of the DESB highlighted a second-order factor, accounting for [illegible] half of the variance. This fundamental factor, Maladap./e Inertia vs. Active Adaptive Behaviour, had a close conceptual similarity to one of the characteristic patterns that the authors had found from an examination of the profiles of children who were not learning effectively. It also had a close conceptual similarity to the factor, Interest-Participation vs. Apathy-Withdrawal (Kohn & Rosman, 1972a), *viewed as a fundamental* adaptive characteristic.

The inverse association (in the DESB factor emerging in the present study) between adaptive activity and anxiety was of considerable clinical interest, lending further support to the views of Atkinson (Atkinson & Raynor, *1978*). *Thus, characteristic* adaptive activity, not dampened by characteristic anxiety or feelings of being out of control, was again highlighted as a core adaptive resource, by the use of this rating scale. This characteristic resource was expressed by active use of environmental opportunities with active self-regulation, and active response to environmental demands, again with active self-regulation. Adequate activity was thus shown to be not only important for using opportunities. It was shown to be also important for achieving adequate and appropriate self-regulation, necessary for both personal achievement and for meeting environmental requirements.

The second fundamental second-order factor, Unrestrained Defiance, was strongly reminiscent of Spivack & Swift's second characteristic pattern describing "the youngster who is called 'acting out' or poorly self-controlled" (p. 22). It was also *closely allied* to Kohn & Rosman's second basic socio-emotional dimension, "Cooperation-Compliance vs. Anger-Defiance".

12.4.2 Fundamental Integrated Criterion from DESB and WRAT

The derivation of a fundamental integrated criterion factor, Inadequate *Mastery, combining Scholastic Achievement* (WRAT) and Active Adaptive Behavioural tendencies vs. Maladaptive Inertia (DESB), was also of considerable interest. The derivation of this factor in itself supported the hypothesized theoretical link between achievement or adaptation, and core dynamic interactive personal characteristics considered to be prerequisites for adequate

cognitive functioning. This integrated criterion factor, therefore, was very close to the construct which had served as the central focus of my study and therefore an appropriate criterion for the final predictive analysis.

12.4.3 *Enhanced Construct Validity for CCT Performance*

The derivation for use in the final multiple regression analysis of a fundamental integrated criterion, Inadequate Mastery, conceptually close to the hypothesized constructs measured by the CCT, confirmed the predictive validity of the CCT measures and reaffirmed the construct validity of these measures. The most important conclusion was that characteristic adaptive activity, measured by two CCT performance measures, was not only a moderately effective predictor of achievement. It was also a moderately effective predictor of overall adjustment or mastery in this significant situation.

These results confirmed my major hypothesis. Adaptive action style, objectively measured by performance on the CCT used as a Dynamic Behaviour Assessment Paradigm yielding quantitative measures with adequate psychometric properties, was a core resource that influenced both major spheres of adaptation in Grade One, scholastic and affective/behavioural. Thus the central importance of the child's active constructive role in the successful pursuit of adaptive mastery was empirically confirmed, and characteristic adaptive activity emphasized as the core resource for effectiveness, achievement, adaptation, and mastery.

The relatively high percentage of predicted variance (relatively high for only two predictors) might be due to the double significance of the *CCT performance measures*. *CCT measures* reflected core dynamic adaptive motivational characteristics. They also represented efficiency of higher mental functioning during an ongoing cognitive activity demanding stable and efficient voluntary attention, information processing, and sustained and organized purposive action.

12.4.4 Research Potential

The provision of objective quantitative measures with adequate psychometric properties as valid measures of fundamental dynamic adaptive characteristics (motivational and psychoneurological) appeared to have a great deal of research potential.

12.4.5 Practical/Clinical Potential

An inspection of favourable areas in the relevant frequency distributions, revealed that the main performance measure, Total Work Output, appeared to have notable potential for accurate identification of individuals in the appropriate Mastery groups. Total Work Output accurately identified a high percentage of children in the Inadequate and Adequate Mastery groups (71.4% and 83.6%, respectively, with no more than 12% false positives or negatives.) This finding was noteworthy as these percentages reflected the potential of a single quantitative measure.

13 INTEGRATION

Characteristic adaptive action style in the 5-6 year old child, representing the way in which the *child tends to confront and use* environmental opportunities, demands, and challenges, was conceived as a relatively-enduring and general behavioural syndrome, a core adaptive prerequisite for intentional learning and adaptation. I proposed that style of adaptive action could be objectively measured and understood in preschool children of this age by using Performance on the Continuous Cognitive Task (CCT), derived in a significant life-like situation, as a Dynamic Behaviour Assessment Paradigm. My major hypothesis was that these measures would predict and explain achievement and adjustment a year later when the children were in the first grade of school.

The findings confirmed that adaptive action style could be objectively measured in a particular sample of 5-6 year olds, and that it could be regarded as a fundamental adaptive competency, a prerequisite for learning, and for adjusting within the classroom *environment*. The fruitful focus on action style as a fundamental adaptive resource; as well as the provision, for this age group, of a valid method of deriving objective quantitative measures of this resource, constituted a significant contribution to the field, a contribution *which should facilitate further research*.

Also, the theoretically-based design of the two original measures in the study (the Continuous Cognitive Task and the Teachers' Checklist), and the selection of additional independent ways to view characteristic adaptive action, enhanced conceptualization and definition of this construct. The major contribution therefore was providing a focus on adaptive action style, enhancing its conceptualization and measurement in the older preschool child, and showing the possibility, value, and relevance of objectively viewing and considering the child's potential to promote his own achievement and adjustment.

In outlining the problem, I discussed the inadequacy of prevailing assessment practices to meet the legislative and conceptual challenges of Early Intervention and Early

Identification. A notable inconsistency was the fact that cognitively-oriented theory (Hunt, 1961, 1980) had inspired and justified Early Intervention with preschool children, frequently guided high-quality curricular approaches, but failed to guide assessment of intervention efficacy. Likewise, these views had not influenced assessment endeavours aimed at guiding the challenging decisions of Early Identification. Thus a fundamental lack of cohesiveness was evident between the underlying theory and the assessment practices serving the needs of both Early Intervention and Early Identification.

The present study provided a theoretically-based focus on characteristic ctive adaptive functioning in the 5-6 year old child, a view which was conceptually cohesive with cognitive, developmental, and psychoneurological theory supporting the notion of Early Intervention (Hunt 1961, 1980; Feuerstein et al., 1979; Luria, 1973). The productive focus on core dynamic adaptive resources in the child, directly influencing and representing characteristic use of environmental opportunities, demands, and challenges, had significant philosophical implications. It emphasized the importance of understanding and considering the child's own active adaptive resources rather than focusing predominantly on the provision of enhanced opportunities. Facilitation of core adaptive resources should be a worthwhile target for intervention. This emphasis should be of value in planning early preschool intervention, and in evaluating its efficacy, particularly in terms of the goals of fostering "psychological development" (McCarthy, 1986, p. 266), increasing motivatic-, independent adaptive use of environmental opportunities, and feelings of effectiveness. The focus on adaptive action style should also be valuable in identifying 5-6 year olds who might be at risk for learning difficulty, providing data with relevance for guiding appropriate intervention decisions, or further diagnostic assessment. A valuable aspect of this focus would be highlighting theoretically-based dynamic adaptive prerequisites for learning and adaptation that are non-stigmatizing, accessible to change, and worthy targets for intervention.

13.1 METHODOLOGICAL CONTRIBUTION

13.1.1 Dynamic Behaviour Assessment Paradigm for 5-6 year Olds

On the *premise that the child's behaviour in a significant* situation would reflect dynamic adaptive characteristics (those which influence or represent adaptive action), I designed a simulated classroom situation in which to derive a significant sample of behaviour. My main methodological contribution was providing an effective theoretically-based assessment method and instrument for deriving valid quantitative measures of characteristic adaptive action style in 5-6 year old children shortly before or after they had commenced formal schooling. The study demonstrated the effective use of performance on a continuous work task as a Dynamic Behaviour Assessment Paradigm (DBAP).

This method involved the assessment of facets of personality by means of measured performance on simple but challenging work tasks presented after a period of instruction and practice. Whereas Continuous Work Tests had been successfully used with adults and older children (Irvine & Reuning, 1981; Lazarus, 1957; Reuning, 1957, 1978, 1983; Reuning & Wortley, 1973; Sheul & Reuning, 1957; Verster, 1982), this appeared to be the first time that this method had been adapted for use with this age group. This mode of personality assessment (the use of performance as a DBAP within an experimental learning and testing situation) was consistent with the trend towards Interactionism in personality assessment. The use of experimental situations to investigate behavioural manifestations under varying conditions was not new. The importance of my study was the recognition and demonstration that relatively-enduring facets of personality in young children could be effectively and objectively measured and understood in this way. The use of performance as a DBAP has specific advantages.

The focus on performance, a sample of action, as a Dynamic Behaviour Assessment Paradigm, provides an integrated picture of a child in action in a significant situation. A theoretically-based focus on performance, viewed as the final effective manifestation of integrated adaptive facets of personality in response to environmental demands, enhances the potential significance of this behavioural sample. The focus on performance in an experimental situation allows manipulation of the antecedent factors and conditions, facilitating investigation of specific constructs of

interest. Finally, the use of performance as a DBAP enables specific theoretically-based measures to be derived with the *potential to enhance understanding of both the child's personality* and his effective work-related characteristics. These theoretically-based measures should facilitate research and decision-making.

13.1.2 The Continuous Cognitive Task

My specific practical contribution was devising, for 5-6 year olds, the Continuous Cognitive Task (CCT), to be used as a Dynamic Behaviour Assessment Paradigm under specific conditions. The CCT allows several aspects of adaptive action style to be objectively measured. It provides quantitative measures of intensity, efficiency, and persistence of activity over a fifteen-minute period. Individual samples of adaptive action can be visually depicted by means of a Curve of Work, portraying the child's unique pattern of application during the work period. Finally, the task has special features favouring wide applicability.

13.1.2.1 Does Not Depend on Past Learning

CCT performance does not measure previously acquired knowledge and therefore does not depend (directly) on past learning. It appears to measure, instead, attitudinal and effective prerequisites for adequate cognitive functioning.

13.1.2.2 Reflects Efficiency not Complexity

The cognitive nature of the task facilitates a theoretically-based objective view, not only of adaptive personality characteristics, but also of the child's integrated functioning through all three phases of the mental act. The design, aimed at maximizing the measurement of volitional/motivational and executive aspects and minimizing the role of ability, emphasizes functional efficiency rather than complexity.

13.1.2.3 Maximizes Individual Differences

CCT performance, in common with other Continuous Work Tests, produces quantitative measures of exact individual differences. A feature of Continuous Work Tests is their open-endedness. They allow the full range, from minimal effort and output to maximal effort and output, to be expressed. This feature enables a focus not only on degrees of motivational and executive deficit but also on degrees of competence.

The CCT appears therefore to have the potential for wide

applicability *within and between* various cultural, socio-emotional, and psychoneurological groups, from the mildly retarded to the gifted. Simulation of a *dynamic classroom* situation should facilitate predictive assessment of children who have not yet been exposed to similar opportunities and demands. It *seems* that diverse children could be objectively assessed and compared in terms of these fundamental adaptive prerequisites. This *mode of assessment* might conceivably point to a future way of integrating, for diverse groups, measurement of motivational and functional prerequisites for adequate cognitive, executive, and adaptive functioning.

The value and economy of providing measures of dynamic adaptive characteristics with double significance in a dynamic situation should facilitate psychological and educational research. Assessment of characteristic effective interaction in a significant cognitive learning/performing situation should be of value in viewing and understanding adaptive personality characteristics. It should also be of value in considering efficiency of cognitive and *executive functioning*.

13.1.3 Designing Measures to Investigate the Central Construct

A *further methodological* contribution was the notion of developing an assessment instrument for examining concurrent construct validity, *that would enhance* understanding of the central construct. The design of the Teachers' Checklist illustrates this contribution. I had been *interested not only* in investigating the concurrent validity of the global construct, adaptive action style, but also in understanding the dynamic *causal factors influencing* its expression. I therefore included in the Checklist not only those characteristics that depicted dynamic adaptive *interaction but also* those considered to influence this interaction. The inclusion of dynamic adaptive characteristics, influencing and *representing* adaptive interaction in different spheres was found to be of theoretical value.

13.1.4 Appropriate Criteria to Investigate Prediction

Another methodological contribution was the demonstration that both the predictive validity and understanding of a central construct could be enhanced by the selection of theoretically cohesive criteria. In this study, the selection of only scholastic achievement as a criterion of school success was shown to be limited in that it did not demonstrate the full predictive or construct

validity of CCT performance measures. The subsequent use of integrated criteria (scholastic and affective/behavioural), relevant to the global opportunities and demands of the classroom situation, was found to be of both predictive and conceptual value.

13.2 ENHANCED CONCEPTUALIZATION OF GLOBAL ADAPTIVE ACTION STYLE

13.2.1 Global Relatively-Enduring Cross-situational Syndrome

Doubts had been expressed about the possibility of identifying relatively-enduring characteristics in preschool children which could serve as reliable predictors of learning or learning disabilities. I viewed characteristic adaptive action style, the tendency to confront and interact effectively with significant aspects of the environment, as a relatively-enduring and general core personal adaptive syndrome reflecting fundamental adaptive motivation towards ef[illegible]veness, mastery, and competence (Atkinson & Raynor, 1978; Corsini & Marsella, 1983; Deci & Chandler, 1986; Hayes, 1962; Lamberth, Rappaport & Rappaport, 1978; Stott, 1976; White, 1959.) The independent measures used to investigate construct validity of the quantitative CCT measures, specifically designed or selected in terms of conceptual cohesiveness, supported this view. Although I had, in the validity studies, focused more on considering the dynamic causes and consequences of adaptive action style measured by CCT Performance, rather than on identifying similar global constructs, the fundamental global construct, adaptive action style, was empirically verified at both stages of the study, and found to be significantly related to CCT Performance.

The investigation of adaptive action style in three different situations, using both original and established assessment instruments and methods, confirmed that this fundamental adaptive resource, effectively and objectively measured by the CCT, could be regarded as relatively enduring and general across situations and a significant period of time. It was also of theoretical interest that a relatively-enduring negative association was found between manifestations of characteristic adaptive action style and manifestations of characteristic anxiety. This significant negative association was found within two global syndromes, identified in preschool and again at the end of the first grade. It was also found between the child's feelings and performance on the CCT.

13.2.1.1 Dynamic Adaptive Interaction Style (Preschool)

The global theme guiding the design of the *Teachers' Checklist*, developed to investigate concurrent construct validity of the CCT, had been the identification of characteristics, observed over an appreciable period of time, directly influencing or depicting dynamic adaptive interaction. The Teachers' Checklist items were found to provide a reliable measure (Alpha = .806) of a unitary dimension depicting Dynamic Adaptive Interaction Style in relation to the opportunities and demands of the preschool environment. This dynamic syndrome included responding to and deriving meaning from directed learning opportunities, independently pursuing purposive self-initiated or organized activities, and interacting interpersonally without undue anxiety, distress, or withdrawal. The integrated measure, Total Work Output or Productivity on the CCT, was found to be significantly related to this global factor ($r=.521$, $p < .01$). As mentioned above, and as hypothesized in the design of the Checklist, items depicting adaptive action tendencies were found to be inversely related to manifestations of anxiety within this global syndrome.

13.2.1.2 Maladaptive Inertia (Grade One)

The inclusion and investigation of the Devereux Elementary School Behavior Rating Scale (DESB) as an additional criterion of adaptation when the children were reassessed towards the end of Grade One, again highlighted a fundamental dynamic adaptive factor of theoretical interest, significantly related to the global CCT measure ($r=-.446$, $p < .01$.)

Maladaptive Inertia vs. Active Adaptive Behaviour , a second order factor, accounted for almost half of the variance of the DESB. It portrayed a pattern of basic adaptive failure, inadequate active adaptation to the opportunities and demands of the significant environment. It depicted a child who did not feel able to meet environmental demands and opportunities adequately. In this global syndrome, characteristic feelings of anxiety were found to be significantly related to the fundamental failure to mobilize, sustain, and regulate energy appropriately in order to derive meaning from directed learning, and also to the failure to independently confront and pursue achievement-oriented activities effectively. This factor emphasized two important aspects of adaptive action style, active adaptive use of environmental

opportunities, and active adaptive control or self-regulation necessary to meet environmental demands.

13.2.1.3 Theoretical Integration and Speculation

These findings supported the notion that characteristic adaptive action style was a relatively enduring and general characteristic, a syndrome with some cross-situational consistency and persistence over time. The focus on action (or interaction) style was of fundamental theoretical relevance as it highlighted activity as a basic adaptive prerequisite, not only for facilitating active interaction with the opportunities of the meaningful environment, but also for enabling appropriate self regulation, necessary for the independent pursuit of purposive activities, and for satisfying environmental demands.

Findings emphasized the relatively-enduring association between anxiety and characteristic inadequacy of adaptive activity within the two global syndromes identified, an association also evident in the *significant correlation* ($r = -.438$, $p < .01$) between low Productivity on the CCT and the child's positive endorsement of the statement that something had worried him while he was working on this task. This *relatively-enduring association suggested* either that the child tends to feel anxious because his fundamental motivation to interact effectively with the environment is not satisfied and/or that his characteristic feelings of anxiety lead to characteristic inertia in confronting and dealing with environmental opportunities and demands. It would seem, logically, that this might be a self-perpetuating maladaptive pattern.

13.2.2 Dynamic Determinants of Adaptive Action Style (CCT)

As CCT Performance was an achievement-oriented sample of adaptive activity, it represented not only the global construct, adaptive action style, but also the more circumscribed construct, 'achievement-oriented action style' in a simulated learning/performing situation. I had hypothesized that Performance on the CCT would reflect the child's characteristic desire and tendency to actively confront environmental opportunities, demands, and challenges, and to strive energetically to meet standards of excellence in order to satisfy his need for competence, achievement, and *mastery*. In order to see how these tendencies influenced or explained characteristic adaptive style measured by CCT Performance, I derived an organized view of some of these dynamic adaptive

characteristics - affect, attitudes, needs, motives, and action tendencies, observed in the preschool environment (Teachers' Checklist). In order to facilitate definition and understanding of specific CCT measures, CCT Performance was first viewed in terms of these hypothesized facets. These findings were then examined from an appropriate motivational perspective.

13.2.2.1 Dynamic Adaptive Syndromes (Checklist)

A subordinate theme in the design of the Teachers' Checklist had been the division of the dynamic adaptive characteristics into different facets or spheres of interaction which, I postulated, might have the power to explain *adaptive action style measured by* CCT Performance. Observations of these different aspects yielded six component facets of the global Checklist factor, Dynamic Adaptive Interaction Style, viz. characteristic Unsaptured Attention vs. Voluntary Focused Receptivity, Achievement Motivation, Pervasive Anxiety, Defensive Withdrawal, Confrontation Anxiety, and Low Tolerance.

Two CCT measures were found to be moderately well explained in terms of these syndromes. The integrated measure, Total Work Output or Productivity, was explained by the first three Teachers' Checklist factors (29,0% of the variance, $R < .01$, $R < .01$, and $R < .05$, respectively). Displaced Responses, a manifestation of susceptibility to attentional disruption, was explained by the first four factors (23,7% of the variance, $R < .01$, $R < .01$, $R < .05$, and $R < .05$, respectively).

The most significant dynamic adaptive syndrome influencing Productivity on the CCT was Achievement Motivation, followed by Voluntary Focused Receptivity vs. Unsaptured Attention, and then by Pervasive Anxiety. Achievement Motivation, observed in set tasks and in self-initiated activities, depicted a fundamental need for pursuing meaningful achievement-oriented goals, an active adaptive style of voluntarily and independently seeking or confronting, creating or using, challenging environmental opportunities, and sustaining energy adequately in order to *accomplish one's purpose*. It demonstrated characteristic voluntary commitment to a goal associated with high personal standards of achievement. The syndrome included the child's feelings of interest, eagerness, caring about, and taking pride in, performance quality, as well as the willingness to endure frustration. Voluntary Focused

Receptivity vs. Unaccepted Attention reflected characteristic willingness to, or interest in, focusing attention *in order* to learn or derive meaning *from* adult-directed communication and instruction (*i.e.* an active adaptive style of confronting and of using mediation or instructional opportunities provided by an educationally-intentioned adult [Feuerstein et al., 1979]).

These achievement-enhancing syndromes clearly portrayed different manifestations of the *need for Achievement*, characteristic independent *purposive achievement*-oriented attitudes and action *tendencies* making achievement possible, and a general attitude of active voluntary receptivity to adult-mediated opportunities to learn. The findings thus demonstrated that characteristic *need for* Achievement enhanced achievement-oriented *activity in a situation* of opportunity, demand, and *challenge* (CCT Performance). Pervasive Anxiety, *depicting* a widespread factor of undermining generalized anxiety, overt distress, and feelings of insecurity, incorporating, but not limited to, achievement-oriented anxiety, was shown to diminish this activity.

Adaptive action style (CCT), and more specifically, achievement-oriented *action* styles, could thus be viewed and *understood* as representing the dynamic integration of relatively-enduring adaptive personality characteristics. The integrated CCT measure, Productivity, was found to provide an objective measure reflecting the need *for Achievement* opposed by generalized anxiety. *Need for* Achievement has been described as a complex *social motive* (Lamberth et al., 1976). The findings demonstrated that the use of a relevant sample of achievement-oriented behaviour as a Dynamic Behaviour Assessment Paradigm provided direct quantitative measurement *reflecting* the expression of this complex *social motive*, opposed by generalized anxiety.

13.2.2.2 Theoretical Motivational Perspective

I had selected the theories of Atkinson and his colleagues (Atkinson & Raynor, 1978) as they viewed achievement-oriented *action* in terms of motivation and personality. *Atkinson & Birch* related intensity, persistence, and efficiency of achievement-oriented *activity to strength* of fundamental motivation; Atkinson maintained that motivation influenced the level of performance by influencing "efficiency in the execution of an activity" as well as persistence

Receptivity vs. Uncaptured Attention *reflected* characteristic willingness to, or interest in, *focusing* attention in order to learn or derive *meaning* from adult-directed communication and instruction (i.e. an active adaptive style of confronting and of using mediation or instructional opportunities provided by an educationally-intentioned adult [Feuerstein et al., 1979]).

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(p. 236). Two fundamental motives, the Motive to Achieve Success (MAS) and the Motive to Avoid Failure (MAF), were regarded as determinants of achievement-oriented activity. They were viewed as relatively *general and* relatively stable dispositions of personality influencing contrasting achievement-oriented tendencies, the Tendency to Achieve *Success* (TAS), with an excitatory effect on achievement-oriented activity, and the Tendency to Avoid Failure (TAF), "opposing and dampening" this tendency (p. 38).

MAS was viewed as a determinant of instigating forces ... "to engage in activities that involve evaluation of one's *performance in* relation to standards of excellence" (pp. 151-152). The inhibitory MAF was conceptualized as "a capacity for reacting with humiliation and shame when one fails" (p. 15), a capacity regarded as the source of individual differences in anticipatory anxiety or fear of failure when the child expects his performance to be evaluated according to some standard. Atkinson asserted that their research had "finally caught up with the relatedness of 'anxiety' and need for achievement as determinants of activities when performance is evaluated."

13.2.2.3 Theoretical Confirmation

Three empirically-derived syndromes, integrating characteristic *attitudes*, attention, and action tendencies, were found to influence achievement-oriented performance. Need for Achievement (Voluntary Receptivity and *Achievement* Motivation, reflecting both MAS and TAS) was shown to enhance level and efficiency of CCT Performance, whereas Pervasive Anxiety (*reflecting* MAF and TAF) was shown to oppose performance and reduce efficiency. In this way confirmation was provided both for the direction and *the* "relatedness of 'anxiety' and need for Achievement as determinants of activities when performance is evaluated" (p. 38).

13.2.2.4 Possible Theoretical Expansion

A possible theoretical expansion was the conceptualization of the Motive to Avoid Failure. In my study, pervasive anxiety was shown to have a dampening effect on achievement-oriented activity, not only anticipatory anxiety or fear of failure "when the child expects his performance to be evaluated in terms of some standard." This finding suggests that the Motive to Avoid Failure, the "capacity for reacting with humiliation and shame when one fails" might be redefined to include a broader concept of "failure", not confined to achievement-oriented situations. The present findings

suggested that *MAF*, a fundamental motivational disposition, influenced anticipatory anxiety about achievement-oriented failure and other spheres of possible failure. This should be of *clinical interest*, explaining dampened achievement-oriented performance tendencies in terms of generalized anxiety, distress, and interpersonal maladjustment.

13.2.2.5 Reversed Perspective

Atkinson had justified the use of the traditional need for Achievement score (nAch) derived from the *Thematic Apperception Test*, on the basis that the generation of imaginative activity was related to strength of motivation (p. 197). His theoretical perspective provided a direct *theoretically-based* view of a sample of motivated achievement-oriented action instead of a sample of operant thought. My findings confirmed the relationship between strength of *characteristic motivation* (success-seeking and failure-avoidant) and the characteristic generation/inhibition of overt adaptive activity (CCT Performance) rather than imaginative activity. From a *reversed perspective*, Productivity on the CCT provided an objective quantitative measure reflecting the 'final strength of need for achievement opposed by the strength of *characteristic anxiety.*'

13.3 NATURE AND CONSEQUENCES OF ADAPTIVE ACTION STYLE (CCT MEASURES)

13.3.1 *Significant* Achievement Predictors

Having viewed the characteristic dynamic adaptive and maladaptive motivational and behavioural *determinants* of *achievement*-oriented action style as measured by CCT Performance, I then focused on the specific nature of this particular sample of achievement-oriented activity. The *cognitive* and executive nature of the Continuous Cognitive Task enabled CCT Performance to be also viewed from a psychoneurological perspective (Luria, 1973). This view facilitated definition and *understanding* of specific measures reflecting activity related to higher mental functioning and its final expression in voluntary purposive action. Eight CCT measures were investigated: *Productivity*, or Total Work Output; number of Errors, Corrections, Displaced Responses, and Extraneous Markings; Increase over time; Convexity, and Fluctuations in the Curve of Work.

Despite a design problem with the potential to attenuate the

predictive findings. Total Work Output or Productivity, and two different manifestations of inefficiency, (Displaced Responses and Corrections), were found to be of value in predicting and explaining global achievement and/or one of the component academic skills. A moderate percentage of the variance of global Scholastic Achievement was predicted (14,8%, $p < .01$ and $p < .05$), representing the integration of an appreciable percentage of the predicted variance of Spelling (24,4%, $p < .01$), followed by Arithmetic (17,6%, $p < .01$), and Reading (7,1%, $p < .01$).

Total work Output, predicted, at a significant level ($p < .01$), 10,7% of the variance of global Achievement, and 7,1% of the variance of Reading. It added 12,4% and 8,5% respectively ($p < .01$) to the predicted variance of Spelling and Arithmetic. Number of Displaced Responses was the most significant predictor of inadequate Arithmetic (explaining 9,1% of the variance, $p < .01$); it also added 4,0% ($p < .05$) to the predicted variance of global Achievement. Number of Corrections was the most significant predictor of inadequate Spelling (explaining 12,0% of its variance, $p < .01$.)

The psychoneurological nature of the significant predictors of global Scholastic Achievement will be viewed in the context of the demands and resources of the CCT situation.

13.3.2 Psychoneurological Nature of These Predictors

In response to this opportunity to work continuously on the cognitive task in a group situation over a fifteen-minute period, and in response to the challenge for maximum effort, continuous uninterrupted attention, and active resistance to any outside distraction:

Total Work Output provided an integrated measure of intensity, efficiency and stability of voluntary attention, speed and efficiency of information processing (simultaneous synthesis), and intensity and efficiency of voluntary organized, sustained, self-regulated, purposive conscious action.

Number of Displaced Responses provided a specific measure of inefficiency, instability, or disruption of the sustained voluntary visuo-spatial attention and organization required by the nature of the task.

13.3.3 How Significant CCT Measures Explained Achievement

Luria (1973, p. 57) had postulated a functional relationship between appropriate activity for higher mental functioning and achievement, asserting that "the fulfillment of a plan or the achievement of a goal requires a certain amount of energy, and they are possible only if a certain level of activity can be maintained." The empirical findings from the present study were in line with Luria's assertion: Characteristic energy mobilization, preservation, and regulation in pursuit of cognitively-oriented achievement (viz. CCT Performance), predicted subsequent Scholastic Achievement.

Luria had drawn attention to the voluntary nature of higher human functions as well as to their social origin. He had also emphasized the motivated nature of thinking. The relevant CCT measures were empirically found to be influenced by dynamic adaptive characteristics with a social origin, (viz. need for Achievement and generalized anxiety). These measures also reflected the core dynamic adaptive characteristic, adequately sustained higher mental activity, necessary for achievement. The dual theoretical perspective in the present study (motivational and psychoneurological) emphasized the importance of viewing and considering both aspects of characteristic adaptive action style to enhance understanding of this syndrome and its influence on Achievement.

The empirical findings should thus be described in terms of both facets, characteristic motivational determinants (Teachers' Checklist) and psychoneurological functions expressed in the significant CCT predictors. Thus Scholastic Achievement was influenced by the following characteristics expressed in confronting and using the opportunities and demands of a significant environment:

Characteristic strength of need for Achievement (Voluntary Focused Receptivity and Achievement Motivation) and Pervasive Anxiety, as well as characteristic integrated intensity, efficiency, and stability of voluntary attention and action, and susceptibility to disrupted attention.

Viewing the characteristic motivational determinants in terms of Luria's fundamental dynamic adaptive constructs, voluntary attention and voluntary action, it could be seen that (a) characteristic Voluntary Focused Receptivity vs. Uncaptured Attention corresponded very closely to voluntary attention, and (b) Achievement Motivation, representing a syndrome of characteristic sustained *achievement-oriented goals, intentions*, attention and action tendencies, could readily be viewed as a syndrome of prerequisite characteristics "essential for programmed goal-directed activity making voluntary movement and *purposive action possible*" (Luria, 1973, p. 250.) Thus we might say that characteristic voluntary attention and voluntary action tendencies were empirically found to be the fundamental dynamic adaptive resources influencing and promoting Scholastic Achievement, whereas Pervasive Anxiety was found to be a fundamental maladaptive characteristic, opposing subsequent Achievement.

13.3.4 How these CCT Measures Predicted Mastery

The use of scholastic and affective/behavioural criteria revealed an interesting association between inadequate Scholastic Achievement and Maladaptive Inertia vs. Active Adaptive Behaviour. The factor, Inadequate Mastery , portrayed a fundamental maladaptive action style impeding achievement. It associated the characteristic lack of mastery (of instructional material, *independent achievement*-oriented performance, feelings of anxiety, and of behaviour) with the specific failure to master the academic requirements of the first grade.

The syndrome of *Maladaptive Inertia* had *revealed* the very close relationship between characteristic anxiety and characteristic inadequacy of adaptive activity and self-regulation. The mere derivation of this integrated criterion factor, *Inadequate Mastery*, combining inadequate Achievement with "characteristic inadequacy of independent adaptive activity, associated with characteristic anxiety", supported the postulated link between adaptive action style, achievement, and adjustment. Inadequate Mastery, providing an appropriate integrated criterion for the final predictive analysis, was also moderately effectively predicted and explained by Total work Output and Number of Displaced Reponses (24.7% of the variance. $p < .01$, $R < .01$.)

Thus these two CCT measures of characteristic adaptive voluntary

attention and action, significantly influenced by fundamental socially-related motivational characteristics, were found to represent, predict, and explain adaptive mastery of environmental opportunities, requirements, and of self.

Characteristic adaptive action style, used as a predictor and as a subsequent criterion, was therefore found to be a core resource influencing and demonstrating environmental adaptation and mastery, as well as personal mastery in significant situations, a resource effectively measured in a sample of 5-6 year old children.

13.4 PROVISION OF DECISION-RELEVANT DATA

It was noteworthy that relatively-enduring dynamic adaptive personality characteristics could be assessed and understood in this age-group and could serve as reliable predictors of Achievement and of Mastery. The use of the CCT as a Dynamic Behaviour Assessment Paradigm, viewed on the basis of complementary theories of action (motivational and psychoneurological), provided, what I had termed, decision-relevant data. It facilitated a dynamic causal (motivational) view of the characteristic generation, preservation, regulation, and also inhibition of achievement-oriented activity, as well as a psychoneurological view of the underlying higher mental activity and the consequences of this characteristic activity for achievement and mastery.

In making decisions about individual children it would be of value to consider the motivational determinants, need for Achievement and generalized anxiety, influencing the child's characteristic style and mode of interacting with the opportunities, demands, and challenges of an achievement-oriented situation. It would also be of value to consider the nature of the child's manifest voluntary attention and voluntary action tendencies related to higher mental functioning. It should finally be of value to consider the adaptive or maladaptive consequences of these fundamental socially-rooted dynamic resources, and to consider how, if necessary, they could be changed.

13.5 CLINICAL POTENTIAL

13.5.1 Discussion and Speculation

It has been suggested that specific theoretically-based quantitative CCT performance measures, reflecting adaptive motives of the individual and his characteristic style of responding to the demands of a significant situation (Sundberg et al., 1978), should

provide data with some relevance for decision-making. The CCT should provide specific measures with the potential to facilitate understanding or at least consideration of characteristic adaptive voluntary attention and action, in terms of their nature, motivational causes, and future consequences.

Maladaptive causal syndromes were detected suggesting maladaptive achievement-oriented attitudes, affect, attention, and action tendencies, as well as pervasive anxiety. It seemed that voluntary attention and action tendencies had either not been adequately *facilitated by the environment* and/or that attitudes of resistance had already been induced. It was also important to note that the effect of generalized anxiety on dynamic interaction (with instructional or performance conditions) *predated formal academic* tuition. This suggested that the pattern of passivity (often considered to be characteristic of, for example, the learning disabled child), might have been a relatively established and fundamental tendency, predating formal tuition. In sum, the findings suggested that maladaptive attitudes, feelings, attention, and action tendencies had already been developed and could be readily detected at this age.

The implications are both favourable and unfavourable. The detection of these maladaptive patterns at this early stage suggested that these children already had fundamental problems. The favourable aspect was that these manifestations might well be accessible to change if recognized and helped expeditiously.

The decision-relevant data derived from the CCT might eventually be *used* to evaluate the gains, for individual children, derived from earlier preschool intervention, gains in adaptive attitudes, needs, voluntary focused receptivity, and achievement motivation, as well as enhanced psychological development related to satisfaction of the child's fundamental needs for effectiveness, achievement, mastery, and freedom from anxiety. Such data, providing a uniform way of viewing diverse children, might also facilitate non-*stimetizing* decisions for individuals about the need for intervention, guiding, if indicated, possible avenues of intervention, or of further diagnostic assessment. It appeared that the CCT might ultimately provide a useful screening measure to identify children who were not using their dynamic adaptive resources adequately, as well as those with highly effective dynamic adaptive resources who might, if

necessary, compensate for other areas of deficit.

(Although outside the scope of this study, it was of interest to note when considering screening, that the inclusion of a measure of successive synthesis (digit recall), representing the other major mode of information processing (Luria, 1973), another fundamental dynamic adaptive resource, increased the predicted variance of global Scholastic Achievement from 14,8% to 23,7%, the predicted variance of Reading from 7,1% to 18,2%, and the predicted variance of Inadequate Mastery from 24,7% to 32,6%. It seemed therefore that CCT Performance and digit recall might provide a more comprehensive sample of characteristic adaptive functioning for this age group, with possible value for screening and preliminary subtyping.)

Impoverished productivity on the CCT, reflecting characteristic inadequacy of active adaptive resources, i.e. inadequate mobilization, preservation, and regulation of energy in response to achievement requirements, would logically merit further investigation. Inadequate productivity, with additional manifestations of inefficiency (viz. inadequate or disrupted visual-spatial orientation and attention, and/or inadequate inhibition of irrelevant stimuli), might suggest further specific avenues of intervention or of further investigation. An impoverished declining performance, would provide an even stronger indication of the need for further diagnostic assessment and intervention.

An illustration is available from the present study. The "problem group", who had been prevented from commencing Grade One, were found to be characterized by a low and deteriorating level of performance. This suggested that the majority of these children were not using their potential adequately due to an established pattern of inadequate achievement motivation, resistance, or excessive anxiety. The practice of merely holding children back at nursery school on the basis of inadequate use of their potential or of their opportunities does not appear to be justified. Intervention aimed at enhancing motivation, reducing resistance, and/or reducing anxiety in order to facilitate appropriate sustained voluntary attention and action might well be more appropriate. It is hoped that the decision-relevant data from the CCT might ultimately help to bridge the gap between a strongly educationally-intentioned adult and a resistant, anxious, or

insufficiently achievement-oriented child.

13.6 DISCRIMINATIVE ABILITY OF CCT MEASURES

13.6.1 Ability to Discriminate Between Groups

Three specific measures of CCT Performance were found to have discriminative ability, the two significant predictors, Total Work Output and Displaced Responses, and a third measure, Increase over Time, representing the average increase in work units during the entire course of the task. (Increase over Time had probably failed to reach a significant predictive level for the Grade One Sample due to attentuation through the loss of the "problem group", characterized by markedly decreasing work output.)

13.6.1.1 Readiness Groups

Total Work Output, the integrated measure of characteristic intensity, efficiency, and persistance of achievement-oriented action, discriminated significantly ($p < .01$) between children in all three Readiness groups, derived from the teachers' judgements (Not Ready, Ready but ... , and Well Ready). In considering the two-group division, Not Ready and Ready, not only Total Work, but also specific measures of inefficiency and persistence (Displaced Responses and Increase over Time) discriminated at a significant level ($p < .01$ and $p < .05$, respectively). (As mentioned in the discussion, decreasing work output would reflect characteristic inadequacy of motivation, active resistance, or the effect of anxiety, factors that would understandably add to a teachers' concern about the child's readiness for school.)

13.6.1.2 Scholastic Achievement Groups

When the de facto Low Achievement Group ("problem group") was combined with the Lower Third Achievement group (Grade One) for comparison with the rest of the Stage Two Sample, both Total Work Output and Increase over Time distinguished between these groups at a significant level ($p < .01$).

13.6.2 Potential for Individual Identification

Frequency distribution graphs for particular groups were drawn in terms of their scores on significant predictors ($p < .01$). The efficacy of these predictors in accurately identifying individuals in these groups was viewed in terms of favourable areas in these graphs, yielding data for analysis of prediction-performance matrices. The single measure, Total Work Output, was found to be most effective in accurately identifying an appreciable percentage

of children in criterion groups. This efficacy appeared to be most notable in identifying children in both deficit and superior Readiness groups based on the preschool teachers' judgements, and in the two groups formed from the fundamental integrated criterion factor, Inadequate Mastery, derived at the end of Grade One.

It must be emphasized, however, that this encouraging view of potential practical applicability, should not be followed by premature attempts to use the CCT for decision-making.

13.7 OVERALL CONCLUSION

I have demonstrated, with respect to a particular sample of 5-6 year old preschool children, the importance and feasibility of assessing the child's characteristic "active constructive role" in achieving and in attaining mastery. The objective quantitative focus on characteristic adaptive action style in 5-6 year old children, reflecting fundamental relatively enduring and general adaptive and maladaptive motivational and neuropsychological characteristics, should facilitate research in psychology, neuropsychology, and education.

Consistent with the trend towards Interactionism in personality assessment, I have shown the value of using a Dynamic Behaviour Assessment Paradigm to assess fundamental integrated dynamic adaptive personality characteristics or dispositions in young children. The cognitive and executive nature of CCT Performance, the sample of measured behaviour, allowed it to be viewed as representing psychoneurological efficiency through all three phases of the mental act, and the final motor expression. This mode of assessment thus provided specific achievement-oriented measures with dual significance (personality and psychoneurological). The dual significance of these measures should emphasize the theoretical and clinical importance of giving adequate consideration to both these aspects of cognitively-oriented performance.

In terms of the specific instrument (the CCT), the overall conclusion was that these promising results merit wide-scale further investigation. This economical (pencil-and-paper) research tool with adequate psychometric properties appears to have the potential for wide applicability with diverse cultural, intellectual, emotional adjustment, learning disabled, and psychoneurological groups. If future research supports these encouraging results, the possibility of standardizing the CCT, to provide, for diverse

children, a uniform objective view of fundamental adaptive characteristics influencing and representing mastery, would appear to hold promise.

APPENDIX A

TEACHERS' CHECKLIST

ATTENTION DEFICITS

1. Attention wanders frequently when directions or instructions are given to the class

YES NO

2. Often unable to follow directions or instructions adequately

YES NO

3. Attention wanders frequently when a story is read or told to the class

YES NO

4. Often fails to focus on important aspects when a story is read or told to the class

YES NO

5. Attention wanders frequently when a series of pictures, shapes or numbers are shown to the class

YES NO

6. Often fails to focus on relevant aspects when a series of pictures, shapes or numbers are shown to the class

YES NO

7. Often restless, fidgety or unable to sit still

YES NO

8. Often too impulsive, interrupting or responding incorrectly without adequate thought to the question or task at hand

YES NO

9. Easily distracted by outside stimuli (objects or sounds) which are not related to the task at hand

YES NO

PERSISTENCE IN SET TASKS OR ORGANISED ACTIVITIES

1. Usually shows interest in taking part in organised tasks or activites

YES NO

2. Generally able to work purposefull, without constant supervision

YES NO

3. Cares about the quality of his/her work

YES NO

4. Tends to become easily frustrated, often wanting to quit if efforts are not immediately successful or when encountering obstacles

YES NO

5. Generally sticks to and finishes a set task which requires effort or practice

YES NO

PERSISTENCE IN SELF-INITIATED OR INDEPENDENT ACTIVITIES

1. Eager to be actively engaged in constructive or creative play

YES NO

2. Generally able to pursue meaningful or purposeful independent activities

YES NO

3. Takes pride in what (s)he does and cares about how well (s)he

does it

YES NO

4. Patience and perseverance generally shown even in the face of difficulties or obstacles

YES NO

5. Generally sticks to a self-initiated activity which requires effort or practice

YES NO

ACHIEVEMENT-RELATED ANXIETY

1. Tends to fear a new or challenging achievement-related activity, showing signs of tension

YES NO

2. Tends to avoid attempting any new or challenging task, often saying "I can't" or "That's too hard" or simply avoiding the unless situation

YES NO

3. Tends to become silent or give frequent "Don't know" responses to questions if unsure whether his/her answer will be right

YES NO

4. In a new task, tension and worry frequently appear to undermine his/her understanding of what (s)he has done

YES NO

5. Tends to become flustered when questioned, and seems to bluffing out any answer, however inappropriate

YES NO

6. Work tends to worsen when (s)he is being watched or judged

YES NO

7. Often unsure, seeking reassurance: asks frequently, "Is that right?"

YES NO

8. Tends to become easily discouraged and upset by errors or difficulties

YES NO

9. Critical of his/her own efforts and belittling or destroying what (s)he has done

YES NO

GENERAL MALADJUSTMENT

1. Tends to be fearful or afraid of new situation or people *

YES NO

2. Frequently miserable, unhappy, tearful or distressed **

YES NO

3. Tends to be emotionally unresponsive or withdrawn, looking solemn, serious and seldom smiling *

YES NO

4. Shows very little interest in ongoing activities: looks around, wanders around aimlessly or daydreams *

YES NO

5. Shows overt signs of tension (e.g. thumb-sucking, fidgeting, smiling excessively, etc.)

YES NO

6. Frequently tries to direct attention to self, e.g. by numerous personal anecdotes or complaints about minor ailments

YES NO

* Similar to items from the Rehm & Marman Scales (1972a)
** Similar to items from Scher & Stringfield's scale (1974)

JASTAK ASSESSMENT SYSTEMS

1978 EDITION

WRAT

WIDE RANGE ACHIEVEMENT TEST

Joseph F. Jastak, Sarah W. Bigler, Edith Jastak

Name _____ Sex M F

Date _____ Birth Date _____ Age _____

Sender _____ Grade _____

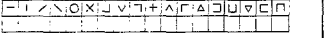
Referred by _____ Examiner _____

Test Results	Raw Score	Grade Score	Sensitive Score	Percentile
Reading				
Spelling				
Arithmetic				

Page 1

Spelling, Level I & Level II

—	I	/	\	O	X	J	V	˥	+	∧	Γ	Δ	⊐	U	▽	⊏	⊓		



Name _____

1	16	31	
2	17	32	
3	18	33	
4	19	34	
5	20	35	
6	21	36	
7	22	37	
8	23	38	
9	24	39	
10	25	40	
11	26	41	
12	27	42	
13	28	43	
14	29	44	
15	30	45	
		46	

Level I, Raw Scores (RS) and Grade Ratings (GR)

Test	Correct Score	RS	GR	RS	GR	RS	GR	RS	GR	RS	GR	RS	GR
Reading													
Spelling													

Level II, Raw Scores (RS) and Grade Ratings (GR)

Test	Correct Score	RS	GR	RS	GR	RS	GR	RS	GR	RS	GR	RS	GR
Reading													
Spelling													

BASE ALL INTERPRETATIONS ON STANDARD SCORES. RADIUS IS TO 42 OF MANUAL.

WIDE RANGE ACHIEVEMENT TEST

JABTAK

Page 2, Arithmetic, Level I
Oral Part

6 ▶ 4 5 6 9 C

3 Fingers. 8 fingers. 9 or 6? 42 or 28?

3 pennies, spend 1¢ _____. 3 + 4 apples? _____. 9 marbles, lose 3? _____.

Written Part

1 + 1 = _____ | 6 +2 | 5 +3 | 34 +40 | 4 x 3 = _____ | 23 +5 | 39 −18 | 75 −6

4 — 1 = _____

462 137 +245 | 6 ÷ 2 = _____ | 863.84 +5.30 | 1½ hr. = ____ min. | 6)948

¾ = _____ | ⅞ − ½ = _____ | 803 +356 | 4⅝ 3½ +2⅞ | ⅛ of 3.5 = _____

½ yd. = ____ in. | 1½ × ⅓ | ½ yr. = ____ mo. | Multiply 7.96 × 30.6

27)3384 | ⅓ × ⅔ | 5 −1½ | 2½ doz. = _____

Which is more? ⅞ or ⅔ Ans. _____

Find the average of: 24, 18, 21, 26, 17 Ans. _____

Write as a percent: ¾ = ____ % | 4½ + 3½ = _____

⅛ − ¾ = _____ | ⅝ × ⅘ × 1½ = _____

Write as decimal: ⅝ = _____ | 20% of 130 = _____

6² = _____ | 6.2)42.703

Change to familiar numbers. M C X L I I = _____ | (−5)(+9) = _____

Find interest on $300 at 4½ % for 7 mo. Ans. _____

Solve: y = (9 − 4y) + 65 y = _____

Find square root: √334.89

Raw Score (RS) and Grade Range (GR)	10–20	10–40	10–60	10–80	10–100	10–120	10–140	10–160	10–180	10–200	10–220	10–240	10–260	10–280	10–300	10–320	10–340	10–360	10–380	10–400
SEE WL.SUG. FOR NORMS	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
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	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
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	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
																				38
																				39
																				40

JASTAK

WIDE RANGE ACHIEVEMENT TEST

Page 3. Arithmetic, Level II
Oral Part

1. Counts 1-5 2. Counts 6-15 3. Reads 3 4. Reads 5 5. Reads 6
6. Reads 17 7. Reads 41 8. Pennies 3-1 9. Apples 3 + 4 10. Marbles 9-3

Written Part

4 3	9 4	5 4 9 5	7 2 6	$2\frac{1}{2} - 1\frac{1}{2}$ = _____	3 2 9
+ 6	− 6 4	× 3	− 3 4 9		5 0 4 5
					6 3
				$\frac{1}{4}$ of 3 0 = _____	+ 1 3 8 1

9) 4 3 2 7

$1\frac{1}{2}$ ft. = _____ in.

2 = _____ $\frac{1}{4}$

Add: $6\frac{1}{2}$, $1\frac{1}{2}$, $4\frac{1}{2}$

8 0 9
× 4 7

Write as percent:

4 2 = _____ %

Subtract: 1 0 $\frac{1}{2}$ − 7 $\frac{1}{2}$

Multiply: 6 2 3 × 1 2 7

Find average: 34, 16, 45, 39, 27

Ans. _____

Write as decimal: 5 2 $\frac{1}{2}$ % = _____

Write as percent: $\frac{1}{2}$ = _____ %

2. 9) 3 0 5 8 5

Add: 3 ft. 6 in.
5 ft. 5 in.
8 ft. 11 in.

M − 2 × 5
M = _____

2x × 3
x = _____

5 × 3 $\frac{1}{2}$ = _____

15% of 175 = _____

Write as common fraction in lowest terms: 075 = _____

The complement of an angle of 30° = _____

4² = _____

If a = 7, b = 3:

$\frac{1}{2}$% of 60 = _____

Solve: $\frac{7 + (6 - 8)}{2}$ = _____

Add: x + y = 25
x − y = 22

25 − $1\frac{1}{2}$ = _____

a² = 3b = _____

50 sq. ft. = _____ sq. yd

Factor: $r^2 - 25 - 10r$

$\frac{r^2 + 5r - 6}{r + 1}$

Ans. _____ Ans. _____

Change to familiar numerals.
M D C X C I = _____

Find interest on $1,200 at 6% for 70 days. Ans. _____

3p − q = 10
2p − q = 7
p = _____
q = _____

$\sqrt{2x^2} \div q$
x = _____
$\frac{x}{r} = \frac{5}{7}$
x = _____

Find square root: $\sqrt{6 7 0 8 1}$

$\log_{10}\left(\frac{1}{100}\right)$

Ans. _____

$\log_5 5\sqrt{5}$

Ans. _____

Reduce: $\frac{k^2 + k}{k^2} \div \frac{3k - 3}{k^2 - 1}$

Ans. _____

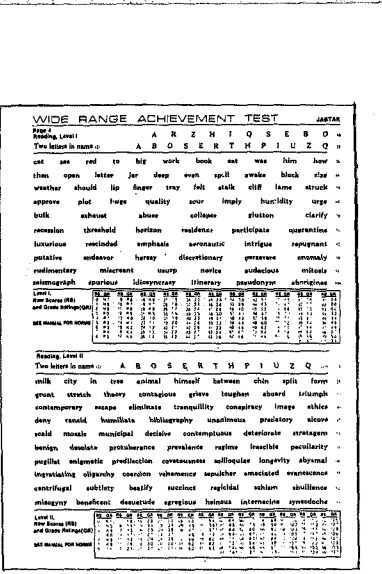
Find root: $2x^2 - 36x + 162$

Ans. _____

Raw Scores (RS) and Grade Ratings (GR)

SEE MANUAL FOR NORMS

RS	GR	RS	GR	RS	GR	RS	GR	RS	GR	RS	GR	RS	GR	RS	GR	RS	GR	RS	GR	RS	GR
1	0.1	1	0.4	1	0.7	1	1.0	1	1.3	1	1.6	1	1.9	1	2.2	1	2.5	1	2.8	1	3.0
2	0.2	2	0.5	2	0.8	2	1.1	2	1.4	2	1.7	2	2.0	2	2.3	2	2.6	2	2.9	2	3.1
3	0.3	3	0.6	3	0.9	3	1.2	3	1.5	3	1.8	3	2.1	3	2.4	3	2.7	3	3.0	3	3.2
4	0.4	4	0.7	4	1.0	4	1.3	4	1.6	4	1.9	4	2.2	4	2.5	4	2.8	4	3.1	4	3.3
5	0.5	5	0.8	5	1.1	5	1.4	5	1.7	5	2.0	5	2.3	5	2.6	5	2.9	5	3.2	5	3.4
6	0.6	6	0.9	6	1.2	6	1.5	6	1.8	6	2.1	6	2.4	6	2.7	6	3.0	6	3.3	6	3.5
7	0.7	7	1.0	7	1.3	7	1.6	7	1.9	7	2.2	7	2.5	7	2.8	7	3.1	7	3.4	7	3.6
8	0.8	8	1.1	8	1.4	8	1.7	8	2.0	8	2.3	8	2.6	8	2.9	8	3.2	8	3.5	8	3.7
9	0.9	9	1.2	9	1.5	9	1.8	9	2.1	9	2.4	9	2.7	9	3.0	9	3.3	9	3.6	9	3.8
10	1.0	10	1.3	10	1.6	10	1.9	10	2.2	10	2.5	10	2.8	10	3.1	10	3.4	10	3.7	10	3.9
11	1.1	11	1.4	11	1.7	11	2.0	11	2.3	11	2.6	11	2.9	11	3.2	11	3.5	11	3.8	11	4.0
12	1.2	12	1.5	12	1.8	12	2.1	12	2.4	12	2.7	12	3.0	12	3.3	12	3.6	12	3.9	12	4.1
13	1.3	13	1.6	13	1.9	13	2.2	13	2.5	13	2.8	13	3.1	13	3.4	13	3.7	13	4.0	13	4.2
14	1.4	14	1.7	14	2.0	14	2.3	14	2.6	14	2.9	14	3.2	14	3.5	14	3.8	14	4.1	14	4.3
15	1.5	15	1.8	15	2.1	15	2.4	15	2.7	15	3.0	15	3.3	15	3.6	15	3.9	15	4.2	15	4.4
16	1.6	16	1.9	16	2.2	16	2.5	16	2.8	16	3.1	16	3.4	16	3.7	16	4.0	16	4.3	16	4.5
17	1.7	17	2.0	17	2.3	17	2.6	17	2.9	17	3.2	17	3.5	17	3.8	17	4.1	17	4.4	17	4.6
18	1.8	18	2.1	18	2.4	18	2.7	18	3.0	18	3.3	18	3.6	18	3.9	18	4.2	18	4.5	18	4.7
19	1.9	19	2.2	19	2.5	19	2.8	19	3.1	19	3.4	19	3.7	19	4.0	19	4.3	19	4.6	19	4.8
20	2.0	20	2.3	20	2.6	20	2.9	20	3.2	20	3.5	20	3.8	20	4.1	20	4.4	20	4.7	20	4.9



WIDE RANGE ACHIEVEMENT TEST — JASTAK

Page 4
Reading, Level I — A R Z H I Q S E B O
Two letters in name — A B O S E R T H P I U Z Q

cat see red to big work book eat was him how
then open letter jar deep even spill awake block rise
weather should lip finger tray felt stalk cliff lame struck
approve plot huge quality sour imply humidity urge
bulk exhaust abuse collapse glutton clarify
recession threshold horizon residence participate quarantine
luxurious rescinded emphasis aeronautic intrigue repugnant
putative endeavor heresy discretionary persevere anomaly
rudimentary miscreant usurp novice audacious mitosis
seismograph spurious idiosyncrasy itinerary pseudonym aborigines

Level I
Raw Scores (RS)
and Grade Ratings(GR)

SEE MANUAL FOR NORMS

Reading, Level II
Two letters in name — A B O S E R T H P I U Z Q

milk city in tree animal himself between chin split form
grunt stretch theory contagious grieve toughen absurd triumph
contemporary escape eliminate tranquillity conspiracy image ethics
deny conceit humiliate bibliography unanimous predatory sincere
scald morals municipal decisive contemptuous deteriorate strategem
benign desolate protuberance prevalence ruptive irascible peculiarity
pugilist enigmatic predilection covetousness soliloquize longevity abysmal
imprisoning oligarchy coercion vehemence sepulcher emaciated evanescence
centrifugal subtlety beatify succinct rejoicing schism ebullience
misogyny beneficent desuetude egregious heinous internecine synecdoche

Level II
Raw Scores (RS)
and Grade Ratings(GR)

SEE MANUAL FOR NORMS

DEVEREUX ELEMENTARY SCHOOL BEHAVIOR RATING SCALE*

George Spivack, Ph.D. and Marshall Swift, Ph.D.

Devereux Foundation Institute for Research and Training

Student's Name _____ Teacher's Name _____

Student's Sex _____ Age _____ Academic Subject _____

Grade _____ School _____ Date of Rating _____

RATING GUIDE

1. Base rating on student's <u>recent and current</u> behavior.	Consider only the behavior of the student over the past month.
2. Compare the student with normal children his age.	The standard for comparison should be the average youngster in the normal classroom situation.
3. Base rating on your own experience with the student.	Consider only your own impression. As much as possible, ignore what others have said about the student and their impressions.
4. Consider each question <u>independently</u>.	Make no effort to describe a consistent behavioral picture or personality. It is known that children may show seemingly contradictory behavior.
5. Avoid interpretations of "unconscious" motives and feelings.	As much as possible, base ratings on outward behavior you actually observe. Do not try to interpret what might be going on in the student's mind.
6. Use <u>extreme</u> ratings whenever <u>warranted</u>.	Avoid tending to rate near the middle of all scales. Make use of the full range offered by the scales.
7. Rate each item quickly.	If you are unable to reach a decision, go on to the next item and come back later to those you skipped.
8. Rate every question.	Attempt to rate each item. If you are unable to rate a particular item because it is not appropriate to the child in question, or because of lack of information, circle the item number.

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YOU ARE GOING TO RATE THE OVERT BEHAVIOR OF A STUDENT. FOR ITEMS 1-26 USE THE RATING SCALE BELOW. WRITE YOUR RATING NUMBER, FOR EACH ITEM IN THE BOX TO THE LEFT OF THE ITEM NUMBER.

Very Frequently	Often	Occasionally	Rarely	Never
5	4	3	2	1

COMPARED WITH THE AVERAGE CHILD IN THE NORMAL CLASSROOM SITUATION, HOW OFTEN DOES THE CHILD...

Rating	Item	Rating	Item
☐	1. Start working on something before getting the directions straight?	☐	14. Tell stories which are exaggerated and untrutable?
☐	2. Say that the teacher doesn't help him enough (i.e., won't show him how to do things, or answer his questions)?	☐	15. Give an answer that has nothing to do with a question being asked?
☐	3. Being things to class that relate to current topic (e.g., exhibits, collections, articles, etc.)?	☐	16. Break classroom rules (e.g., throw things, move up front or back, etc.)?
☐	4. Tell stories or describe things in an interesting and colorful fashion (e.g., has an active imagination, etc.)?	☐	17. Interrupt when the teacher is [illegible]
☐	5. Speak disrespectfully to teacher (e.g., call teacher names, treat teacher as an equal, etc.)?	☐	18. Quickly lose attention when it explains something to [illegible] (e.g., [illegible], looks away)
☐	6. Initiate classroom discussion?	☐	19. Offer to do things for the [illegible] (e.g., erase the board, [illegible] all sharpener, open the door, [illegible] mail, etc.)?
☐	7. Act defined (i.e., will act in what he is asked to do, [illegible] want to do)?	☐	20. Makes you doubt whether he is paying attention to what you are doing or saying (e.g., looks all where, has blank stare or harmony look, etc.)?
☐	8. Back out the teacher before or after [illegible] to talk about [illegible] or personal [illegible]?	☐	21. Introduce into class discussion personal experiences or things he has heard which relate to what is going on in class?
☐	9. Exhibit or make derogatory remarks about the subject being taught (e.g., "spelling is stupid")?	☐	22. Get upset disturbed about [illegible] on a test (e.g., may cry, get emotionally upset, etc.)?
☐	10. Get the point of what he needs to learn in class?	☐	23. Show worry or get anxious about knowing the "right" answers?
☐	11. Have to be reprimanded or controlled by the teacher because of his behavior in class?	☐	24. Look to see how others are doing something I have to do it (e.g., when teacher gives a direction, etc.)?
☐	12. Pulls, torment, or tease classmates?	☐	25. Complete teacher never calls on him (e.g., that teacher calls on others first, etc.)?
☐	13. Annoy or interfere with the work of his peers in class?	☐	26. Make irrelevant remarks during a classroom discussion?

YOU ARE GOING TO RATE THE OVERT BEHAVIOR OF A STUDENT. FOR ITEMS 1-26 USE THE RATING SCALE BELOW. WRITE YOUR RATING (NUMBER) FOR EACH ITEM IN THE BOX TO THE LEFT OF THE ITEM NUMBER.

Very frequently	Often	Occasionally	Rarely	Never
5	4	3	2	1

COMPARED WITH THE AVERAGE CHILD IN THE NORMAL CLASSROOM SITUATION, HOW OFTEN DOES THE CHILD...

Rating	Item	Rating	Item
☐	1. Start working on something before getting the directions straight?	☐	14. Talk during the times are unappreciated and unwanted?
☐	2. Say that the teacher doesn't help him enough (i.e., won't show him how to do things, or answer his questions)?	☐	15. Give an answer that has nothing to do with a question being asked?
☐	3. Bring things to class that relate to normal play (e.g., animals, collections, sportsing, etc.)?	☐	16. Break classroom rules (e.g., throw things, mark up desk or books, etc.)?
☐	4. Tell stories or describe things in an	☐	17. Interrupt when the teacher is talking?
	ingenious, " and colorful fashion (e.g., has an active imagination, etc.)?	☐	18. Quickly lose attention when teacher presents something to him (e.g., becomes fidgety, looks away, etc.)?
☐	5. Spend disproportionate amount of time (e.g., all laundry seems, trust teacher as an equal, etc.)?	☐	19. Offer to do things for the teacher (e.g., erase the board, empty the pencil sharpener, open the door, get the mail, etc.)?
☐	6. Initiate classroom discussion?	☐	20. Misuse you doubt whether he is paying attention to what you are doing or saying (e.g., look elsewhere, has blank stare or faraway look, etc.)?
☐	7. Act defiant (i.e., will not do what he is asked to do, says "I won't do it")?	☐	21. Introduce into class discussion personal experiences or things he has heard which is this to what is going on in class?
☐	8. Seek out the teacher before or after class to talk about school or personal matters?	☐	22. Get easily distracted about anyone on a task (e.g., real shy, get emotionally upset, etc.)?
☐	9. Exhibit or make derogatory remarks about the rational being taught (e.g., "spelling is stupid")?	☐	23. Show worry or get anxious about learning the "right" answers?
☐	10. Tell the point of what he tends or hears in class?	☐	24. Look to see how others are doing something before he does it (e.g., when teacher gives a direction, etc.)?
☐	11. Have to be reprimanded or controlled by the teacher because of his behavior in class?	☐	25. Discipline teacher never calls on him (e.g., the teacher calls on others first, etc.)?
☐	12. Fail, torment, to cause disruptions?	☐	26. Make irrelevant remarks during a classroom discussion?
☐	13. Annoy or irritate, a with the work of his peers in class?		

FOR ITEMS 37-47 USE THE RATING SCALE BELOW:

Extremely	Distinctly	Quite a bit	Moderately	A little	Very slightly	Not at all
7	6	5	4	3	2	1

COMPARED WITH THE AVERAGE CHILD IN THE NORMAL CLASSROOM SITUATION, TO WHAT DEGREE IS THE CHILD...

Rating	Item	Rating	Item
☐	37. Unable to change from one task to another when asked to do so (e.g., has difficulty beginning a new task, may get upset or disorganized, etc.)?	☐	56. Able to apply what he has learned to a new situation?
☐	38. Oblivious to what is going on in class (i.e., not "with it," seems to be in own "person" almost world)?	☐	57. Happy in his work (e.g., his products are dirty or marked up, wrinkled, etc.)?
☐	39. Ballast upon the teacher for directions and to be told how to do things or proceed in class?	☐	58. Likely to have the material when called upon to recite in class?
☐	40. Quickly drawn into the talking or mischief of others (i.e., stops work to listen or join in)?	☐	59. Quick to say work assigned is too hard (e.g., "you mean too much," "I can't get it," etc.)?
☐	41. Constantly nervous when a test is given?	☐	60. Responsive or friendly in his relationship with the teacher in class (re. being cool, detached or distant)?
☐	42. Unable to follow directions given in class (i.e., need precise directions before he can proceed successfully)?	☐	61. Likely to quit or give up when something is difficult or demands more than usual effort?
☐	43. Sensitive to criticism or correction about his school work (e.g., gets angry, sulks, hangs "defeated", etc.)?	☐	62. How to complete his work (i.e., has to be prodded, takes excessive time)?
☐	44. Prone to blame the teacher, the test, or external circumstances when things don't go well?	☐	63. Swayed by the opinion of his peers?
		☐	64. Difficult to reach (e.g., seems preoccupied with his own thoughts, may have to call him by name to bring him out of himself)?
		☐	65. Unwilling to go back over his work?

COMPARED WITH THE AVERAGE CHILD IN THE NORMAL CLASSROOM SITUATION, TO WHAT DEGREE DOES THE CHILD...

☐	66. Like to be alone in the teacher (e.g., hug or touch the teacher, sit or stand next to teacher, etc.)?	☐	67. Rush through his work and therefore make unnecessary mistakes?
☐	68. Have difficulty deciding what to do when given a choice between two or more things?		

- 3 -

DEVEREUX ELEMENTARY SCHOOL BEHAVIOR RATING SCALE*

George Spivack, Ph.D. and Marshall Swift, Ph.D.
Devereux Foundation Institute for Research and Training

DEES PROFILE

Student's Name _____ Teacher's Name _____

Student's Sex _____ Age _____ Academic Subject _____

Grade _____ School _____ Date of Rating _____

Behavior Factor	Factor Item Sub Scores	Total Raw Sc.	Raw Score in Standard Score Units -100	0	+100	+200
1. Classroom Disturbance	[illegible]					
2. Impatience	[illegible]					
3. Disturbance-Defiance	[illegible]					
4. External Blame	[illegible]					
5. Achievement Anxiety	[illegible]					
6. External Defiance	[illegible]					
7. Comprehension	[illegible]					
8. Inhibitive - Withdrawn	[illegible]					
9. Irrelevant - Responsiveness	[illegible]					
10. Creative Initiative	[illegible]					
11. Need Closeness to Teacher	[illegible]					
Additional Items	[illegible]					

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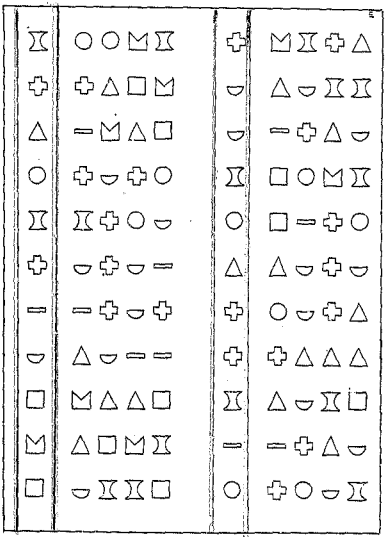
APPENDIX D

SAMPLE PAGE FOR CONTINUOUS COGNITIVE TASK (CCT)

(1/4 Full Scale)



APPENDIX E

INSTRUCTIONS FOR THE CONTINUOUS COGNITIVE TASK

PREPARATORY PERIOD: TUITION

Each child is given a small tuition sheet and a large practice sheet, divided into two vertical sections as shown in Appendix D. The small tuition sheet contains eight work units, each presenting a standard symbol followed by a group of four symbols, one of which matches the standard. Four work units are presented on the left hand side of the page, with the standard symbol placed within parallel red lines. Similarly, an additional four work units are presented on the right hand side of the page. On the right side, the standard symbol is presented between blue lines.

The task is introduced in a positive and enthusiastic manner, the tester/teacher saying, "Today, I'm going to show you some work that children do in 'big school'". ('Big school' is the term commonly used by the children when referring to primary school.)

The children are taught on the blackboard to look at each standard symbol within the coloured lines and then to look along the line at the other four in order to select the matching symbol and draw a line through it. The tester completes four of the work units on the blackboard, verbalizing each step as she proceeds. After each example has been demonstrated, the children are required to find and mark the corresponding unit on their individual tuition sheets. Each child then has a turn to come up to the blackboard in order to match and mark a selected symbol.

The children are told to draw a line under the last completed symbol whenever a prescribed signal is given (buzzer or bell followed by the verbal reminder, "Draw a line"). They are then required to complete the remaining work units on their tuition sheets, underlining their last response when the signal is presented. Each child is praised for mastery and successful completion.

INDEPENDENT PRACTICE

When each child has demonstrated mastery of the basic task and underlining, a practice sheet with a similar presentation is given. This consists of 11 work units on each side of the page. Instructions are given to match all the standard symbols presented within the red lines before proceeding to the top of the page where they are presented within the blue lines. The children are required to work independently, underlining their last response whenever the signal is presented before continuing with the next work unit. Each child must complete his practice sheet satisfactorily (with additional help and encouragement if necessary) before the challenge is presented to the entire group. When the practice sheets have been adequately completed, individual praise is given acknowledging the child's demonstration that he can do this work.

PRESENTATION OF THE CHALLENGE

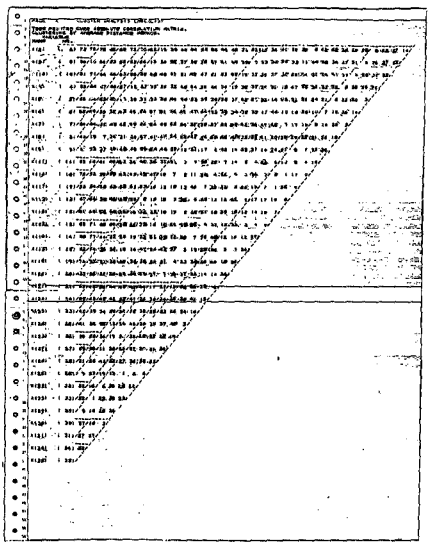
The following instructions are given, also in a friendly, enthusiastic and encouraging manner. "Now you all know how to do this work. I want to see how much work you can do and how hard you can try. I want you to do this work for quite a long time. When you finish the work on the red side of your paper you must go straight on to do the work on the blue side. When you finish the work on the blue side, you will get another page. Just keep on working until I tell you to stop." The tester then makes sure that the children remember (a) what they have to do when they hear the signal, (b) where they should start working, and (c) where to proceed when they have completed a column. They are asked not to talk while they are working and are requested to keep on working hard even if they 'get tired and feel like stopping'. They are told, "If there is a noise outside you must take no notice. Just keep on working. If someone comes into the room, take no notice. Just keep on working. Let's see how much work you can do."

CONTINUOUS PERFORMANCE

The fifteen-minute work period then commences with the signal presented every one-and-a-half minutes. The tester and assistant check to see that the children mark their last response each time the signal is given. If they have failed to do this, this is quickly marked for them. A new page is presented as soon as one page is completed. Despite maintaining the atmosphere of challenge, by presenting new pages speedily, it is important to remember to give no individual encouragement once the continuous work period has commenced. If the child sucks his pencil, stares into space, or stops working, his attention is not redirected. He is only checked if he is noisy, disturbing the group. It is important that the child be allowed to work at his own tempo and in his own way once the original challenge has been given.

APPENDIX F

CLUSTER ANALYSIS OF ITEMS FROM THE TEACHERS' CHECKLIST



DETECTION UTILITY OF CCT MEASURES (READINESS GROUPS)

TEACHERS' JUDGEMENTS

TOTAL WORK

	Not Ready	Ready			
< 145	26	13	39	Sensitivity	74.3%
≥ 145	9	60	69	Specificity	82.2%
				Detect. Utility (Positive)	66.7%
	35	73	108	Detect. Utility (Negative)	87.0%
				Overall Hit Rate	79.6%

TOTAL WORK

	Well Ready	Not W.R.			
≥ 185	23	15	38	Sensitivity	74.2%
< 185	8	62	70	Specificity	80.5%
				Detect. Utility (Positive)	60.5%
	31	77	108	Detect. Utility (Negative)	88.6%
				Overall Hit Rate	78.7%

DISPLACED RESPONSES

	Not Ready	Ready			
≤ 2	19	18	37	Sensitivity	54.3%
≥ 3	16	55	71	Specificity	75.3%
				Detect. Utility (Positive)	51.4%
	35	73	108	Detect. Utility Negative)	77.5%
				Overall Hit Rate	68.5%

PREDICTIVE AND DISCRIMINATIVE UTILITY OF CCT (ACHIEVEMENT GROUPS)

Predictive Utility

SCHOLASTIC ACHIEVEMENT (Grade One Only)

TOTAL WORK

	WRAT < 34th P	WRAT > 34th P		
< 145	18	13	31	Sensitivity 52.9%
> 145	16	48	64	Specificity 78.7%
				Detect. Utility (Positive) 56.1%
	34	61	95	Detect. Utility (Negative) 75.0%
				Overall Hit Rate 69.5%

Discriminative Utility

ACHIEVEMENT (Entire Stage Two Sample)

TOTAL WORK

	Inadequate	Adequate		
< 145	25	13	38	Sensitivity 61.0%
> 145	16	48	64	Specificity 78.7%
				Detect. Utility (Positive) 65.8%
	41	61	102	Detect. Utility (Negative) 75.0%
				Overall Hit Rate 71.6%

ACHIEVEMENT (Entire Stage Two Sample)

INCREASE

	Inadequate	Adequate		
< -1	25	20	45	Sensitivity 61.0%
> -1	16	41	57	Specificity 67.2%
				Detect. Utility (Positive) 55.6%
	41	61	102	Detect. Utility (Negative) 71.9%
				Overall Hit Rate 64.7%

PREDICTION UTILITY OF CCT MEASURES (MASTERY GROUPS)

TOTAL WORK

	MASTERY: Inadequate	MASTERY: Adequate		
≤ 145	20	11	31	Sensitivity 71.4%
> 145	8	56	64	Specificity 83.6%
				Detect. Utility (Positive) 64.5%
	28	67	95	Detect. Utility (Negative) 87.5%
				Overall Hit Rate 80.0%

DISPLACED RESPONSES

	MASTERY: Inadequate	MASTERY: Adequate		
≤ 2	13	16	29	Sensitivity 46.4%
> 3	15	51	66	Specificity 76.1%
				Detect. Utility (Positive) 44.8%
	28	67	95	Detect. Utility (Negative) 77.3%
				Overall Hit Rate 67.4%

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