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USING THE DIFFERENTIATION BETWEEN VOCABULARY  
AND MATRICES SCORES ON THE K-BIT AS PREDICTORS  
OF PARENTING PROGRAM OUTCOMES

A DISSERTATION  
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degree of  
Doctor of Philosophy

By  
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A DISSERTATION APPROVED FOR THE  
DEPARTMENT OF EDUCATIONAL PSYCHOLOGY

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## ABSTRACT

This study examined whether the Kaufman Brief Intelligence Test (K-BIT) Matrices subtest was more predictive than the K-BIT Vocabulary subtest of parenting program completion and whether select demographic variables, K-BIT subtest scores, parenting programs (PCIT or regular parenting class), and reported barriers to participation were predictive of parenting program outcomes (completion or non-completion). Research participants consisted of 93 parents enrolled in community-based parenting classes. Results from a regression analysis indicated that the K-BIT Matrices subtest was not more predictive than the K-BIT Vocabulary subtest of parenting program completion. In addition, a discriminant analysis revealed that select demographic variables, parenting programs, and reported barriers to participation were not predictive of parenting program outcomes.



## Introduction

This study was designed to build upon the theory of human information processing. Specifically, that reasoning and the capacity to think fluidly are as predictive of general intelligence and learning as crystallized intelligence and that reasoning skills should be given greater consideration when assessing general intelligence (Haier, White & Alkire, 2003). Furthermore, understanding the unique impact of reasoning and verbal skills on learning may aid in the development of teaching styles and assessments that are more culturally sensitive.

### *Background of Problem*

A review of literature did not provide evidence that attention had been given to the impact of high reasoning or nonverbal skills compared to verbal skills on an individual's level of intelligence. A 2003 study by Colom, Contreras, Shih and Santacreu assessed spatial ability using a computerized test to measure differential aptitude and reasoning. It was noted in this study that spatial ability added incremental validity to the Scholastic Assessment Test -Mathematics. Markovits and Vachon's 1990 study examined the idea that the development of mental representations using reasoning involves both concrete and abstract thought processes. Whereas Gitomer, Curtis, Glaser, and Lensky (1987) pointed out in their study a need for the development of test models that incorporate more than just different levels of verbal capacity. Hernstein, Nickerson, de Sanchez, and Swets (1986) developed a course emphasizing the importance of observation, reasoning, and the critical use of language. While there have been studies that address verbal and reasoning abilities, this researcher did not find any studies

addressing the difference in learning capacity identified by a differentiation in verbal and reasoning skills, with reasoning or nonverbal skills being higher than verbal skills.

*Statement of the Problem*

In assessing adults for verbal and reasoning skills, assessments for intelligence and capacity to learn are frequently correlated with an individual's verbal aptitude. While reasoning (nonverbal) skills are typically integrated into the intelligence quotient, an individual's capacity to reason is not emphasized to the degree of verbal skills. The limited research in this area has revealed a strong correlation between working memory and reasoning ability and discussed the importance of considering individual differences in intelligence. This differentiation is of particular importance when teaching parenting skills, as teaching in a context that incorporates an individual's strongest style of learning allows for a greater percentage of parents who can successfully incorporate the information and techniques being taught. Continuing to investigate the unique contribution of reasoning skills to cognitive functioning is crucial to establishing and promoting more effective learning for a range of individuals.

## Literature Review

In researching human information processing and whether high reasoning (nonverbal) skills can have an equal or larger impact than high verbal skills on an individual's level of intelligence, a review of literature did not indicate that this differentiation has been widely studied. Studies addressing portions of the research question included the development of a course emphasizing the importance of observation, reasoning, and the critical use of language by Hernstein, Nickerson, de Sanchez, and Swets (1986). Along a similar line, Gitomer, Curtis, Glaser, and Lensky (1987) identified a need for the development of test models that incorporate more than just different levels of verbal capacity.

Sternberg (1999) took a different approach when he argued the possibility that intelligence is actually expertise, and the role of intelligence tests is to measure the development of expertise. Along a different line, Markovits and Vachon's 1990 research examined the influence of concrete and abstract thought processes on the development of mental representations, while a study conducted by Ramsey, Jansma, Jager, VanRaalten, and Kahn (2004) looked at brain function during the actual event of information processing.

There are many factors to take into consideration when assessing different types of intelligence and how they influence human information processing and an individual's capacity to learn. Several studies that have influenced the current research include Schroeder and Salthouse's (2004) assessment of age and cognitive variables; Haier, White, and Alkire's (2003) study of general intelligence (*g*) and brain function; the study

of gender difference in semantic memory and reasoning ability conducted by Lynn and Irwing (2002); the impact of emotional and *g* on individual performance (Lam & Kirby, 2002); and Moutafi, Furnham, and Paltiel's study (2004) that assessed conscientiousness, fluid intelligence, and crystallized intelligence.

### *Information Processing and Intelligence*

In researching human information processing it seems that it is described both by direct definition and by how it is measured. It is also frequently found in literature along with metacognition. In Sternberg's 1999 study on developing expertise and intelligence, he incorporated the concept that an individual's success in life is based upon more than what conventional tests measure; he based his theory upon the hypothesis that "individuals are constantly in a process of developing expertise when they work within a given domain" (p. 361). His model of developing expertise had five key elements: (a) metacognitive skills, (b) learning skills, (c) thinking skills, (d) knowledge skills, and (e) motivation (Sternberg). Campione, Brown, and Borkowski's theory suggests that "information processing conceptions of intelligence focus on the ways individuals mentally represent and process information" and that mental processes are categorized by the different stages of operation required to complete different tasks (as cited in Sattler, 2001, p. 143). The Information-Processing Theory of Intelligence includes the concept that the dynamics of change in the learning process include continual processing by an individual of their personal abilities and processing style (Campione & Brown, 1987). In this context, information processing has been defined as the ability to monitor and evaluate one's progress during task completion (Brown, Bransford, Ferrara, & Campione,

1983). Other research defines human information processing as a measure of an individual's ability to improve performance through systematic learning (Campione & Brown, 1987). Along this same line, Borkowski, Day, Saenz, Dietmeyer, Estrada and Groteluschen (1992) described human information processing as the ability to selectively attend to materials and choose effective and efficient performance strategies. With this in mind, one can see how information processing incorporates aspects of fluid intelligence with crystallized intelligence as individuals learn new information, problem solve, or even review and reprocess previously learned information.

When looking specifically at human information processing, Ramsey, Jansma, Jager, VanRaalten and Kahn (2004) addressed the neurophysiological factors involved in the capacity to address multiple tasks simultaneously. In assessing human data acquisition, they used functional neuroimaging to look at brain activity in the frontal and parietal lobes, as well as in the visual cortex. This dual-task paradigm required participants to rapidly switch from one task to another. Study results indicated that an individual's successful attention to dual tasks required constant and ongoing attention to context and the rule sets associated with both tasks (Ramsey et al.). As a whole, the Ramsey study found that an increase in the number of simultaneous tasks being conducted could increase brain function and influence how information is processed. The study also indicated that repetition of tasks increased familiarity and information processing became automated over time.

While the principle finding of their study focused on individual differences in the transition from controlled to automated cognitive actions, they also noted that the degree

to which a stimulus was decreased did not correlate with improvement of task performance (Ramsey et al., 2004). This study suggested that the lack of improvement in task performance with decreased stimulus illustrated that “neurophysiological trimming does not affect the ‘streamlining’ of stimulus-response mapping that follows practice” (p. 522). Previous studies viewed this phenomenon as being reflective of a shift from computational mapping, which is acquired through practice or retrieval from long-term memory (Strayer & Kramer, 1990), or as an enhancement of communication within the same network of the brain (LaBerge & Samuels, 1974).

In a broader study conducted by Haier, White, and Alkire (2003), which included right-handed male and female college students, the primary focus was to gain a better understanding of what underlies individual differences in *g* during non-reasoning tasks. The study included the use of PET imagery and both reasoning or problem solving and non-reasoning tasks. In looking at the physiological process of brain function during reasoning tasks in correlation to *g*, as opposed to psychometric assessment of *g*, study results indicated that individual differences in intelligence correlate to brain function. Furthermore, this process occurs even when the brain is engaged in non-reasoning tasks, suggesting that high and low *g* subjects may preferentially activate different neural circuits (Haier et al.). The researchers found primary correlation findings and exploratory interaction correlation findings, as well as the limitation that PET allows only cumulative effects to be identified. This study provided a new dimension in understanding “how” individual differences in intelligence are exhibited (Haier et al.).

Spiegel (1999) also looked at information processing from a physiological perspective, defining a “state of mind” as “the total activations in the brain at a particular moment in time” (p. 208). Building upon the concept that the mind’s central function is information processing, Spiegel described the activation of systems within the brain as being context sensitive and consisting of (a) perceptual bias, (b) emotional tone and regulation, (c) memory processes, (d) mental models, and (e) behavioral response patterns. Discovering the elements of a person’s state of mind can be achieved by taking the time to understand the individual’s perceptual processes which are influenced by perceptions including, but not limited to, thoughts, memories, attitudes, beliefs, and desires (Spiegel). These perceptual processes influence neural activity within the brain and the lateral integration of activity includes the coordination of circuits at a similar level of complexity across sensory modalities. For example, vision, auditory and tactile perceptions are integrated to create a whole picture of an experience. Spiegel describes perceptual integration as a trajectory of developmental pathways toward resilience or vulnerability in cases of attachment.

Studies on brain function imaging have supported previous findings from split-brain studies (as cited in Spiegel, 1999) that information is perceived and processed within the right hemisphere. The right hemisphere does not use syllogistic logic to reach conclusions about cause-effect relationships like the left hemisphere of the brain does (Spiegel), but rather incorporates information from various components of experience, including spatial relationships and mental processes. The output from the right hemisphere is nonverbal and is expressed through physical expressions such as pointing

to an object or through an artistic expression such as drawing. In contrast, processing of information in the left hemisphere appears to lack the contextual representation of the right hemisphere, which results in an effort to create verbal output of the interpretation of what has been seen or heard (Spiegel). These words are made-up in an effort to describe the information received, but do not relate to the context of the story. By stating major and minor premises and using deduction to come to logical conclusions, the left hemisphere attempts to establish simple cause and effect relationships (Spiegel). Integration of the information from the left and right hemispheres provides the path for deductive explanations that are logical and incorporate a contextual understanding of a scene (Spiegel).

In a study on whether individuals who exhibit mental speed also score high on intelligence tests, it was found that speed is not a reliable means of delineating individual differences in functional models of cognitive processing (Rabbitt, 1996). What was identified was the need to compare speed and accuracy in high and low ability groups (Rabbitt). The author reported that individual differences are not reflective of speed of performance, but more of individual differences of efficiency of memory and learning (Rabbitt). The most significant finding of this study was that when assessing speed in task completion, it is not a global performance characteristic, but rather a measurable performance index (Rabbitt).

Another study on cognitive ability, speed of information processing, and working memory was conducted by Fink and Neubauer (2005). This study took into consideration the differentiation between working memory and short-term memory in regard to g,



reasoning, and problem solving, specifically looking at IQ and performance during cognitively demanding tasks in relation to time estimation (Fink & Neubauer). What Fink and Neubauer found was that brighter individuals were likely to outperform less intelligent individuals in regard to both speed and working memory. This information would be particularly helpful in working with a less intelligent population, as it clearly identifies the need to provide a learning environment that allows additional time for reasoning and processing.

Hernstein et al.'s study (1986) was conducted over a full academic year and utilized pre and post-tests to assess fundamental cognitive skills on material not covered in the standard curriculum. Hernstein et al. found that students and teachers alike benefited from a learning environment that allowed intellectual exchange and activity between teachers and students. At the completion of the study, it was found that students who had experienced a more interactive learning environment exhibited higher levels of perceptual and verbal reasoning skills, reading comprehension, and use of verbal analogies.

Identifying differences in learning, Gitomer et al. (1987) studied different performance models, which included the speed in which individuals execute subprocesses as well as organization and component processes. Their results suggest that once individuals experience initial encoding of information, their ability to increase speed of future processing of the information was influenced in part by whether they could assess if a correct alignment of information had been made (Gitomer et al.).

### *Fluid and Crystallized Intelligence*

In breaking down the components of intelligence, Cattell and Horn (1967) identified the concepts of fluid intelligence (*gf*) and crystallized intelligence (*gc*). Fluid intelligence was defined as the broad ability exhibited in motor, sensory, and rote learning (Cattell & Horn). For example, a child's task that requires solving conceptual, numerical, spatial, or complex problems requires (*gf*), or the ability to learn by mimicking or repetition (Cattell & Horn). Crystallized intelligence incorporates what is learned through practice and experience in (*gf*) with perceptual and motor skills, which in turn helps to develop abilities that are more complex and specialized (Cattell & Horn). An example would be a child's capacity to continue developing and improving their reading and writing skills as they progress through school.

In a 1990 study, Kyllonen and Christal found a high correlation between working memory and reasoning ability (.80 - .90), which led to their conclusion that "working memory capacity affects success across the various component stages of reasoning task" (p. 427). Along this same line was a 2004 study, which used a hierarchical model to predict *g* (Colom, Rebollo, Palacios, Juan-Espinosa, & Kyllonen, 2004). Colom et al. built upon the concept that working memory is comprised of the combined functions of attention and conscious rehearsal, along with the integration and manipulation of information. In their study, variables measured included *g*, which was reflective of the common variances of all tests of ability, *gc* and spatial/fluid intelligence (*gv/gf*), as well as psychometric speed (*gs*). Colom et al.'s study supported the earlier findings, with *g*

predicting working memory (.94), followed by the quantitative factor (.84), processing speed (.72), and the verbal factor (.53).

The influence of experience, education, and individual differences all play a part in *gc*, and the study of crystallized intellectual ability has often been viewed as being reflective of different aspects of verbal, concrete, and knowledge-based abilities as *gc* measures frequently outperform measures of fluid intelligence (Ackerman, Beier, & Bowen, 2000). This study specifically looked at the difference between cloze tests and completion tests as measures of *gc*. Ackerman et al. found completion tests to share more variance with *gc* than cloze tests.. It was also found that both tests suppressed the relationship between *gc* and age so that when the individual differences of the tests were accounted for, the positive association between *gc* and age was increased.

In looking at cognitive abilities, declarative knowledge, and *gc*, Reeve (2004) took into consideration concerns voiced in prior research and looked at the relationship between ability constructs and criterion constructs and whether latent components of criterion measures fully assess the involvement of narrow abilities. In investigating how *gf* shapes *gc*, it was found that only *g* was consistently related to the criteria after observed criterion scores were individually regressed according to abilities (Reeve). In discussing study outcomes, Reeve compared the concept of finding the relationship between narrow ability factors and knowledge factors to observable human work traits that either occur naturally or are contrived, noting that investigator perspective can influence direction of interpretation and study implications.

A 2004 study by Gignac built upon previous work by Gignac and Vernon (2002) and Gignac, Strough and Loukomitis (2004) by studying the relationship between general openness to experience and  $g$  and residualized Vocabulary and Information scores from the Wechsler Adult Intelligence Scale (as cited in Gignac, 2004). The results revealed no significant relationship (.11) between openness to experience and  $g$ , with no statistically significant relationship between objective openness and  $gc$  being observed. It was noted that objective openness component scores, reflected in the verbal subtest residuals, correlated positively with  $g$  but not with  $gc$  (Gignac).

A 2002 study by Lam and Kirby studied how an individual's ability to perceive, understand, and regulate emotions is related to performance. They found that  $g$  made a significant contribution to the prediction of individual performance of a cognitive task. Variables that were measured included levels of emotional reasoning ability,  $g$ , and individual cognitive-based performance. Results of this study indicated that specific emotions might cause problems for task performance, depending upon whether the emotions were perceived as enhancing or distracting. This is particularly useful when taking into consideration the importance of nonverbal skills when establishing an effective learning environment.

From a neurological perspective, a 2004 study by Liu, Sabbagh, Gehring and Wellman has been identified as the first to directly target the cortical activity associated with reasoning. Specifically, they studied "theory of mind" which was identified as being the capacity to reason in social interactions. This study monitored event-related brain function based upon the differences of judgments based on belief and those based on

reality. What they found was that there is a “decoupling” mechanism that takes place in the left orbitofrontal cortex, which allows an individual with a healthy, fully developed frontal cortex to differentiate between beliefs and reality.

Schulze, Beauducel, and Brocke (2005) conducted a study on the influence of abstract and concrete reasoning on *gc* and *gf*. They purposefully looked at which aspects of figural reasoning tasks tend to mark *gf* and found that the differences between *gf* and *gc* loadings were significant for abstract figural reasoning tasks but were not significant for concrete figural reasoning tasks. It was also found that when individuals were given additional knowledge in which to solve tasks, the difference between *gf* and *gc* figural loadings was reduced (Schulze et al.). It was the conclusion of the authors in this study that figural reasoning tasks do not measure *gf* exclusively, but that they also measure *gc* and are dependent upon the amount of knowledge required to accomplish the task (Schulze et al.).

In a replication study, Moutafi, Furnham, and Paltiel (2004) assessed conscientiousness and *gf* and *gc* to find whether their research supported earlier studies that reported a negative correlation between conscientiousness and *g*. The research results did find that abstract reasoning was significantly correlated with conscientiousness, and verbal reasoning was significantly correlated with neuroticism, agreeableness, and conscientiousness. A particular strength about this study was the statistical analysis, as the researchers went beyond the basic correlations and looked at the regressions and partial correlations. Using regression analysis, conscientiousness was found to be a significant predictor of abstract reasoning, and agreeableness was a significant predictor

of verbal reasoning, but numerical reasoning was not significant. This study appeared to take previous research a step further, as well as paving the way for future research. From a practical standpoint, the results of this study could be beneficial in a clinical setting as it sheds light on why some clients may struggle with what they know intellectually and what they are feeling emotionally.

### *Kaufman Brief Intelligence Test*

The Kaufman Brief Intelligence Test (K-BIT) was designed for use in making brief, individual assessments of intelligence and not as a replacement for comprehensive assessments such as the Wechsler series of scales or the Peabody Individual Achievement Test-Revised (Kaufman & Kaufman, 1990). The K-BIT is well normed and the standard scores use the same metric as many other intelligence and achievement tests, permitting direct comparisons (Kaufman & Kaufman, 1990; Naugle, Chelune, & Tucker, 1993; Wechsler, 1981). Kaufman and Kaufman described the nonverbal or reasoning portion of their assessment as resembling the Performance Scale of the Wechsler Adult Intelligence Test, which assesses planning and foresight, visual-spatial ability, and ability to learn rote tasks. A 1995 study by Prewett found the K-BIT to have a high correlation to the WISC-III ( $r_s = .78$ ). It offers an assessment of intelligence for a wide range of individuals (4-90 years) based upon the measurement of both verbal (crystallized) and nonverbal (fluid) abilities and can be administered by staff members who do not have strong psychometric backgrounds (Kaufman & Kaufman). Within the K-BIT, vocabulary abilities are measured by assessing word-knowledge and verbal concept formation, whereas the

matrices section assesses an individual's ability to perceive relationships and complete analogies (Kaufman & Kaufman).

Kaufman and Kaufman (1990) consider the vocabulary subtest of the K-BIT to be an assessment of intelligence rather than achievement, as the K-BIT range traverses from childhood to adulthood and is not used for categorizing an individual based upon their score. The matrices subtest assesses an individual's ability to respond to both meaningful and abstract stimuli (Kaufman & Kaufman), which requires the use of reasoning and is considered to be more "cultural-fair" as it is designed to take into consideration variables such as race differences in IQ scores, left versus right brain processing, and crystallized versus fluid intelligence (Raven, Court, & Raven, 1983).

#### *Variables Affecting Participation in Parenting Skills Programs*

Research on parenting programs addresses multiple participant issues, including participant age, gender, level of education, socio-economic status, and perceived barriers to participation. A review of literature in regard to variables specific to participation and completion of parenting programs was not fruitful; however, there is a plethora of articles that address these variables in other contexts.

A study conducted by Entwisle, Alexander, and Olson (2004) addressed the distinction between high school dropouts who return to complete their GED and those who do not and the events and experiences common to those populations. Of the individuals who did not ultimately complete their high school education, the need to work to help support their family was a common theme, as was the failure of competency tests, and negative attitudes of teachers toward students who work (Entwisle, Alexander, &

Olson). The bigger picture for these individuals is the fact that, without formal education, they typically continue to work the same type of job throughout their lives, compromising their ability to provide financially for their families and limiting their exposure to more effective ways in which to communicate and interact with the people around them, including their known patterns of parenting and family interaction (Entwisle, Alexander, & Olson).

Supporting the concept that there is a relationship between academic achievement and personal financial stability, a study by Yang (2003) looked at the relationship between socioeconomic status (SES) and knowledge in the fields of math and science. Drawing participants from 17 countries and accounting for cultural variances, Yang found that, as a whole, individuals who have an increased level of comprehension for math and science attain a higher SES than those who do not. In delineating between whether a higher SES provided the opportunity for greater exposure to the fields of math and science or whether increased knowledge in these areas provided the means for a higher SES, it appears that one supports the other in an ever increasing cycle (Yang, 2003), suggesting that academic achievement could be an indicator of how individuals receive and process information. Furthermore, understanding an individual's capacity to think in an abstract, spatial, novel or spontaneous manner could increase the potential for developing and implementing parenting program protocols tailored more effectively to meet a range of parenting needs.

Based upon the concept that the quality of a home environment impacts a child's performance on intellectual/academic tasks and how they perceive and respond to social



demands, McFarlane, Powell, and Dudgeon (2002) conducted a study on the difference between gender, IQ, and SES and the degree to which each variable influences the suggestibility of kindergarten age children. Using the Wechsler Preschool and Primary Scale of Intelligence- Revised to assess IQ and The Video Suggestibility Scale for Children (VSSC) to measure suggestibility, the researchers found that when looking at individual differences, there was a significant negative relationship between SES and suggestibility ( $r = -.29, p < .01$ ) and age and suggestibility ( $r = -.23, p < .01$ ) (McFarlane et al.). IQ was the main predictor of suggestibility, even though it correlated moderately with SES ( $r = .40$ ). Children with higher IQ scores were less likely to acquiesce to questions with yes/no answers than children with lower IQ scores. Also of note is that in the population studied, children with higher SES were exposed to more educational and social opportunities than were the children with lower SES (McFarlane, Powel, & Dudgeon). From a longitudinal perspective, a study of this type is particularly helpful in understanding the generational cycle of individual perception of social demands. If a child grows up in an environment that does not encourage or support academics or offer opportunities for a global awareness and understanding of life events, that child has a significantly higher chance of growing up and repeating their parent's life choices. From the perspective of introducing this population to new parenting concepts, it becomes easier to understand their hesitancy to change and the high number of participants who do not complete parenting programs.

Research regarding gender differences in intelligence and cognitive processing was also telling, as studies argued both for and against the difference between genders. In

an effort to replicate previous studies, Lynn and Irwing (2002) conducted a second study showing that males have a greater general knowledge than females (.46*d*), with males obtaining higher average means in the domains of literature, general science, games, and finance. In contrast, when looking at the degree and extent to which *gf* explains the difference between genders, no significant difference was found between *gf* and *g* ( $r = .23$ ) (Lynn & Irwing). In regard to the plethora of studies being conducted regarding gender differences is the argument that “differences” do not equal “deficiencies” (Halpern, 1997). When researching gender differences, Halpern stated it clearly when offering the perspective that

“...there are many cognitive areas in which the sexes, on average, differ, and many in which there are no differences. Conclusions about differences do not mean that there is a better or smarter sex. If society routinely values those traits associated with one sex more than those associated with the other sex, then the problem lies in the value hierarchies of the society, not in the fact that there are differences...” (p. 1092).

If one were to take the perspective offered above when considering the role of parenting, it becomes apparent that while mothers and fathers may hold different views regarding parenting, these views typically represent differences and not deficiencies. Keeping an awareness and clear perspective on group differences plays an important role in how these beliefs affect thoughts and behaviors that occur without conscious awareness, particularly when being cognizant of and understanding stereotypes and prejudices (Halpern, 1997). With this in mind, it is particularly important to examine materials used in educational settings for biases to gender, IQ, or SES (Halpern).

Areas studied in treatment interventions include barriers that hinder parents' successful completion of parenting programs (Spoth, Redmond, Hockaday, & Shin, 1996; Kazdin & Wassell, 1999; Lynch, 2003; Nordstrom, 2005). Parental attitudes and beliefs toward interventions have been found to play a significant role in successful parenting program completion (Spoth et al.). This research also supported previous findings that it is important to take into consideration an individual's perception of the intervention program as well as the attitudes and beliefs of other family members (Spoth et al.). Specifically, whether the individual was supported by others in their social circle or challenged to question interventions that contradicted their beliefs and attitudes. Key barriers identified in Spoth et al.'s study included scheduling conflicts and the perception that participation would take too much of their family time. Spoth et al.'s study also found socioeconomic status to be inversely related to privacy issues, such as reluctance to be videotaped during assessments. Findings suggested greater concerns regarding privacy issues in lower SES families (Spoth et al.).

A 1999 study by Kazdin and Wassell incorporated family demographics that included education and occupational attainment, family income, and receipt of public assistance. Also integrated were assessments of parent psychopathology and stress as well as child dysfunction. This study supported the authors' hypotheses that perceived barriers significantly predicted treatment outcome (Kazdin & Wassell). Additionally, the study revealed that even though socioeconomic disadvantage, parental psychotherapy and stress, or child dysfunction may influence treatment outcome, they are not predictive of perceived barriers (Kazdin & Wassell). Of particular note in Kazdin and Wassell's study

was the finding that barriers to participation in treatment were significantly associated with therapeutic change, but were not explained by previously noted family, parent, or child predictors.

When parental cognitions and parent participation in preventive parent training programs were studied in 2005 by Nordstrom, parent perception of time barriers and program relevance was found to be predictive of commitment to the parent training, but only perception of time barriers exclusively predicted program retention (Nordstrom). It was also found that even though attributes of the parent-child dyad accounted for a significant amount of unique variance in parenting program engagement and retention, variables such as child gender, disruptive behaviors, parent age, parent minority status, or home chaos were not predictive of parent participation (Nordstrom).

In a 2003 study by Lynch that assessed predictors of enrollment in parenting programs, intent was found to be the single predictor that accounted for significant variance in enrollment. This study found a positive correlation between intent to enroll and actual enrollment in the program,  $r = .35, p < .01$ . In contrast, it was also found that the odds ratio showed that for every one-unit increase in intent, the odds of enrolling in the parenting intervention decreased; a finding that was in contrast to previous literature reporting evidence indicating that inclination to enroll in parenting intervention significantly predicted recruitment (Spoth et al., 1996).

#### *Parenting and Parent-Child Interaction Therapy*

Over the years studies have been conducted to identify different barriers that impact both parenting skills and programs designed to teach parenting skills (Spoth,

Redmond, Hockaday, & Shin, 1996; Kazdin & Wassell, 1999; Lynch, 2003; Nordstrom, 2005). Common themes found across these studies include degree of social or family support, parent perception of program benefit, and loss of family time. Parent-Child Interaction Therapy (PCIT) addresses several of these barriers, as the therapy is based upon structured family time that optimally results in observable improvement in parent-child interactions and child behaviors (Eyberg & Boggs, 1998).

The PCIT protocol being used in this study combines traditional PCIT, in which parents are taught how to alter their children's behavior at home by establishing a secure, nurturing relationship with their child through the use of praise and age-appropriate discipline such as time-outs, (Eyberg & Boggs, 1998; Eyberg & Robinson, 1982) with Barkley's parent training model for older school-age children using the same principles, but with age-appropriate disciplines such as loss of privileges (1987). Both approaches were derived from Hanf's (1969) operant and social learning theory where parents first use differential social attention to follow their child's play in the first stage, then in the second stage direct their child's play using praise to reinforce compliance or time-out in response to non-compliance. PCIT was originally developed for use with children ages 2-7 years, whereas Barkley's program targeted children 8-12. Common elements across developmental/age groups include structured parent-child sessions, relationship enhancement, learning concrete behavioral discipline strategies, and *in vivo* coached rehearsal.

Previous studies using PCIT have been multi faceted and include one recent study with children with behavior disorders. The researchers suggest this study as being "the

first step in identifying strategies to improve long-term outcomes” (Querido & Eyberg, 2005, p. 2). A second study with children experiencing separation anxiety disorder found PCIT to be effective in reducing familial anxiety factors initially and at a 3-month follow-up (Choate, Pincus, & Eyberg, 2005). In a study where researchers worked with maltreated children in foster care, it was found that parenting barriers with foster parents had to first be addressed before PCIT could be effectively used with foster children (Fricker-Elhai, Ruggiero, & Smith, 2005).

Research on the effectiveness of PCIT over time and across situations has identified that it is more effective for some populations than others (Hembree-Kigin & McNeil, 1995). For instance, Hembree-Kigin and McNeil found that families where there is marital discord, active drug abuse, or where mothers are significantly depressed do not respond as well to PCIT. Families who complete PCIT and experience an improvement of interactions between parents and children also report clinically and statistically significant improvements in other areas of their life (Herschell, Calzada, Eyberg & McNeil, 2002). These areas include less personal distress for parents in regard to their child’s behavior, an increased confidence in parenting skills, and improved classroom behaviors for the children. It was also noted that within PCIT families, there were improved behaviors of children who were not treated (Herschell et al.). One study conducted by Harwood and Eyberg (2004) found that therapists who used more facilitative statements than supportive or questioning statements during the assessment interview and the first child-directed interaction had significantly fewer (ES > .80) families drop out of therapy.

A 2003 study examined the effects of father involvement on the outcome of parent-child interaction therapy (Bagner & Eyberg). In this particular study, it was found that in families where fathers were present, children maintained gains made in treatment; whereas families with absent fathers reported a significant decline 4 months following treatment (Bagner & Eyberg, 2003). In a longitudinal study of PCIT conducted by Boggs, Eyberg, Edwards, Rayfield, Jacobs Bagner, and Hood (2004), families who had completed PCIT and an equal number of families who had dropped out prior to completion were studied. A key finding of the study was that 10 to 30 months following treatment, parents who completed PCIT reported a significant positive change in their child's disruptive behaviors and their own level of parenting stress (Boggs et al.). Between-group comparisons, revealed that mothers who had dropped out of treatment reported a higher level of parenting stress related to their child (Boggs et al.). Over twice as many children who dropped out of the study were reported by their parents to exhibit behaviors of oppositional defiant disorder (ODD) criteria than those who completed treatment. It was also found that of the children who had completed treatment, almost half no longer met criteria for attention deficit hyperactivity disorder (Boggs et al.). One follow-up study investigating the maintenance of prosocial behaviors was conducted in a school setting 12 and 18 months following treatment (Funderburk, Eyberg, Newcomb, McNeil, Hembree-Kigin, & Capage, 1998). Using one treatment group and three control groups, it was found that at 12 months following treatment, student compliance and level of conduct behavior problems were very similar to posttreatment (Funderburk et al.). At 18 months following treatment, children who had completed PCIT continued to maintain

significant improvement over pretreatment scores on compliance, but teacher ratings indicated a shift towards pretreatment scores on observational behaviors (Funderburk et al.).

Another study where parenting program outcomes were measured (Chaffin, Silovsky, Funderburk, Valle, Brestan, Balachova, et al., 2004) looked at recidivism of reported cases of child abuse. Parents were randomized to one of three parenting groups, Standard PCIT, Enhanced PCIT, and the standard parenting class. Study findings indicated that 19% of participants participating in either PCIT group had a future physical abuse report within 850 days of program completion, compared to 49% of those who participated in the general condition (Chaffin et al.).

#### *Rationale and Significance of Study*

The purpose of this study was to explore (a) whether Matrices (reasoning) scores on the K-BIT are more predictive of successful parenting program outcomes in a learning environment than Vocabulary scores and (b) whether select demographic variables (e.g., age, education, income, etc.), K-BIT subtest scores (Matrices and Vocabulary), parenting programs (PCIT or regular parenting class), and reported barriers to participation were predictive of parenting outcomes (completion or non-completion). Delineating which scores, Vocabulary or Matrices, on the K-BIT are more predictive of successful completion of the AFF-III study parenting program or other parenting classes is particularly important in assessing whether teaching styles should be adapted to better accommodate the verbal and reasoning skills of program participants and may hold the



potential for developing parenting programs that foster longer-term positive change in parenting practices.

## Methodology

### *Participants*

The population for this study consisted of parents receiving parenting classes at a community-based agency located in a south central metropolitan area. A convenience sample of parents participating in an ongoing research project, Alternatives for Families III being conducted at the community agency, was used for this study. Participants were both male and female and between the ages of 18 and 64. The mean age for the sample ( $N = 93$ ) was 30.4 years; the mean for females ( $n = 62$ ) was 28.65 years and for males ( $n = 31$ ) was 32.93 years. The mean age for participants who completed the parenting program was 30.25 years and 29.75 years for those who withdrew from the study. Of the 31 males, 18 (58.1%) completed the parenting program. Forty-six (74.2%) of the females completed the parenting program. The mean monthly income for study participants was \$1,871.70. In regard to educational level, 9.7% of participants reported less than a 9th grade level of education, 19.4% reported that their highest level of education was grades 9-12, 11.8% reported having only a high school diploma, 21.5% had earned a GED, 24.7% reported having attended college classes without attaining a degree, 6.5% had completed a Vo-tech program. Of the study participants, 6.5% reported attaining a college degree or higher. As to ethnicity, 57% of study participants self-identified as Caucasian, 22.6% as African American, 8.6% as American Indian/Native American, 5.4% as Hispanic American, and 6.5% identified as "other."

### *Instruments*

Basic demographic information including age, gender, ethnicity, and level of formal education was obtained through the computer-based assessment conducted as part of the AFF-III study. Two quantitative instruments were used for this study. The Kaufman Brief Intelligence Test (K-BIT) (Kaufman & Kaufman, 1990) and the Barriers to Participation Scale (BPS) developed by J. Dumas (personal communication, January 8, 2002) and based upon previous research (Kazdin, Holland, Crowley, & Breton, 1997; Prinz & Miller, 1994).

*The Kaufman Brief Intelligence Test (K-BIT).* The K-BIT (Kaufman & Kaufman, 1990) is a brief, individually administered measure of verbal and nonverbal intelligence designed for use when a brief measure of intelligence is sufficient. The measure is commonly used as a screening mechanism in educational and professional settings as a means of obtaining an estimate of intelligence. The K-BIT corresponds closely to the major comprehensive intelligence tests (Kaufman & Kaufman, 1990) and was designed so that there was a logical relationship between the abilities that it measured and the interpretive models that are fundamental to longer test batteries such as the Wechsler and Stanford-Binet measures of intelligence.

The K-BIT is comprised of two subtests, Vocabulary and Matrices. The Vocabulary subtest is a 2-part, 82-item measure of verbal ability which demands an oral response for each item. The Vocabulary subtest measures language development and verbal conceptualization. The K-BIT treats vocabulary as a measure of intelligence, rather than achievement. Because use of the K-BIT extends from childhood through

adulthood, use of the K-BIT excludes labeling and placement based on the IQ standard score. Standardization of the K-BIT included gender, geographic region, socioeconomic status, and ethnicity. A representative sample of 2,022 subjects, based upon the most recent census, from across the United States was tested at 60 sites nationwide.

The Matrices subtest is a 48-item nonverbal measure, which utilizes visual stimuli, both meaningful (identifiable objects) and abstract (designs and symbols). All items require understanding of relationships among the stimuli, and all are multiple choice, requiring the person to identify the correct response either verbally or by pointing to the identified response. Abstract matrices were popularized by Raven (1956, 1960) as a method of assessing intelligence in a manner that was culturally more sensitive than other popular IQ tests at that time.

Kaufman & Kaufman (1990) report using corrected split-half reliability coefficients to establish reliability for Vocabulary, Matrices, and the K-BIT IQ Composite for 14 different age groups. Values for the Vocabulary subtest had exceptional reliability for adults ages 20-90 ( $M = .97$ ). For Matrices, the reliability value was excellent for adults ages 20-90 ( $M = .94$ ). For the Composite score, average reliabilities increased with age, and for adults 20-90 years of age the mean = .97.

*Barriers to Participation Scale (BPS)*. The Barriers to Participation Scale (BPS) was developed by J. Dumas and based upon previous research (Kazdin, Holland, Crowley, & Breton, 1997; Prinz & Miller, 1994). The scale measures factors that are likely to facilitate/hinder parental involvement in a parenting training program along five dimensions: stressors and obstacles (e.g., lack of time), intervention demands (e.g., too

many sessions), perceived relevance (e.g., lack of interest to participate), interventionist (e.g., supportiveness), and critical events (e.g., alcohol or drug problems in family). Response options for each of the questions were: 1 = Definitely Yes, 2 = Probably Yes, 3 = Probably No, and 4 = Definitely No. Questions were worded so that the higher the number of the response (1 – 4), the fewer perceived barriers to participation being reported by the individual. There are six subscales within the BPS scale: (a) total barriers to participation (with no spouse items), (b) personal or family stressors and obstacles, (c) intervention relevance and trust of organization, (d) intervention demands and program atmosphere, (e) time and scheduling demands, and (f) spouse items. Cronbach's alpha for the BPS total score was .74 for this study.

### *Procedures*

*AFF-III Parenting Program Protocol.* The Alternatives for Families III (AFF -III) research study was approved by the Centers for Disease Control Institutional Review Board and the University of Oklahoma Health Sciences Center Institutional Review Board. As principle investigator of the AFF-III study, Dr. Mark Chaffin granted access to the data from the AFF-III study for the purpose of this study. AFF-III participants signed informed consents giving permission for their information to be used in external studies. Each participant was screened using the Kaufman Brief Intelligence Test (K-BIT) (Kaufman & Kaufman, 1990) and had to attain a composite score of 65 or higher to be eligible for the study.

For the purpose of the AFF-III study, PCIT was adapted for use with children up to 12 years of age. Modifications to the treatment protocol were also made in light of the

populations of parents who had previously been or are currently at risk of being physically abusive. The AFF-III PCIT program consisted of two components: (a) the Relationship Enhancement Phase (7-9 sessions), which was designed to teach skills that enhance nurturing parent-child interactions, increase the parent's attention to positive aspects of their child, reduce anger in both the parent and the child, and increase warmth and attachment in the family; and (b) the Discipline Phase (7-9 sessions), which provides specific behavior management skills in handling children's misbehavior through non-physical, non-coercive methods.

*Current Study Protocol.* For this study, the researcher used data collected as part of the AFF-III study. Data included demographic information, the Vocabulary and Matrices scores of the Kaufman Brief Intelligence Test, and a change in participant scores on the Barriers to Participation Scale. Prior to reviewing data, the researcher ascertained that all data had been deidentified to protect the confidentiality of study participants.

Study participants were screened using the K-BIT (Kaufman & Kaufman, 1990). A composite score of 65 or higher was required to participate. A participant was considered to have successfully completed the AFF-III study once their agency therapist documented that they had been randomized to and completed one of the two six-week orientations (Starting Point or Self-Motivation); then re-randomized and completed one of the sixteen-eighteen week parenting classes (PCIT or the regular agency parenting class).

The Starting Point orientation class consisted of teaching parents to be aware of how significant life events affect their current parenting style. This class is designed to guide parents through goal setting so that they can meet the requirements of their court ordered treatment plan. The focus of the Self-Motivation class was to work with parents to develop an internal locus of control so that they become more self-directive in their decision-making skills. The PCIT protocol consisted of didactic training, first between the parent and therapist, then between the parent and child. It is a hands-on training where mastery is attained through parents interacting with their child(ren) under the supervision of a therapist. In contrast, the regular parenting program taught by the agency is a manualized form of therapy in which the parents read material and receive lectures on appropriate parenting skills.

The Barriers to Participation Scale was administered at the pre-intervention assessment to assess participants' perceptions of how various barriers may interfere with future participation in the parenting program. A revised version of the scale (worded for post-treatment) was administered at the third assessment point (6 months) to assess participants' perception of whether or not the barriers actually interfered with participation. Results from both assessments were used to calculate any change in participant report of barriers to parenting program participation. Scores on Items 1-7, 9-11, 13, 14, 16-18, 19, 21, 22, 24, 27, 30, 31, 34-36 were summed to yield the total barriers to participation score (Kazdin et al., 1997). Total barriers to participation scores for both the pre-test and the post-test were calculated, then the change score between the pre and post administration of the questionnaire was determined. A positive change score

from the first administration of the BPS to the second represents a decrease in reported barriers to participation, and a negative change score from the first administration to the second represents an increase in reported barriers to participation.

Parenting program outcomes included successful completion of the program and change in report of barriers to participation during the training program. Successful completion of the parenting program included the participant meeting all parenting class requirements for attendance and therapist observation of comprehension based upon group participation as well as integration and modeling of information and techniques learned. Participants were considered as non-completers under the following circumstances: (a) participant voluntarily withdrawing from the research study, (b) the participant being involuntarily withdrawn because parental rights were terminated, (c) parent no longer had access to the child(ren), or (d) participant had moved out of the area without withdrawing from the study.



## Results

### *Preliminary Analyses*

Select demographic variables (age, gender, ethnicity, income, and level of education), K-BIT subtest scores (Matrices and Vocabulary), type of parenting program (PCIT or regular parenting class), and Barriers to Participation were examined as potential predictors of parenting program outcomes in a learning environment. Means, standard deviations, and correlations for each of these variables grouped by whether the participants completed the parenting program or not are shown in Table 1. T-tests were used to analyze potential differences between program completers and non-completers on the demographic variables of age and income. Chi-square analyses were used to examine differences between the groups on gender, ethnicity, and level of education. No significant difference was found between parenting program completers and non-completers on any of the demographic variables.

### *Primary Analyses*

A regression analysis was run to evaluate whether K-BIT Matrices scores were more predictive than K-BIT Vocabulary scores of parenting program completion. The resulting model was not significant,  $R^2$  was .012 and  $F(2, 90) = .550, p = .579$ .

A discriminant analysis was conducted to determine whether a combination of the demographic variables (age, gender, ethnicity, income and education level), K-BIT subtest scores, parenting program, and Barriers to Participation were predictive of parenting program completion. All independent variables met the assumptions necessary

for conducting discriminant analysis. One function was generated, but it was not significant (Wilks'  $\lambda = .809$ ,  $\chi^2(9) = 6.902$ ,  $p = .647$ ).

Due to missing data on the Barriers to Participation scores, only 39 cases (41.9%) of the original 93 were valid for the analysis. Therefore, a second discriminant analysis was run removing the Barriers to Participation scores which resulted in 65 valid cases (69.6%). The function generated was not significant (Wilks'  $\lambda = .913$ ,  $\chi^2(8) = 5.375$ ,  $p = .717$ ).

Change scores in reported Barriers to Participation were calculated for all participants ( $N = 64$ ) who completed the parenting program by subtracting the pre-barriers to participation score from the post-barriers to participation score. Positive change scores reflected fewer barriers to participation. T-tests were used to analyze the change scores. There were no significant differences in change scores between the PCIT and the regular parenting group ( $t(39) = -.845$ ,  $p = .403$ ).

## Discussion

The purpose of this study was two-fold: (a) to examine whether the K-BIT Matrices score would be more predictive than the Vocabulary score in predicting parenting program completion and (b) to determine whether a combination of variables including select demographics, K-BIT subtest scores (Matrices and Vocabulary), type of parenting program (PCIT or regular parenting class), and barriers to participation scores were predictive of parenting program outcomes (completion or non-completion). Discriminant analyses did not support the study hypothesis that K-BIT Matrices scores were more predictive of successful parenting program outcomes in a learning environment than K-BIT Vocabulary scores. Furthermore, none of the demographic variables, type of parenting class (PCIT or the regular parenting class), or the total pre-barriers to participation scores were predictive of parenting program outcomes.

Several studies previously conducted found that fewer participant-perceived barriers to participation positively correlated with program completion, in that a higher number of perceived barriers were reflected in fewer weeks of participation and a higher rate of program incompleteness, (Kazdin, Holland, Crowley, & Breton, 1997; Kazdin, 2000; Baydor, Reid, & Webster-Stratton, 2003). In contrast, it was also found that for mothers, the influence of poor socio-economic conditions and mental health risk factors did not prohibit them from benefiting from parenting training (Baydor et al.). Results from the Baydor et al. study reflect those of the current study, which found no significant difference between perceived barriers of participation and program completion.

Another study found that beyond demographics and barriers to participation, family systems factors were more predictive of parenting program completion (Perrino, Coatsworth, Briones, Pantin, & Szapoeznik, 2001). Specifically, if the family exhibited a higher level of organization, communication skills, and shared similar perspectives regarding the family, they were more likely to be successfully engaged in and complete the parenting program. Adding information regarding family systems and degree of household chaos to the current study could both provide beneficial information regarding the role of social support and the challenge of disorganization.

While the current study did not find significant differences between gender, age, ethnicity, income, or level of education and parenting program outcomes, a similar study conducted by Webster-Stratton (1990) found mothers to perceive significantly more child behavior problems and increased levels of stress. Unlike the current study, Webster-Stratton's study also looked at the role of social support and how it can help to minimize life-related stress and lessen negative perceptions of parent-child interactions.

#### *Limitations and Future Research*

In hindsight, there are several aspects of the AFF-III study which created limitations for the research questions addressed in this study. For example, the convenience sample of participants all came from one community agency, thus limiting access to a larger cross-section of participants with different reasons and motivations for seeking parenting skills training. Secondly, there was only one measure used for assessing reasoning and vocabulary skills and perceived barriers to participation. The barriers assessed included social barriers as well as familial barriers. Additional barriers

that would be beneficial to study include: (a) an individual's motivation to change, (b) individual coping styles, and (c) an individual's foresight and ability to plan ahead (Webster-Stratton, 1990).

Parenting skills incorporate complex and varied dynamics and, because of the innate nature of parenting, there are additional variables which would be beneficial to study. Included in this list would be parental motivation for attending parenting classes, i.e., whether it to improve their chance of visitation with their child, strengthen their chance of being awarded custody in a divorce, or to enhance the quality of their interactions with their child (Lebow, 2003).

In addition to the variables of gender, age, income, level of education and ethnicity, which were included in the current study, it is also recommended that future research take into consideration diversity of the population being served and adaptability of the concepts recommended to various racial and ethnic groups. Continuing to investigate the role of perceived barriers to program participation is imperative, as hesitancy to participate in a program that requires commitment or change can be influenced by societal expectations as well as implicit and explicit coercion. Parental anxiety and depression can also create barriers to participation and play a significant role in the parent-child relationship, as these symptoms can limit a parent's capacity to adapt and change (McCarthy & McMahon, 2003). Another facet of parenting which could be helpful to study is available internal parenting resources, which would include a parent's ability to have a more sensitive and responsive reaction to their child's emotional needs as opposed to focusing on their own needs (Smith, Landry, & Swank, 2005).

The make-up of the parent-child relationship would also be beneficial to include in future research. A study by Wei, Shaffer, Young, and Zakalik (2005) looked at adult attachment anxiety and the influence of shame, loneliness, and depression on these relationships. This study identified that not having basic psychological needs met correlated more with attachment avoidance than attachment anxiety (Wei, Shaffer, Young, & Zakalik).

Even though participation in the research study was voluntary and responses were confidential, the majority of participants were court-ordered to participate in parenting classes, which could potentially impact how participants responded to self-report questionnaires. For example, parents who have been court-ordered to participate in parenting classes may be reluctant to identify barriers to participation if they feel it might reflect poorly on their motivation to have their children returned to their custody. As most participants in the current study had been referred to parenting classes due to concerns of child abuse or neglect, a better measure for future studies might be recidivism.

Based upon the theory that a good measure is highly sensitive to changes in the characteristic being measured (Leavitt, 1991), another problem with the study could lie with the measurement of parenting outcomes which were based on subjective observations of participation and comprehension of class material. Also, a longitudinal study designed to assess whether participants are able to integrate and maintain changes in their parenting style may provide more detailed information on what type of parenting programs are more beneficial based on particular individual needs and learning styles.

In retrospect, inclusion of all study participants, including those who withdrew from the study prior to the second randomization, may have helped to identify barriers to program participation. Likewise, the Matrices and Vocabulary scores of the participants who withdrew before being randomized to parenting may have offered insight into challenges for participant retention in the parenting program.

Despite the lack of significant findings in this study, the research question of whether reasoning or verbal skills should be considered when developing teaching curriculum is one that begs for additional study and could potentially aid the development of teaching styles and assessments that are more culturally sensitive, and potentially more effective

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Table 1

*Means, Standard Deviations, and Intercorrelations of Program Completers and Non-completers on Measured Variables*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9
Completers (n=65)											
1.Age	30.25	6.30	1.00	-.303*	.465**	.096	.334*	.185	.181	-.095	-.090
2.Gender <sup>A</sup>	1.72	0.45		1.00	-.149	-.053	-.017	.009	-.186	-.062	.100
3.Income	1895.29	1929.54			1.00	.033	.330*	.394**	.344**	.027	-.163
4.Ethnicity <sup>A</sup>	2.91	1.79				1.00	.168	.312*	.175	-.188	.172
5.Education <sup>A</sup>	2.84	1.69					1.00	.575**	.439**	.218	-.003
6.K-BIT Vocab	91.92	9.68						1.00	.471**	.005	-.181
7.K-BIT Matrices	98.94	8.51							1.00	-.012	-.095
8.Parent Group <sup>A</sup>	1.51	0.50								1.00	-.069
9.Pre-BP	91.51	10.02									1.00
Non-Completers (n=28)											
1.Age	29.57	7.90	1.00	-.318	.037	-.033	.377*	.226	.272	.167	.070
2.Gender <sup>A</sup>	1.55	0.51		1.00	-.097	.247	.003	-.060	-.148	-.296	.162
3.Income	1803.56	1808.59			1.00	.175	.362	.597**	.370	.026	.648
4.Ethnicity <sup>A</sup>	2.72	1.83				1.00	.430*	.635**	.230	-.196	.302
5.Education <sup>A</sup>	2.62	1.68					1.00	.766**	.401*	-.079	-.126
6.K-BIT Vocab	91.83	13.32						1.00	.569**	-.071	.256
7.K-BIT Matrices	95.28	15.92							1.00	.141	-.504
8.Parent Group <sup>A</sup>	1.38	0.49								1.00	.092
9.Pre-BP	91.36	9.12									1.00

A = these variables were dummy-coded

\*. Correlation is significant at the 0.05 level (2-tailed)

\*\* . Correlation is significant at the 0.01 level (2-tailed)



Table 2A.

*Discriminant Analysis Predicting Program Completion from Measured Variables (n=39)*

Function	Wilks' $\lambda$	$\chi^2$	<i>df</i>	Sig.
1*	.809	6.903	9	.647

\*DA based on Age, Gender, Income, Ethnicity, Education, K-BIT Vocabulary, K-BIT Matrices, Parenting Group, and Pre-Barriers to Participation.

Table 2B.

*Discriminant Analysis Predicting Program Completion from Measured Variables excluding Pre-Barriers to Participation (see text for explanation). (n=65)*

Function	Wilks' $\lambda$	$\chi^2$	<i>df</i>	Sig.
1*	.913	5.375	8	.717

\*DA based on Age, Gender, Income, Ethnicity, Education, K-BIT Vocabulary, K-BIT Matrices, and Parenting Group variables.

Appendix A

Proposal Submitted to the Graduate College

Using the Differentiation Between Vocabulary and Matrices Scores on the  
K-BIT as Predictors of Parenting Program Outcomes  
Dissertation Prospectus

SUBMITTED TO THE GRADUATE FACULTY

In partial fulfillment of the requirement for the  
Degree of Doctor of Philosophy

Carol I. Moore

University of Oklahoma

2005

## Chapter 1: Introduction

This proposal would build upon the theory of human information processing. Specifically, that reasoning and the capacity to think fluidly are as predictive of general intelligence and learning as crystallized intelligence, and that reasoning skills should be given greater consideration when assessing general intelligence (Haier, White & Alkire, 2003). Furthermore, a greater understanding of the impact and importance of assessing an individual whose reasoning and non-verbal skills are significantly higher than their verbal skills would aid in the development of teaching styles and assessments that are more culturally sensitive.

### *Background of Problem*

A recent review of literature does not provide evidence that attention has been given to the impact of high reasoning or non-verbal skills compared to verbal skills on an individual's level of intelligence. A 2003 study by Colom, Contreras, Shih and Santacreu assessed spatial ability using a computerized test to measure differential aptitude and reasoning. It was noted in this study that spatial ability added incremental validity to the Scholastic Assessment Test -Mathematics. Markovits and Vachon's 1990 study examined the idea that the development of mental representations using reasoning involves both concrete and abstract thought processes. Whereas Gitomer, Curtis, Glaser, and Lensky (1987) pointed out in their study a need for the development of test models that incorporate more than just different levels of verbal capacity. Hernstein, Nickerson, de Sanchez, and Swets (1986) developed a course emphasizing the importance of observation, reasoning, and the critical use of language. While there have been studies

that address verbal and reasoning abilities, this researcher did not find any studies addressing the difference in learning capacity identified by a differentiation in verbal and reasoning skills, with reasoning or non-verbal skills being higher than verbal skills.

### *Statement of the Problem*

In assessing adults for verbal and reasoning skills, assessments for intelligence and capacity to learn are frequently correlated with an individual's verbal aptitude. While reasoning (non-verbal) skills are typically integrated into the intelligence quotient, an individual's capacity to reason is not emphasized to the degree of verbal skills. The limited research in this area has revealed a strong correlation between working memory and reasoning ability and discussed the importance of considering individual differences in intelligence. This differentiation is of particular importance when teaching parenting skills, as teaching in a context that incorporates an individual's strongest style of learning allows for a greater percentage of parents who can successfully incorporate the information and techniques being taught. Continuing to investigate the unique contribution of reasoning skills to cognitive functioning is crucial to establishing and promoting more effective learning for a range of individuals.

## Chapter 2: Review of Literature

### *Introduction*

In researching human information processing and whether high reasoning (non-verbal) skills can have an equal or larger impact than high verbal skills on an individual's level of intelligence, a recent review of literature did not indicate that this differentiation has been widely studied. Studies addressing portions of the research question included

the development of a course emphasizing the importance of observation, reasoning, and the critical use of language by Hernstein, Nickerson, de Sanchez, and Swets (1986).

Along a similar line, Gitomer, Curtis, Glaser, and Lensky (1987) identified a need for the development of test models that incorporate more than just different levels of verbal capacity.

A different approach was taken by Sternberg (1999) when he argued the possibility that intelligence is actually expertise, and the role of intelligence tests is to measure the development of expertise. Another facet of intelligence was studied in Markovits and Vachon's 1990 research examining the influence of concrete and abstract thought processes on the development of mental representations. A more recent study by Ramsey, Jansma, Jager, VanRaalten, and Kahn (2004) looked at brain function during the actual event of information processing.

There are many factors to take into consideration when assessing different types of intelligence and how that influences human information processing and an individual's capacity to learn. Several studies that have influenced the current research include Schroeder and Salthouse's (2004) assessment of age and cognitive variables; Haier, White, and Alkire's (2003) study of general intelligence (*g*) and brain function; the study of gender difference in semantic memory and reasoning ability conducted by Lynn and Irwing (2002); the impact of emotional and *g* on individual performance (Lam & Kirby, 2002), and Moutafi, Furnham and Paltiel's study (2004) that assessed conscientiousness, fluid intelligence, and crystallized intelligence.

*Information Processing and Intelligence*

In researching human information processing it seems that it is described both by direct definition and by how it is measured. It is also frequently found in literature along with metacognition. In Sternberg's 1999 study on developing expertise and intelligence, he incorporated the concept that an individual's success in life is based upon more than what conventional tests measure; he based his theory upon the hypothesis that "individuals are constantly in a process of developing expertise when they work within a given domain"(p. 361). His model of developing expertise had five key elements: a) metacognitive skills, b) learning skills, c) thinking skills, d) knowledge skills, and e) motivation (Sternberg). Campione, Brown, and Borkowski's theory suggests that "information processing conceptions of intelligence focus on the ways individuals mentally represent and process information" and that mental processes are categorized by the different stages of operation required to complete different tasks (as cited in Sattler, 2001, p. 143). The Information-Processing Theory of Intelligence includes the concept that the dynamics of change in the learning process include continual processing by an individual of their personal abilities and processing style (Campione & Brown, 1987). In this context, information processing has been defined as the ability to monitor and evaluate one's progress during task completion (Brown, Bransford, Ferrara, & Campione, 1983). Other research defines human information processing as a measure of an individual's ability to improve performance through systematic learning (Campione & Brown, 1987). Along this same line, Borkowski, Day, Saenz, Dietmeyer, Estrada and Groteluschen (1992) described human information processing as the ability to selectively attend to materials and choose effective and efficient performance strategies. With this in

mind, one can see how information processing incorporates aspects of fluid intelligence with crystallized intelligence as individuals learn new information, problem solve, or even review and reprocess previously learned information.

When looking specifically at human information processing, Ramsey, Jansma, Jager, VanRaalten and Kahn (2004) addressed the neurophysiological factors involved in the capacity to address multiple tasks simultaneously. In assessing human data acquisition, they used functional neuroimaging to look at brain activity in the frontal and parietal lobes, as well as the visual cortex. This dual-task paradigm required participants to rapidly switch from one task to another. Study results indicated that an individual's successful attention to dual tasks required constant and ongoing attention to context and the rule sets associated with both tasks (Ramsey et al.). As a whole, the Ramsey study found that an increase in the number of simultaneous tasks being conducted could increase brain stimuli and influence how information is processed. The study also indicated that repetition of tasks increased familiarity and information processing became automated over time.

Ramsey et al. (2004) viewed the automatization of cognitive functions as a means to decrease brain activity, as well as to increase an individual's capacity to process additional information or perform additional tasks. While the principle finding of their study focused on individual differences in the transition from controlled to automated cognitive actions, they also noted that the degree to which a stimulus was decreased did not correlate with improvement of task performance (Ramsey et al.). This study suggested that the lack of improvement in task performance with decreased stimulus

illustrated that “neurophysiological trimming does not affect the ‘streamlining’ of stimulus-response mapping that follows practice” (p. 522). In a previous study, Strayer and Kramer (1990) felt that this same phenomenon was reflective of a shift from computational mapping, which follows practice, or retrieval from long-term memory. Prior to that, LaBerge and Samuels (1974) had viewed this same finding as an enhancement of communication within the same network of the brain. All three studies identified the need for future research.

In a broader study conducted by Haier, White, and Alkire (2003), which included right-handed male and female college students, the primary focus was to gain a better understanding of what underlies individual differences in *g* during non-reasoning tasks. The study included the use of PET imagery and both reasoning or problem solving and non-reasoning tasks. In looking at the physiological process of brain function during reasoning tasks in correlation to *g*, as opposed to psychometric assessment of *g*, study results indicated that individual differences in intelligence correlate to brain function. Furthermore, this process occurs even when the brain is engaged in non-reasoning tasks, suggesting that high and low *g* subjects may preferentially activate different neural circuits (Haier et al.). The researchers found both primary correlation findings and exploratory interaction correlation findings, as well as the limitation that PET allows only cumulative effects to be identified. This study provided a new dimension in understanding “how” individual differences in intelligence are exhibited (Haier et al.).

Spiegel (1999) also looked at information processing from a physiological perspective, defining a “state of mind” as “the total activations in the brain at a particular



moment in time” (p. 208). Building upon the concept that the mind’s central function is information processing, Spiegel described the activation of systems within the brain as being context sensitive and consisting of a) perceptual bias, b) emotional tone and regulation, c) memory processes, d) mental models, and e) behavioral response patterns. Discovering the elements of a person’s state of mind can be achieved by taking the time to understand the individual’s perceptual processes which are influenced by perceptions including, but not limited to, thoughts, memories, attitudes, beliefs, and desires (Spiegel). These perceptual processes influence neural activity within the brain and the lateral integration of activity includes the coordination of circuits at a similar level of complexity across sensory modalities. For example, vision, auditory and tactile perceptions are integrated to create a whole picture of an experience. Spiegel describes perceptual integration as a trajectory of developmental pathways toward resilience or vulnerability in cases of attachment.

Studies on brain function imaging have supported previous findings from split-brain studies (as cited in Spiegel, 1999) that information is perceived and processed within the right hemisphere. The right hemisphere does not use syllogistic logic to reach conclusions about cause-effect relationships like the left hemisphere of the brain does (Spiegel), but rather incorporates information from various components of experience, including spatial relationships and mental processes. The output from the right hemisphere is non-verbal, and is expressed through physical expressions such as pointing to an object, or through an artistic expression such as drawing. In contrast, processing of information in the left hemisphere appears to lack the contextual representation of the

right hemisphere, which results in an effort to create verbal output of the interpretation of what has been seen or heard (Spiegel). These words are made-up in an effort to describe the information received, but do not relate to the context of the story. By stating major and minor premises and using deduction to come to logical conclusions, the left hemisphere attempts to establish simple cause and effect relationships (Spiegel). Integration of the information from the left and right hemispheres provides the path for deductive explanations that are logical and incorporate a contextual understanding of a scene (Spiegel).

In a study on whether individuals who exhibit mental speed also score high on intelligence tests, it was found that speed is not a reliable means of delineating individual differences in functional models of cognitive processing (Rabbitt, 1996). What was identified was the need to compare speed and accuracy in high and low ability groups (Rabbitt). The author reported that individual differences are not reflective of speed of performance, but more of individual differences of efficiency of memory and learning (Rabbitt). The most significant finding of this study was that when assessing speed in task completion, it is not a global performance characteristic, but rather a measurable performance index (Rabbitt).

Another study on cognitive ability, speed of information processing and working memory was conducted by Fink and Neubauer (2005). This study took into consideration the differentiation between working memory and short-term memory in regard to *g*, reasoning, and problem solving, specifically looking at IQ and performance during cognitively demanding tasks in relation to time estimation (Fink & Neubauer). What Fink

and Neubauer found was that brighter individuals were likely to outperform less intelligent individuals in regard to both speed and working memory. This information would be particularly helpful in working with a less intelligent population, as it clearly identifies the need to provide a learning environment that allows additional time for reasoning and processing.

Hernstein et al.'s study (1986) was conducted over a full academic year and utilized pre and post-tests to assess fundamental cognitive skills on material not covered in the standard curriculum. Hernstein et al. found that students and teachers alike benefited from a learning environment that allowed intellectual exchange and activity between teachers and students. At the completion of the study, it was found that students who had experienced a more interactive learning environment exhibited higher levels of perceptual and verbal reasoning skills, reading comprehension, and use of verbal analogies.

Identifying differences in learning, Gitomer et al. studied different performance models, which included the speed in which individuals execute subprocesses, as well as organization and component processes. Their results found that once individuals experience initial encoding of information, their ability to increase speed of future processing of the information was influenced in part by whether they could assess if a correct alignment of information had been made (Gitomer et al.).

### *Fluid and Crystallized Intelligence*

In breaking down the components of intelligence, Cattell and Horn (1967) identified the concepts of fluid intelligence (*gf*) and crystallized intelligence (*gc*). Fluid

intelligence was defined as the broad ability exhibited in motor, sensory, and rote learning (Cattell & Horn). For example, a child's tasks that require solving conceptual, numerical, spatial, or complex problems requires (*gf*), or the ability to learn by mimicking or repetition (Cattell & Horn). Crystallized intelligence incorporates what is learned through practice and experience in (*gf*) with perceptual and motor skills, which in turn helps to develop abilities that are more complex and specialized (Cattell & Horn). An example would be a child's capacity to continue developing and improving their reading and writing skills as they progress through school.

In a 1990 study, Kyllonen and Christal found a high correlation between working memory and reasoning ability (.80 - .90), which led to their conclusion that "working memory capacity affects success across the various component stages of reasoning task" (p. 427). Along this same line was a 2004 study, which used a hierarchical model to predict *g* (Colom, Rebollo, Palacios, Juan-Espinosa, & Kyllonen). Colom et al., built upon the concept that working memory is comprised of the combined functions of attention and conscious rehearsal, along with the integration and manipulation of information. In their study, variables measured included *g*, which was reflective of the common variances of all tests of ability, *gc* and spatial/fluid intelligence (*gv/gf*), as well as psychometric speed (*gs*). Colom et al.'s study supported the earlier findings, with *g* predicting working memory (.94), followed by the quantitative factor (.84), processing speed (.72), and the verbal factor (.53).

The influence of experience, education, and individual differences all play a part in *gc*, and the study of crystallized intellectual ability has often been viewed as being

reflective of different aspects of verbal, concrete, and knowledge-based abilities as *gc* measures frequently outperform measures of fluid intelligence (Ackerman, Beier, & Bowen, 2000). This study specifically looked at the difference between cloze tests and completion tests as measures of *gc*. Ackerman et al. found completion tests to share more variance than the cloze tests with *gc*. It was also found that both tests suppressed the relationship between *gc* and age so that when the individual differences of the tests were accounted for, the positive association between *gc* and age was increased.

In looking at cognitive abilities, declarative knowledge, and *gc*, Reeve (2004) took into consideration concerns voiced in prior research and looked at the relationship between ability constructs and criterion constructs and whether latent components of criterion measures fully assess the involvement of narrow abilities. In investigating how *gf* shapes *gc*, it was found that only *g* was consistently related to the criteria after observed criterion scores were individually regressed according to abilities (Reeve). In discussing study outcomes, Reeve compared the concept of finding the relationship between narrow ability factors and knowledge factors to observable human work traits that either occur naturally or are contrived, noting that investigator perspective can influence direction of interpretation and study implications.

A 2004 study by Gignac built upon previous work by Gignac and Vernon (2002) and Gignac, Strough and Loukomitis (2004) studying the relationship between general openness to experience and *g* and residualized Vocabulary and Information scores from the Wechsler Adult Intelligence Scale (as cited in Gignac, 2004). Using  $n=128$ , a non-significant relationship (.11) was found between openness to experience and *g*, with no

statistically significant relationship between objective openness and *gc* being observed. It was noted that objective openness component scores, reflected in the verbal subtest residuals, correlated positively with *g* but not with *gc* (Gignac).

A 2002 study by Lam and Kirby studied how an individual's ability to perceive, understand, and regulate emotions is related to performance. They found that *g* made a significant contribution to the prediction of individual performance of a cognitive task. Variables that were measured included levels of emotional reasoning ability, *g*, and individual cognitive-based performance. Results of this study indicated that specific emotions experienced might cause problems for task performance, depending upon whether the emotions are perceived as enhancing or distracting. This is particularly useful when taking into consideration the importance of non-verbal skills when establishing an effective learning environment.

From a neurological perspective, a 2004 study by Liu, Sabbagh, Gehring and Wellman has been identified as the first to directly target the cortical activity associated with reasoning. Specifically, they studied "theory of mind" which was identified as being the capacity to reason in social interactions. This study monitored event-related brain function based upon the differences of judgments based on belief and those based on reality. What they found was that there is a "decoupling" mechanism that takes place in the left orbitofrontal cortex, which allows an individual with a healthy, fully developed frontal cortex to differentiate between beliefs and reality

Schulze, Beauducel and Brocke (2005) conducted a study on the influence of abstract and concrete reasoning on *gc* and *gf*. They purposefully looked at which aspects

of figural reasoning tasks tend to mark *gf* and found that the differences between *gf* and *gc* loadings were significant for abstract figural reasoning tasks but were not significant for concrete figural reasoning tasks. It was also found that when individuals were given additional knowledge in which to solve tasks, the difference between *gf* and *gc* figural loadings was reduced (Schulze et al.). It was the conclusion of the authors in this study that figural reasoning tasks do not measure *gf* exclusively, but that they also measure *gc* and are dependent upon the amount of knowledge required to accomplish the task (Schulze et al.).

In a replication study, Moutafi, Furnham, and Paltiel (2004) assessed conscientiousness, *gf* and *gc* to find whether their research supported earlier studies that reported a negative correlation between conscientiousness and *g*. The research results did find that abstract reasoning was significantly correlated with conscientiousness, and verbal reasoning was significantly correlated with neuroticism, agreeableness, and conscientiousness. A particular strength about this study was the statistical analysis, as the researchers went beyond the basic correlations and looked at the regressions and partial correlations. Using regression analysis, conscientiousness was found to be a significant predictor of abstract reasoning, and agreeableness was a significant predictor of verbal reasoning, but numerical reasoning was not significant. This study appeared to take previous research a step further, as well as paving the way for future research. From a practical standpoint, the results of this study could be beneficial in a clinical setting as it sheds light on why some clients may struggle between what they know intellectually and what they are feeling emotionally.

### *Variables Affecting Participation in Parenting Skills Programs*

Research on parenting programs addresses multiple participant issues, including participant age, gender, level of education, socio-economic status, and perceived barriers to participation. A review of literature in regard to variables specific to participation and completion of parenting programs was not fruitful; however, there is a plethora of articles that address these variables in other contexts.

A study conducted by Entwisle, Alexander, and Olson (2004) addressed the distinction between high school dropouts who return to complete their GED and those who do not and the events and experiences common to those populations. Of the individuals who did not ultimately complete their high school education, the need to work to help support their family was a common theme, as was the failure of competency tests, and negative attitudes of teachers toward students who work (Entwisle, Alexander, & Olson). The bigger picture for these individuals is the fact that, without formal education, they typically continue to work the same type of job throughout their lives, compromising their ability to provide financially for their families and limiting their exposure to more effective ways in which to communicate and interact with the people around them, including their known patterns of parenting and family interaction (Entwisle, Alexander, & Olson).

Supporting the concept that there is a relationship between academic achievement and personal financial stability, a study by Yang (2003) looked at the relationship between socioeconomic status (SES) and knowledge in the fields of math and science. Drawing participants from 17 countries and accounting for cultural variances, Yang



found that, as a whole, individuals who have an increased level of comprehension for math and science attain a higher SES than those who do not. In delineating between whether a higher SES provided the opportunity for greater exposure to the fields of math and science or whether increased knowledge in these areas provided the means of a higher SES, it appears that one supports the other in an ever increasing cycle (Yang, 2003), suggesting that academic achievement could be an indicator of how individuals receive and process information. Furthermore, understanding an individual's capacity to think in an abstract, spatial, novel or spontaneous manner could increase the potential for developing and implementing parenting program protocols tailored more effectively to meet a range of parenting needs.

A 1999 study by Kazdin and Wassell incorporated family demographics that included education and occupational attainment, family income, and receipt of public assistance. Also integrated were assessments of parent psychopathology and stress as well as child dysfunction. This study supported the authors' hypotheses that perceived barriers significantly predicted treatment outcome (Kazdin & Wassell). Additionally, the study revealed that even though socioeconomic disadvantage, parental psychotherapy and stress, or child dysfunction may influence treatment outcome, they are not predictive of perceived barriers (Kazdin & Wassell). Of particular note in Kazdin and Wassell's study was the finding that barriers to participation in treatment were significantly associated with therapeutic change, but were not explained by previously noted family, parent, or child predictors.

Based upon the concept that the quality of a home environment impacts a child's performance on intellectual/academic tasks and how they perceive and respond to social demands, McFarlane, Powell, and Dudgeon (2002) conducted a study on the difference between gender, IQ, and SES and the degree to which each variable influences the suggestibility of kindergarten age children. Using the Wechsler Preschool and Primary Scale of Intelligence Revised to assess IQ and The Video Suggestibility Scale for Children (VSSC) to measure suggestibility, the researchers found that when looking at individual differences, there was a significant negative relationship between SES and suggestibility ( $r = -.29, p < .01$ ) and age and suggestibility ( $r = -.23, p < .01$ ) (McFarlane et al.). IQ was the main predictor of suggestibility, even though it correlated moderately with SES ( $r = .40$ ). Children with higher IQ scores were less likely to acquiesce to questions with yes/no answers than children with lower IQ scores. Also of note is that in the population studied, children with higher SES were exposed to more educational and social opportunities than were the children with lower SES (McFarlane, Powel, & Dudgeon). From a longitudinal perspective, a study of this type is particularly helpful in understanding the generational cycle of individual perception of social demands. If a child grows up in an environment that does not encourage or support academics or offer opportunities for a global awareness and understanding of life events, that child has a significantly higher chance of growing up and repeating their parent's life choices. From the perspective of introducing this population to new parenting concepts, it becomes easier to understand their hesitancy to change and the high number of participants who do not complete parenting programs.

Research regarding the difference between gender in regard to intelligence and cognitive processing was telling, as studies argued both for and against the difference between genders. In an effort to replicate previous studies, Lynn and Irwing (2002) conducted a second study showing that males have a greater general knowledge than females (.46*d*), with males obtaining higher average means in the domains of literature, general science, games, and finance. In contrast, when looking at the degree and extent in which *gf* explains the difference between genders, it was found that there is no significant difference between *gf* and *g* ( $r = .23$ ) (Lynn & Irwing). In argument of the plethora of studies being conducted regarding gender differences is the argument that “differences” do not equal “deficiencies” (Halpern, 1997). When researching gender differences, Halpern stated it clearly when offering the perspective that

“...there are many cognitive areas in which the sexes, on average, differ, and many in which there are no differences. Conclusions about differences do not mean that there is a better or smarter sex. If society routinely values those traits associated with one sex more than those associated with the other sex, then the problem lies in the value hierarchies of the society, not in the fact that there are differences...” (p. 1092).

If one were to take the perspective offered above when considering the role of parenting, it becomes apparent that while mothers and fathers may hold different views regarding parenting, these views typically represent differences and not deficiencies. Keeping an awareness and clear perspective on group differences plays an important role in how these beliefs affect thoughts and behaviors that occur without conscious awareness, particularly when being cognizant of and understanding stereotypes and prejudices (Halpern, 1997). With this in mind, it is particularly important to examine materials used in educational settings for biases to gender, IQ, or SES (Halpern).

Areas studied in treatment interventions include barriers that hinder parents' successful completion of parenting programs (Spoth, Redmond, Hockaday, & Shin, 1996; Kazdin & Wassell, 1999; Lynch, 2003; Nordstrom, 2005). Parental attitudes and beliefs toward interventions have been found to play a significant role in successful parenting program completion (Spoth et al.). This research also supported previous findings that it is important to take into consideration an individual's perception of the intervention program as well as the attitudes and beliefs of other family members (Spoth et al.). Specifically, whether the individual was supported by others in their social circle or challenged to question interventions that contradicted their beliefs and attitudes. Key barriers identified in Spoth et al.'s study included scheduling conflicts and perception that participation would take too much of their family time. Spoth et al.'s study also found socioeconomic status to be inversely related to privacy issues, such as reluctance to be videotaped during assessments. Findings suggested greater concerns regarding privacy issues in lower SES families (Spoth et al.).

In a 2003 study by Lynch that assessed predictors of enrollment in parenting programs, intent was found to be the single predictor that accounted for significant variance in enrollment. This study found a positive correlation between intent to enroll and actual enrollment in the program,  $r = .35, p < .01$ . In contrast, it was also found that the odds ratio showed that for every one-unit increase in intent, the odds of enrolling in the parenting intervention decreased; a finding that was in contrast to previous literature reporting evidence indicating that inclination to enroll in parenting intervention significantly predicted recruitment (Spoth et al., 1996).

Parental cognitions and parent participation in preventive parent training programs were studied in 2005 by Nordstrom. It was found that parent perception of time barriers and program relevance was predictive of commitment to the parent training, but only perception of time barriers exclusively predicted program retention (Nordstrom). It was also found that even though attributes of the parent-child dyad accounted for a significant amount of unique variance in parenting program engagement and retention, variables such as child gender, disruptive behaviors, parent age, parent minority status, or home chaos were not predictive of parent participation (Nordstrom).

#### *Kaufman Brief Intelligence Test*

The Kaufman Brief Intelligence Test (K-BIT) was designed for use in making brief, individual assessments of intelligence and not as a replacement for comprehensive assessments such as the Wechsler series of scales or the Peabody Individual Achievement Test-Revised (Kaufman & Kaufman, 1990). The K-BIT is well normed and the standard scores use the same metric as many other intelligence and achievement tests, permitting direct comparisons (Kaufman & Kaufman, 1990; Naugle, Chelune, & Tucker, 1993; Wechsler, 1981). Kaufman and Kaufman described the nonverbal or reasoning portion of their assessment as resembling the Performance Scale of the Wechsler Adult Intelligence Test, which assesses planning and foresight, visual-spatial ability, and ability to learn rote tasks. A 1995 study by Prewett found the K-BIT to have a high correlation to the WISC-III ( $r_s = .78$ ) It offers an assessment of intelligence for a wide range of individuals (4-90 years) based upon the measurement of both verbal (crystallized) and nonverbal (fluid) abilities and can be administered by staff members who do not have strong psychometric

backgrounds (Kaufman & Kaufman). Within the K-BIT, vocabulary abilities are measured by assessing word-knowledge and verbal concept formation, whereas the matrices section assesses an individual's ability to perceive relationships and complete analogies (Kaufman & Kaufman).

Kaufman and Kaufman (1990) consider the vocabulary subtest of the K-BIT to be an assessment of intelligence rather than achievement, as the K-BIT range traverses from childhood to adulthood and is not used for categorizing an individual based upon their score. The matrices subtest assesses an individual's ability to respond to both meaningful and abstract stimuli (Kaufman & Kaufman), which requires the use of reasoning and is considered to be more "cultural-fair" as it is designed to take into consideration variables such as race differences in IQ scores, left versus right brain processing, and crystallized versus fluid intelligence (Raven, Court, & Raven, 1983).

#### *Parenting and Parent-Child Interaction Therapy*

Over the years studies have been conducted to identify different barriers that impact both parenting skills and programs designed to teach parenting skills (Spoth, Redmond, Hockaday, & Shin, 1996; Kazdin & Wassell, 1999; Lynch, 2003; Nordstrom, 2005). Common themes found across these studies include degree of social or family support, parent perception of program benefit, and loss of family time. Parent-Child Interaction Therapy addresses several of these barriers, as the therapy is based upon structured family time that optimally results in observable improvement in parent-child interactions and child behaviors (Eyberg & Boggs, 1998).

The PCIT protocol being used in this study combines traditional PCIT, in which parents are taught how to alter their children's behavior at home by establishing a secure, nurturing relationship with their child through the use of praise and age-appropriate discipline such as time-outs, (Eyberg & Boggs, 1998; Eyberg & Robinson, 1982) with Barkley's parent training model for older school-age children using the same principles, but with age-appropriate disciplines such as loss of privileges (1987). Both approaches were derived from Hanf's (1969) operant and social learning theory where parents first use differential social attention to follow their child's play in the first stage, then in the second stage direct their child's play using praise to reinforce compliance or time-out in response to non-compliance. PCIT was originally developed for use with children ages 2-7 years, whereas Barkley's program targeted children 8-12. Common elements across developmental/age groups include structured parent-child sessions, relationship enhancement, learning concrete behavioral discipline strategies, and *in vivo* coached rehearsal.

Previous studies using PCIT have been multifaceted and include one recent study with children with behavior disorders. The researchers suggest this study as being "the first step in identifying strategies to improve long-term outcomes" (Querido & Eyberg, 2005, p. 2). A second study with children experiencing separation anxiety disorder, found PCIT to be effective in reducing familial anxiety factors initially and at a 3-month follow-up (Choate, Pincus, & Eyberg, 2005). In a study where researchers worked with maltreated children in foster care, it was found that parenting barriers with foster parents

had to first be addressed before PCIT could be effectively used with foster children (Fricker-Elhai, Ruggiero, & Smith, 2005).

Research on the effectiveness of PCIT over time and across situations has identified that it is more effective for some populations than others (Hembree-Kigin & McNeil, 1995). For instance, Hembree-Kigin and McNeil found that families where there is marital discord, parents are actively abusing drugs, or where mothers are significantly depressed do not respond as well to PCIT. Families who complete PCIT and experience an improvement of interactions between parents and children also report clinically and statistically significant improvements in other areas of their life (Herschell, Calzada, Eyberg & McNeil, 2002). These areas include less personal distress for parents in regard to their child's behavior and an increased confidence in parenting skills, and improved classroom behaviors for the children. It was also noted that within PCIT families, there were improved behaviors of children who were not treated (Herschell et al.). One study conducted by Harwood and Eyberg (2004) found that therapists who used more facilitative statements than supportive or questioning statements during the assessment interview and the first child-directed interaction had significantly fewer (ES > .80) families drop out of therapy. A 2003 study examined the effects of father involvement on the outcome of parent-child interaction therapy (Bagner & Eyberg). In this particular study, it was found that families where fathers were involved in the lives of the children, maintained gains made in treatment; whereas families with absent fathers reported a significant decline 4 months following treatment (Bagner & Eyberg, 2003). In a longitudinal study of PCIT conducted by Boggs, Eyberg, Edwards, Rayfield, Jacobs



Bagner, and Hood (2004), families who had completed PCIT and an equal number of families who had dropped out prior to completion were studied. A key finding of the study was that 10 to 30 months following treatment, parents who completed PCIT reported a significant positive change in their child's disruptive behaviors and their own level of parenting stress (Boggs et al.). In between-group comparisons, it was found that mothers who had dropped out of treatment reported a higher level of parenting stress related to their child (Boggs et al.). Over twice as many children who dropped out of the study were reported by their parents to exhibit behaviors of oppositional defiant disorder (ODD) criteria than those who completed treatment. It was also found that of the children who had completed treatment, almost half no longer met criteria for attention deficit hyperactivity disorder (Boggs et al.). One follow-up study investigating the maintenance of prosocial behaviors was conducted in a school setting 12 and 18 months following treatment (Funderburk, Eyberg, Newcomb, McNeil, Hembree-Kigin, and Capage (1998). Using one treatment group and three control groups; it was found that at 12 months following treatment, student compliance and level of conduct behavior problems were very similar to posttreatment (Funderburk et al.). At 18 months following treatment, children who had completed PCIT continued to maintain significant improvement over pretreatment scores on compliance, but teacher ratings indicated a shift towards pretreatment scores on observational behaviors (Funderburk et al.).

Another study where parenting program outcomes were measured (Chaffin, Silovsky, Funderburk, Valle, Brestan, Balachova, et al., 2004) looked at recidivism of reported cases of child abuse. Parents were randomized to one of three parenting groups,

Standard PCIT, Enhanced PCIT, and the standard parenting class. Study findings indicated that 19% of participants participating in either PCIT group had a future physical abuse report within 850 days of program completion, compared to 49% of those who participated in the general condition (Chaffin et al.).

For the purpose of the AFF-III study, PCIT was adapted for use with children up to 12 years of age. Modifications to the treatment protocol were also made in light of the populations of parents who have previously been or are currently at risk of being physically abusive. The AFF-III PCIT program consists of two components: 1) the Relationship Enhancement Phase (7-9 sessions), which is designed to teach skills that enhance nurturing parent-child interactions, increase the parent's attention to positive aspects of their child, reduce anger in both the parent and the child, and increase warmth and attachment in the family, and 2) the Discipline Phase (7-9 sessions), which provides specific behavior management skills in handling children's misbehavior through non-physical, no-coercive methods.

#### *Rationale and Significance of Study*

The purpose of this study is to determine whether Matrices (reasoning) scores on the K-BIT are more predictive of successful parenting program outcomes in a learning environment than Vocabulary scores. Delineating which scores, Vocabulary or Matrices, on the K-BIT are more predictive of successful completion of the AFF-III study parenting program or other parenting classes is particularly important in assessing whether teaching styles should be adapted to better accommodate the verbal and

reasoning skills of program participants and may hold the potential for developing parenting programs that foster longer-term positive change in parenting practices.

### Chapter 3: Methodology

#### *Participants*

The population for this study will consist of parents receiving parenting classes at a community-based agency located in a south central metropolitan area. A convenience sample of parents participating in an ongoing research project, Alternatives for Families III, being conducted at the community agency will be used for this study. Participants will be both male and female and between the ages of 18 and 64. Each participant will be screened using the Kaufman Brief Intelligence Test (K-BIT) (Kaufman & Kaufman, 1990) and must attain a composite score of 65 or higher. The sample size of the present study will include 100 subjects.

#### *Instruments*

Basic demographic information including age, gender, ethnicity, and level of formal education will be obtained through the computer-based assessment conducted as part of the AFF-III study. Two quantitative instruments will be used for this study. The Kaufman Brief Intelligence Test (K-BIT) (Kaufman & Kaufman, 1990) and the Barriers to Participation Scale (BPS) developed by J. Dumas (personal communication, January 8, 2002) and based upon previous research (Kazdin, Holland, Crowley, & Breton, 1997; Prinz & Miller, 1994).

### *The Kaufman Brief Intelligence Test*

The Kaufman Brief Intelligence Test (K-BIT) (Kaufman & Kaufman, 1990) is a brief, individually administered measure of verbal and nonverbal intelligence. The K-BIT is designed for use when a brief measure of intelligence is sufficient. It is commonly used as a screening mechanism in educational and professional settings as a means of obtaining an estimate of intelligence. The K-BIT is comprised of two subtests, Vocabulary and Matrices.

The Vocabulary subtest is a 2-part, 82-item measure of verbal ability, which demands an oral response for each item. The Vocabulary subtest measures language development and verbal conceptualization. The K-BIT treats vocabulary as a measure of intelligence, rather than achievement: first, because use of the K-BIT extends from childhood through adulthood, use of the K-BIT excludes labeling and placement based on the IQ standard score.

The Matrices subtest is a 48-item nonverbal measure, which utilizes visual stimuli, both meaningful (identifiable objects) and abstract (designs and symbols). All items require understanding of relationships among the stimuli, and all are multiple-choice, requiring the person to identify the correct response either verbally or by pointing to the identified response. Abstract matrices were popularized by Raven (1956, 1960) as a method of assessing intelligence in a manner that was culturally more sensitive than other popular IQ tests at that time.

*Standardization.* A representative sample of 2,022 subjects, based upon the most recent census, from across the United States was tested at 60 sites nationwide.

Standardization included gender, geographic region, socioeconomic status, and ethnicity.

*Reliability.* Kaufman & Kaufman (1990) report using corrected split-half reliability coefficients to establish reliability for Vocabulary, Matrices, and the K-BIT IQ Composite for 14 different age groups. Values for Vocabulary subtest had exceptional reliability for adults ages 20-90 ( $M = .97$ ). For Matrices, the reliability value was excellent for adults ages 20-90 ( $M = .94$ ). For the Composite score, average reliabilities increased with age, and for adults 20-90 years of age the mean = .97.

*Validity.* The K-BIT corresponds closely to the major comprehensive intelligence tests (Kaufman & Kaufman, 1990). The K-BIT was designed so that there was a logical relationship between the abilities that it measured and the interpretive models that are fundamental to longer test batteries such as the Wechsler and Stanford-Binet measures of intelligence.

#### *Barriers to Participation Scale*

The Barriers to Participation Scale (BPS) was developed by J. Dumas (personal communication, January 8, 2002) and based upon previous research (Kazdin, Holland, Crowley, & Breton, 1997; Prinz & Miller, 1994). The scale measures factors that are likely to facilitate/hinder parental involvement in a parenting training program along five dimensions: stressors and obstacles (e.g., lack of time), intervention demands (e.g., too many sessions), perceived relevance (e.g., lack of interest to participate), interventionist (e.g., supportiveness), and critical events (e.g., alcohol or drug problems in family).

Response options for each of the questions are: 1 = Definitely Yes, 2 = Probably Yes, 3 = Probably No, and 4 = Definitely No. Questions are worded so that the higher the number of the response (1 – 4), the fewer perceived barriers to participation being reported by the individual. There are six subscales within the BPS scale: (a) total barriers to participation (with no spouse items), (b) personal or family stressors and obstacles, (c) intervention relevance and trust of organization, (d) intervention demands and program atmosphere, (e) time and scheduling demands, and (f) spouse items.

The Barriers to Participation Scale will be administered at the pre-intervention assessment to assess participants' perceptions of how the various barriers may interfere with future participation in the parenting program. A revised version of the scale (worded for post-treatment) will be administered at the third assessment point (6 months) to assess participants' perception of whether or not the barriers actually interfered with participation. Results from both assessments will be used to calculate any change in participant report of barriers to parenting program participation. Scores on Items 1-7, 9-11, 13, 14, 16-18, 19, 21, 22, 24, 27, 30, 31, 34-36 will be summed to yield the Total barriers to participation score (Kazdin et al., 1997). Total barriers to participation scores for both the pre-test and the post-test will be calculated, then the change score between the pre and post administration of the questionnaire will be determined. A positive change score from the first administration of the BPS to the second will represent a decrease in reported barriers to participation, and a negative change score from the first administration to the second will represent an increase in reported barriers to participation.

### *Procedures*

Relationships among select demographic variables (age, gender, ethnicity, and level of education) will be studied in conjunction with K-BIT subtest scores (Matrices and Vocabulary), type of parenting program (PCIT or regular parenting class), and barriers to participation will be examined as potential predictors of parenting program outcomes in a learning environment. Parenting program outcomes will include completion of the program and change in report of barriers to participation during the training program. Parenting program outcomes will include successful completion of the program. Successful completion of the parenting program will include the participant meeting all parenting class requirements for attendance and therapist observation of comprehension based upon group participation. Participants will be considered as non completers under the following circumstances: (a) participant voluntarily withdrawing from the research study, (b) the participant being involuntarily withdrawn because parental rights were terminated, (c) parent no longer has access to the child(ren), or (d) participant has moved out of the area without withdrawing from the study.

Threats to the internal validity of this study include the selection of study participants, as all participants will be clients of one specific community agency that provides parenting classes. In order to minimize the effects of the limited study population, this study will include both self-referred and court-referred clients. Additionally, instrumentation could weaken the internal validity of this study, as only one instrument is being used to assess verbal and reasoning skills. To maximize the generalizeability of the study findings, triangulation of participant self report

(demographics), differentiation of K-BIT scores, and change in participant report of barriers to participation between the pre and post assessment of the BPS will be used in the interpretation of study outcome.

#### *AFF-III Parenting Program Protocol*

The Alternatives for Families III (AFF-III) research study was approved by the Centers for Disease Control Institutional Review Board and the University of Oklahoma Health Sciences Center Institutional Review Board. As principle investigator of the AFF-III study, Dr. Mark Chaffin has granted access to the data from the AFF-III study for the purpose of this study. AFF-III participants sign informed consents that give permission for their information to be used in external studies. The researcher will use data collected as part of the AFF-III study. Data will include demographic information, verbal and matrices scores of the Kaufman Brief Intelligence Test, and a change in participant scores on the Barriers to Participation Scale. Prior to reviewing data, the researcher will ascertain that all data has been deidentified to protect the confidentiality of study participants.

#### *Current Study Protocol*

Study participants will be screened using the K-BIT (Kaufman & Kaufman, 1990) and must receive a composite score of 65 or higher to participate. A participant is considered to have successfully completed the AFF-III study once their agency therapist has documented that they have been randomized to and completed one of the two six-week orientations (Starting Point or Self-Motivation); then re-randomized and completed



one of the sixteen-eighteen week parenting classes (PCIT or the regular agency parenting class).

The Starting Point class consists of teaching parents to be aware of how significant life events affect their current parenting style and then guides them through goal setting so that they can meet the requirements of their court ordered treatment plan. The focus of the Self-Motivation classes is to work with parents to develop an internal locus of control so that they can become more self-directive in their decision-making skills. PCIT consists of didactic training, first between the parent and therapist then the parent and child. It is a hands-on training where mastery is attained through parents interacting with their child(ren) under the supervision of a therapist. In contrast, the regular parenting program taught by the agency is a manualized form of therapy utilized by the agency in which the parents read material and receive lectures on appropriate parenting skills. Satisfactory course completion is comprised of attendance and participation in class discussion as well as integration and modeling of information and techniques learned.

#### *Data Analysis*

Demographic data for participants will be analyzed using measures of central tendency. Descriptive statistics will be presented for all participant characteristics (e.g., age).

Discriminate Functional Analysis will be used to examine whether K-BIT subscales scores (Matrices and Vocabulary) or the total barriers to participation change score are predictive of parenting program completion outcomes (PCIT or regular

parenting class). Chi square analysis and t-tests will be conducted on selected demographic variables to examine whether there are any significant differences between groups in regard to parenting program completion outcomes.

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