

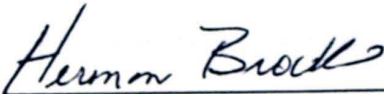
A COMPARISON OF KAUFMAN ADOLESCENT AND ADULT  
INTELLIGENCE TEST (KAIT) PROFILES OF TYPICAL COLLEGE  
UNDERGRADUATES AND COLLEGE STUDENTS WITH  
LEARNING DIFFICULTIES

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To the Graduate Council:

I am submitting herewith a thesis written by Jennifer Ann Etnyre entitled "A Comparison of Kaufman Adolescent and Adult Intelligence Test (KAIT) Profiles of Typical College Undergraduates and College Students with Learning Difficulties." I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Psychology.

  
Herman Brock, Ph.D., Major Professor

We have read this thesis and  
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INTELLIGENCE TEST (KAIT) PROFILES OF TYPICAL COLLEGE  
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A Thesis

Presented for the

Master of Arts Degree

Austin Peay State University

Jennifer Ann Etnyre

May 1995



## DEDICATION

This thesis is dedicated to my husband

Andrew, and son, Michael.

Thank you for encouraging me to finish.

## ACKNOWLEDGMENTS

I would like to thank my major professor, Dr. Herman Brock, for his guidance and patience over the past three years. I would also like to thank the other committee members, Dr. Garland Blair and Dr. Carlette Hardin, for their assistance over the past year. I would also like to thank my husband, Andrew, for his patience and understanding. I would like to thank my parents, Don and Marilyn Efinger, for supporting the decisions I make and for giving me the opportunity to receive an education. Finally, I would like to thank my grandparents, Don and Nancy Efinger, for stressing the importance of education.

## ABSTRACT

One purpose of this study was to investigate the theory of dual intelligence, crystallized and fluid, as postulated by Horn and Cattell and utilized in the development of the KAIT by Kaufman and Kaufman. Examination of 90 college students (39 SWOLD, 25 DS1, and 26 DS2) volunteers from undergraduate psychology classes at a small university in middle Tennessee confirmed the two factor theory of Fluid and Crystallized intelligence. Further examination revealed significant differences between students who were required to complete three or more developmental classes (DS2) and those who took two or less (DS1) and those without identified learning difficulties (SWOLD), with the DS2 group showing lowered abilities in areas representing prior learning from formal education and requiring more culture-free abilities, less representative of formal education experiences. Subtest analysis further revealed marked differences in how the DS2 group and the DS1 and SWOLD process and integrate information, not necessarily just "underprepared" students as pointed out by some who address the issues of developmental studies in higher education. This assumption should be further explored in other studies as these students who enroll in developmental studies with learning difficulties or learning disabilities constitute one of the fastest growing groups in higher education.



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## CHAPTER 1

### LITERATURE REVIEW

Institutions of higher education have realized a rapid increase in the enrollment of adult students with learning difficulties and learning disabilities (Higbee, et al., 1991; McGuire, Hall & Litt, 1991). In 1982 it was estimated that approximately 67% of high school students with learning disabilities planned to attend college (White, et al., 1982). A similar trend has evolved with students who are described as "underprepared" to successfully complete the traditional college curriculum. The underprepared young adults, with learning difficulties and/or learning disabilities, constitute possibly the fastest growing group of students in higher education (Astin, 1984).

The National Center for Education Statistics (1985) revealed approximately twenty percent of college freshmen were enrolled in one or more [developmental] courses designed to assist the adult learner in acquiring academic skills necessary to succeed in higher education. These young adult students were presented as complex individuals and cannot be easily categorized (Higbee et al., 1991).

To assist institutions of higher education in assessing the abilities of underprepared students, it is important to determine whether intra-individual differences exist between typical college students and students who are identified as underprepared for college academics. These intra-individual differences can be examined through measures of intelligence has been done with students with learning disabilities (Salvia, et al., 1988).

Whimbey (cited by Boylan, 1983) postulated that the concept referred to as intelligence represents a "series of reasoning and critical thinking (p. 5). Whimbey's findings indicated that "these skills can be taught to any learner and that training in such

skills can lead to a substantial improvement in students' capacities to perform well academically" (p. 5).

Kaufman and Kaufman (1993) indicated that assessment of "adult intelligence should reflect a relatively broad spectrum of both fluid and crystallized abilities, since both are important...". Kaufman and Kaufman (1993) advanced two types of general intelligence, which they characterize as crystallized and fluid intelligence. These two types of intelligence were formulated by Cattell (1941) and advanced by Horn and Cattell (1966). Crystallized intelligence (Gc) and fluid intelligence (Gf) continue to represent these two different types of intelligence (Kaufman and Kaufman, 1993).

Crystallized intelligence, according to Sattler (1992) refers to acquired skills and knowledge that are strongly dependent for their development on cultural assimilation highly influenced by formal and informal educational factors. Conversely, fluid intelligence, according to Sattler (1992) refers to essentially nonverbal, relatively culture-free mental efficiency.

The theory of crystallized and fluid intelligence was formulated by Cattell (1941). Some twenty years later Horn contributed to the theory to confirm the two types of intelligence (Horn and Cattell, 1966). Crystallized intelligence, according to Horn and Cattell (1966) involves "high-level skills like abstract reasoning, concept formation, and perceiving relationships." They indicate this type of intelligence may in fact be dependent on fluid intelligence. Crystallized intelligence, unlike fluid intelligence, relates to "...advanced education and acculturation..." Fluid intelligence is "the ability to solve new problems..., that are not made easier by extended education or intensive acculturation," as

cited in Kaufman and Kaufman (1993, p. 11). Thus, young adults who are identified as underprepared for college academics should show intra-individual differences. This assumption is supported by Kaufman and Kaufman (1993) in a preliminary finding where as a sample of adolescents who were identified as reading disabled, scored significantly higher on the Fluid Scale than the Crystallized Scale. This preliminary study reveals a discrepancy between how these individuals process and utilize information.

There is an absence of studies involving intra-individual differences in college adult underprepared students. However, previous studies have compared Wechsler Adult Intelligence Scale-Revised (WAIS-R) profiles of nondisabled college students and college students with learning disabilities to determine if significant differences exist. Morris and Levenberger (1990) found that these two groups, consisting of 74 students identified as learning disabled and 37 students without an identified learning disability, did not differ significantly in their levels of performance. They did find that learning disabled students were more likely to display a Verbal-Performance split of ten points or greater, more often with a higher Performance score. This finding is consistent with the reading disabled group according to Kaufman and Kaufman (1993). When nondisabled students showed a Verbal-Performance split, the tendency was toward higher Verbal scores. No significant differences were found for Verbal-Performance splits between such groups.

In 1988, Salvia et al., also reported that overall the learning disabled students did not display significantly greater Verbal-Performance splits than the nondisabled college students. Learning disabled students were found to exhibit a more variable range of scores on verbal subtests, performance subtests, or all subtests than the nondisabled



students. A third study, comprised of 57 learning disabled college students and 17 nondisabled college students, found that the two groups displayed significant differences in five subtests (Information, Similarities, Vocabulary, Digit Span, and Digit Symbol) of the Wechsler Adult Intelligence Scale (WAIS) (Cordoni, et al., 1981).

Other studies have compared Wechsler Intelligence Scale for Children-Revised (WISC-R) and the Kaufman Assessment Battery for Children (K-ABC) profiles of learning disabled students. No significant differences were found between the WISC-R, Full Scale IQ, and the K-ABC Mental Processing Composite for learning disabled children, or nondisabled children (Naglieri, 1985). The mean Verbal-Performance split on the WISC-R was not significantly higher for either the learning disabled or the nondisabled students compared to the normative group. Similar results were found for the Simultaneous-Sequential split on the K-ABC and the Mental Processing-Achievement split on the K-ABC (Naglieri, 1985). Fourqurean (1987) administered the WISC-R and K-ABC to 42 Latino learning disabled children with limited proficiency in English and found the WISC-R Full Scale IQ to be significantly lower than the Mental Processing Composite on the K-ABC. The results from the previous studies, with the exception of Fourqurean's study, appear to be inconclusive as nondisabled and learning disabled students exhibit a variety of test score profiles.

Students who do not yet have the academic skills necessary to do college level work make up one of the largest and fastest growing groups of college students. Students who are not sufficiently prepared for college work can be found in almost any college setting. These students may be underprepared for a variety of reasons. Some of these

students may never have planned on attending college, therefore, they did not take college preparatory classes. Some students may not have graduated from high school but received a high school equivalency diploma instead. Other reasons that may lead to being underprepared may include low motivation, a weak high school academic program not aimed towards those planning on continuing their education, or older students returning to school after many years away (Higbee, et al., 1991).

Many studies have been conducted to determine the number of students who receive some type of special instruction (e.g., developmental studies) at the college level. Gross (1978) found that 90% of City University of New York freshmen were enrolled in special writing classes. In 1985, Austin reported that 50% of first time college freshmen at the University of California-Los Angeles were in need of remedial classes in both mathematics and English. Ten years ago it was estimated that 20% of college freshmen were required to complete at least one developmental studies class (National Center for Education Statistics, 1985). In 1987, Abraham reported on the data gathered by the Southern Regional Education Board. The research revealed that approximately 30% of two- and four-year colleges and universities required developmental studies classes to be taken by an estimated 50% of freshmen. The study also found that 82% of all colleges and universities offer one or more developmental classes. This number increased to 94% when only students from public schools are considered. Developmental study classes of some type are necessary at the college level because underprepared students who are in the most need of help are the least likely to voluntarily seek the help they need (Higbee et al., 1991).

The Kaufman Adolescent and Adult Intelligence Test (KAIT) may offer a new perspective to the study of intra-individual differences displayed by students with learning difficulties. The KAIT, developed for people ages 11 to over 85, is an individual measure of general intelligence (Kaufman and Kaufman, 1993). The KAIT produces three intelligence scales: Crystallized Intelligence, Fluid Intelligence, and a Composite Intelligence Scale. The Crystallized Intelligence Scale assesses acquired concepts which rely on schooling and acculturation. The Fluid Intelligence Scale measures the ability to solve problems, both verbal and nonverbal, that have not previously been encountered and are not simplified by school experiences. The Composite Intelligence Scale is a combination of the crystallized and fluid Scales and is used when there is not a significant difference between the two scales. Initial findings, which compared reading disabled adolescents to a matched control group, showed that the two groups did not differ significantly on any KAIT subtest scaled scores. However, the sample with learning difficulties (e.g., reading disabilities) did have a significant fluid-crystallized difference, with the Fluid Scale score of 7.7 points better than the Crystallized Scale score. This study also found that the reading disabled group had a significantly higher delayed recall versus immediate recall than the control sample (Kaufman and Kaufman, 1993).

The Fluid Scale measures many different abilities including abstract reasoning, nonverbal concept formation, long-term memory, verbal comprehension, and perceptual organization. The stimuli used to measure fluid intelligence varies including: symbols, spoken words, abstract designs, pictures, letters, and numbers. On most subtests, subjects are required to use more than one type of stimuli in order to successfully solve the



problem being presented. The Crystallized Scale measures problem solving, conceptualization, reasoning, verbal comprehension, and expression. The skills assessed focus on verbal concepts that are presented in everyday situations, functional skills (e.g., understanding newscasts) and alertness of auditory and visual situations (Kaufman and Kaufman, 1993).

One purpose of this study was to investigate the intra-individual differences of crystallized and fluid intelligence as measured by the KAIT for college students without identified learning difficulties and college students with learning difficulties (developmental studies students). Secondly, the study attempted to analyze the factor structure of the KAIT for college students without identified learning difficulties and college students with learning difficulties.

### Definition of Terms

Crystallized Intelligence: a scale score which represents acquired skills and knowledge highly influenced by formal and informal education.

Fluid Intelligence: a scale score which represents the ability to solve new problems less influenced by formal education.

Underprepared: students enrolled in college who are not sufficiently prepared for college studies.

SWOLD: represents college undergraduate volunteers who participated in the study, with no identified learning disabilities nor have they participated in any developmental studies in college.

DS1: represents college undergraduate volunteers who participated in the study, who have enrolled in one or two developmental studies courses.

DS2: represents college undergraduate volunteers who participated in the study, who have enrolled in three or more developmental studies courses.

## CHAPTER 2

### METHODOLOGY

#### Subjects

The subjects consisted of 90 students, between the ages of 18-1 and 45-5 years with a mean age of 24-8 years, attending Austin Peay State University. The subjects were volunteers enrolled in Educational Psychology, Psychology of Adjustment, or developmental study skills courses.

The subjects were divided into three samples: (a) students without learning difficulties (SWOLD), (b) students who currently or previously have been enrolled in one or two developmental studies classes (DS1), and (c) students who currently or previously have been enrolled in three or more developmental studies class (DS2).

#### Instrument

The KAIT is an individual measure of intelligence for people ages 11 to over 85. The KAIT's three intelligence scales (Fluid, Crystallized, and Composite) each have a mean of 100 and a standard deviation of 15. The Crystallized Scale is composed of Definitions, Auditory Comprehension, Double Meanings, and Famous Faces (as an alternate). This scale measures concepts which rely on activities taught in school. The Fluid Scale is comprised of Rebus Learning, Mystery Codes, Logical Steps, and Memory for Block Design (as an alternate). The Fluid Scale focuses on decision making and solving problems which have not previously been presented. The Composite Intelligence Scale is made up of three Crystallized and three Fluid Scales and was intended to describe intelligence of people who perform alike on the Crystallized and Fluid Scales. An Expanded Battery is also available which includes, in addition to the Crystallized and Fluid

Scales, two subtests of delayed recall, measuring retention of information presented earlier in the administration of the KAIT. Each of the ten subtests have a mean of 10 and a standard deviation of 3.

### Procedure

The Kaufman Adolescent and Adult Intelligence Test (KAIT) was individually administered to each student by a female third year graduate student in School Psychology. Each test was conducted in a single session which lasted approximately one and a half to two hours to complete. The steps to protect the subjects anonymity were also explained to each subject before the test was administered. A coding system, rather than the subjects name, was used to prevent the examiner from knowing to which group each subject was assigned to. Each test was administered and scored in accordance with set procedures. The Expanded Battery was administered to all students. The testing was completed in a six-week period.

### Design

A factor analysis was performed to analyze the factor structure of the KAIT. An analysis of variance was performed on the scale scores of the KAIT. The three groups serves an independent variables and the KAIT Fluid, Crystallized, and Composite scores served as the dependent measures. An analysis of variance was also conducted using the three groups as independent variables and the KAIT subtest scores as the dependent measures. The significance level of .05 was utilized with both statistical procedures involving analysis of variance.



## CHAPTER 3

### RESULTS

An analysis of variance (ANOVA) was performed with the three groups serving as the independent variables while the Crystallized, Fluid, and Composite intelligence scales of the Kaufman Adolescent and Adult Intelligence Test (KAIT) served as the dependent variables. An analysis of variance (ANOVA) was computed with the three groups serving as the independent variables while the KAIT subtests served as the dependent variables.

The KAIT scale score means and standard deviations for the typical college undergraduates, without learning difficulties (SWOLD), developmental studies group one (DS1) and developmental studies group two (DS2) are listed in Table 1. KAIT Standard Scale Scores for the three groups (SWOLD, DS1, and DS2) are presented in Figure 1.

The scale score means and standard deviations for the three groups (SWOLD, DS1 and DS2) on KAIT subtests are listed in Table 2. The KAIT subtest correlations are presented in Table 3. Factor Analysis results for the KAIT subtests are presented in Table 4.

Table 1

Scaled Score Means and Standard Deviations (SD) For KAIT Scales

	SWOLD (n=39)		DS1 (n=25)		DS2 (n=26)	
	mean	SD	mean	SD	mean	SD
Composite Scale	104.56	10.33	102.76	7.12	91.04	7.91
Crystallized Scale	103.05	9.17	100.40	9.10	92.81	7.26
Fluid Scale	104.95	11.57	104.92	9.00	90.00	9.94



Table 2

Scaled Means and Standard Deviations (SD) For KAIT Subtest Scores by Group

	SWOLD (n=39)		DS1 (n=25)		DS2 (n=26)	
	mean	SD	mean	SD	mean	SD
Definitions	11.08	2.58	10.68	2.46	8.27	1.26
Rebus Learning	11.60	2.69	11.56	1.65	8.00	2.60
Logical Steps	10.18	2.85	9.32	2.56	7.54	2.24
Auditory Comprehension	10.77	2.03	9.44	2.16	9.00	2.51
Mystery Codes	11.64	2.11	11.21	3.31	8.96	2.16
Double Meanings	10.69	1.74	10.68	2.03	9.00	2.06
Rebus Delayed Recall	12.12	1.80	11.64	2.73	8.15	3.09
Auditory Delayed Recall	11.08	3.32	10.08	2.73	8.81	2.63
Memory for Block Design	8.53	3.01	9.00	2.67	7.12	2.79
Famous Faces	10.21	3.42	10.12	2.34	9.12	2.59

Table 3

Intercorrelations of KAIT Subtest Scaled Scores

	DEF	RL	LS	AC	MC	DM	RDR	ADR	MBD	FF
Definitions (DEF)		66	35	54	34	59	62	47	38	51
Rebus Learning (RL)			52	43	45	56	87	37	47	31
Logical Steps (LS)				33	59	33	43	35	40	14
Auditory Comprehension (AC)					24	51	37	65	23	54
Mystery Codes (MC)						29	43	39	46	10
Double Meanings (DM)							52	41	38	46
Rebus Delayed Recall (RD)								38	44	29
Auditory Delayed Recall (ADR)									24	60
Memory for Block Design (M)										13
Famous Faces (FF)										

Decimal points have been omitted

Table 4

Factor Loadings for the KAIT Subtest Scaled Scores

Variables	Varimax		Promax	
	I	II	I	II
Famous Faces	86		86	
Auditory Comprehension	80		84	
Auditory Delayed Recall	76		82	
Definitions	66		72	
Double Meanings	62		66	
Rebus Learning		77		87
Mystery Codes		76		75
Logical Steps		74		75
Rebus Delayed Recall		73		82
Memory for Black Designs		71		69

Decimals points have been omitted

One purpose of this study was to identify differences which exist between SWOLD, DS1, and DS2 on the KAIT major scales (e.g., Composite, Crystallized, and Fluid). An ANOVA revealed a significant difference to exist for groups on the Composite scale of the KAIT (DS2 M=91.04, SWOLD M=104.56, DS1 M=102.76),  $F(2,87)=19.05$ ,  $p<.05$ . A significant difference between groups existed for Crystallized Intelligence on the KAIT (DS2 M=92.81, SWOLD M=103.05, DS1 M=100.40),  $F(2,87)=10.84$ ,  $p<.05$ . A significant difference between groups existed for Fluid Intelligence on the KAIT (DS2 M=90.00, SWOLD M=104.95, DS1 M=104.92),  $f(2,87)=18.28$ ,  $p<.05$ . No significant differences were found between SWOLD and DS1 for the three scales on the KAIT.



A significant difference exists between the groups on the KAIT subtest, Definitions (DS2 M=8.27, SWOLD M=11.08, DS1 M=10.68),  $F(2,87)=12.77$ ,  $p<.05$ . A significant difference exists between groups on the KAIT subtest, Rebus Learning (DS2 M=8.00, SWOLD M=11.60, DS1 M=11.56),  $F(2,87)=19.74$ ,  $p<.05$ . A significant difference exists between the groups on the KAIT subtest, Logical Steps (DS2 M=7.54, SWOLD M=10.18, DS1 M=9.32),  $F(2,87)=7.79$ ,  $p<.05$ . A significant difference exists between the groups on the KAIT subtests, Mystery Codes (DS2 M=8.96, SWOLD M=11.64, DS1 M=11.21),  $F(2,87)=7.28$ ,  $p<.05$ . A significant difference exists between groups on the KAIT subtest, Rebus Delayed Recall (DS2 M=8.15, SWOLD M=12.12, DS1 M=11.64),  $F(2,87)=17.73$ ,  $p<.05$ . A significant difference exists between groups on the KAIT subtest, Auditory Comprehension (DS2 M=9.00, SWOLD M=10.77),  $f(2,87)=5.50$ ,  $p<.05$ . A significant difference exists between groups on the KAIT subtest, Auditory Delayed Recall (DS2 M=8.81, SWOLD M=11.08),  $F(2,87)=4.39$ ,  $p<.05$ . No significant differences were observed between groups on the KAIT subtests, Memory for Block Designs and Famous Faces.

The KAIT scaled scores from the ten subtests were factor analyzed using varimax rotation. The analysis revealed two consistent factors. Factor one loaded on Definitions, Auditory Comprehension, Double Meanings, Auditory Delayed Recall, and Famous Faces with factor loadings ranging from .62 to a high of .86. This reflects a factor consistent with the organization of the subtests into the crystallized scale of intelligence.

The second factor on the KAIT is consistent with the Fluid Scale. Factor loadings were on subtests Rebus Learning, Logical Steps, Mystery Codes, and Memory for Block

Designs. Factor loadings ranged from .71 to .77. This reflects a factor consistent with the organization of the subtests into the Fluid Scale of intelligence.

The KAIT scores from the ten subtests were factor analyzed using Promax rotation. The analysis revealed two consistent factors. Factor one loaded on Definitions, Auditory Comprehension, Double Meaning, Auditory Delayed Recall, and Famous Faces, with factor loadings ranging from .66 to .86. This factor is consistent with the organization of the subtests into the crystallized scale of intelligence.

The second factor on the KAIT is consistent with the organization of the subtests into the Fluid Scale of Intelligence as set forth by the authors of KAIT. Factor loadings were on subtests Rebus Learning, Logical Steps, Mystery Codes, and Memory for Block Designs. Factor loadings ranged from .69 to .87.



## CHAPTER 4

### DISCUSSION

The results of the study revealed significant differences between college students with no identified learning difficulties or those who participated in developmental studies for fewer than three developmental courses and students who were required to enroll in three or more developmental classes. The results indicated the students who participate in three or more developmental studies score significantly lower on the Composite, Crystallized, and Fluid scales on the Kaufman Adolescent and Adult Intelligence Scale (KAIT). The results of this analysis may lead to the following conclusions: (a) students who require three or more developmental classes (DS2) are distinctly different in their level of intelligence than the other two groups, (b) the DS2 groups has equally delayed crystallized and fluid levels of intelligence whereas SWOLD and DS1 have average crystallized and fluid intellectual scores. The results of the present study should be reviewed carefully since the sample size of 89 students is limited to volunteers from one university program in middle Tennessee.

One of the possible conclusions which may be considered as a result of this research is the prospect that students who are identified and required to take three or more developmental classes (DS2) are quite different in their abilities than are the other two groups (SWOLD,DS1). The delay in intellectual abilities is not limited to crystallized intelligence which reflects previous learning and formal education, but in various fluid intelligence which involves tasks that are less related to formal education. One conclusion that should be considered is the DS2 group have more limited abilities overall in which they can draw from to address educational requirements and other aspects of life. Thus,

one may conclude that DS1 as a group does not differ significantly from SWOLD in regard to general intellectual skills, yet does differ from the SWOLD group in academic achievement. The DS1 group may more clearly represent the group identified by Higbee et al., 1991 as underprepared for the college curriculum. The group DS2, however, appears to have more significant limitations and resembles some of the learning disabled groups which show delays in general cognitive skills.

Further analysis revealed significant differences between the SWOLD and DS1 group and the DS2 group in several subscale scores. The DS2 group scored significantly low on the subtest, Definitions, which reflects limited word knowledge when presented as a closure technique. Also, the DS2 group scored significantly low in Double Meanings. This subtest requires the individual to review two sets of word clues and then respond with a single answer that represents the two different meanings. Both of these subtests reflect limits in acquisition of verbal language comprehension skills.

In the fluid area, significant differences were observed between groups SWOLD and DS1 and the DS2 group on subtests Rebus Learning, Logical Steps, and Mystery Codes. The group DS2 was delayed in acquiring meaning from visual symbols that could be used to communicate. Likewise, DS2 failed to grasp a task that required the individual to study pictorial stimuli and then determine the code for the novel task while using deductive reasoning. The subtest, Logical Steps, presented difficulty for DS2 as they were unable to benefit from logical premises presented both visually and aurally, and then solving a problem using the logical premises.

Group DS2 differed significantly from SWOLD on the subtests, Auditory

Comprehension and Auditory Delayed Recall. However, DS1 group did not differ significantly from SWOLD or DS2 on these tasks. The group DS2 scored significantly lower on the subscales that require both immediate and delayed recall for information presented orally. The conclusion that can be drawn is that group DS2 is delayed on immediate and delayed measures of what Kaufman and Kaufman (1993) described as "old learning". This denotes, according to Kaufman and Kaufman (1993) difficulty in auditory processing associated with lengthy information messages. This may help to account for why DS2 students, as a group, require the additional remediation upon entrance into college.

An intercorrelation matrix was obtained from the ten KAIT subtests. The correlations were presented in Table 3. The ten KAIT subtest scaled scores were subjected to factor analysis followed by varimax and promax rotation. Factor scores emerged from both varimax and promax techniques, suggesting stability across rotational techniques. The factor scores were presented in Table 4.

Two factor solutions were clearly the best choice for both techniques, and the factors were easily recognized as crystallized and fluid dimensions. The crystallized subtests each loaded above .62 on the crystallized factor, and the fluid subtests each loaded above .68 on the fluid factor. The analyses indicated that only two meaningful factors emerged from the data obtained from the SWOLD, DS1, and DS2 groups, and that these factors are consistent with the factors designated by the authors of the KAIT with the standardization sample and clinical samples (Kaufman and Kaufman, 1993). This finding is in keeping with the theoretical basis of the KAIT and supports the theoretical



assumptions put forth by Horn and Cattell (1966).

Factor one was composed of crystallized Intelligence which reflect general knowledge, verbal comprehension, and the ability to evaluate one's past experiences (Kaufman and Kaufman, 1993). High loadings were reported from all five contributors (Definitions, Auditory Comprehension, Double Meanings, Auditory Delayed Recall, and Famous Faces).

The second factor was comparable to fluid intelligence as proposed by Horn and Cattell (1966) and Kaufman and Kaufman (1993) with the KAIT. High loadings were reported from all five contributors (Rebus Learning, Logical Steps, Mystery Codes, Rebus Delayed Recall, and Memory for Block Designs). Their subtests measured such skills as inductive reasoning, deductive reasoning, concept formation, and understanding of figural relations. Kaufman and Kaufman (1993) considered, "flexibility, analytic ability, and adaptability when faced with novel problem solving situations closely related to the ability to succeed on fluid intelligence tests" (p. 1).

These factorial results support the construct validity of the KAIT as postulated by Horn and Cattell (1966) and proposed with the KAIT by Kaufman and Kaufman (1993). These factorial structures clearly resemble fluid intelligence and crystallized intelligence set forth by Kaufman and Kaufman (1993).



## CHAPTER 5

### SUMMARY

"The fluid-crystallized theory argues that the primary abilities which can be said to involve intelligence to any considerable degree are organized at a general level into two principal classes or dimensions" (Horn and Cattell, 1966, p. 253-254). Horn and Cattell (1966) postulated that these two classes or dimensions of intelligence were crystallized intelligence and fluid intelligence. Crystallized intelligence represent what Horn and Cattell described as knowledge which requires considerable pretraining (education) to successfully complete tasks. Fluid intelligence involves tasks of a relatively culture-free nature, which Kaufman and Kaufman (1993) described as the insightfulness to respond to tasks without cultural restrictions. Factor analyses support Horn and Cattell's theory of dual contributors to understanding what constitutes intelligence. These factorial results support the construct validity of the KAIT, with these factors interpreted as Crystallized and Fluid.

The study supports differences in intra-individual differences on the KAIT between students enrolled in college who have taken three or more developmental courses and college students without learning difficulties and those who took less than three developmental courses. The analyses revealed lowered abilities in both crystallized and fluid intelligence. These results fail to support the findings of a small sample of reading disabled students described by Kaufman and Kaufman (1993), whereas they exhibited a higher Fluid scale than Crystallized scale. These findings also fail to support the results of Morris and Levenberger (1990) who found learning disabled students to show higher Performance scores from the Wechsler Scale. The conclusion drawn from this study is

that the delay in intellectual abilities is represented equally in crystallized and fluid intelligence, for group DS2.

Subtest analyses from the KAIT revealed significant differences in both fluid and crystallized intelligence. This denotes differences in the manner in which these groups process and interpret information in an effort to solve tasks, with group DS2 manifesting obvious limitations in cognitive and achievement areas. These findings raise the question as to the adaptability of these adults, especially group DS2, as they attempt to pursue college studies.

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## APPENDIX

## INFORMED CONSENT STATEMENT

The purpose of this investigation is to compare the Kaufman Adolescent and Adult Intelligence Test (KAIT) profiles of typical college undergraduate students without identified learning difficulties and college students with learning difficulties. Your responses are confidential. At no time will you nor will anyone other than the investigators have access to your responses. There are no foreseen hazards which may occur from participation in this research. The demographic information collected will be used only for purposes of analysis. Your participation is completely voluntary, and you are free to terminate your participation at any time without any penalty. The scope of the project will be explained fully upon completion.

Thank you for your cooperation.

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I agree to participate in the present study being conducted under the supervision of a faculty member of the Department of Psychology at Austin Peay State University. I have been informed, either orally or in writing or both, about the procedures to be followed and about any discomforts or risks which may be involved. The investigator has offered to answer any further inquiries as I may have regarding the procedures. I understand that I am free to terminate my participation at any time without penalty or prejudice and to have all data obtained from me withdrawn from the study and destroyed. I have also been told of any benefits that may result from my participation.

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NAME (PLEASE PRINT)

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SIGNATURE

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DATE



## Permission to Access Student File at Austin Peay State University

The nature of this investigation involves the study of how college-age students process information. Since recall and retrieval of information is related to prior knowledge, it is important to have knowledge of prior test accomplishments. Therefore, I grant permission for the primary researcher of this study to retrieve my ACT (American College Test) and/or AAPP (Academic Assessment and Placement Program) test scores and current grade point average from my University file.

\_\_\_\_\_  
Student's Name (Please Print)

\_\_\_\_\_  
Signature of Student

\_\_\_\_\_  
Student Identification Number

\_\_\_\_\_  
Signature of Researcher

\_\_\_\_\_  
Date

Have you ever been diagnosed as having a learning disability in any area? Yes No

Would you like to be notified of your results? Yes No

## LEARNING STYLES INVENTORY

1. Provide your ACT or AAPP (Academic Assessment and Placement Program) scores\*  

ACT

Composite \_\_\_\_\_

English \_\_\_\_\_

Math \_\_\_\_\_

Science \_\_\_\_\_

Social Studies \_\_\_\_\_

AAPP

Writing \_\_\_\_\_

Reading \_\_\_\_\_

Comprehension \_\_\_\_\_

Mathematics \_\_\_\_\_
2. How many semester hours have you completed in college?  
0- 30 \_\_\_\_\_  
31- 60 \_\_\_\_\_  
61- 90 \_\_\_\_\_  
91-128 \_\_\_\_\_
3. What is your current grade point average?  
less than 1.00 \_\_\_\_\_ 2.51 to 2.99 \_\_\_\_\_  
1.00 to 1.50 \_\_\_\_\_ 3.00 to 3.50 \_\_\_\_\_  
1.51 to 1.99 \_\_\_\_\_ 3.51 to 4.00 \_\_\_\_\_  
2.00 to 2.50 \_\_\_\_\_
4. Have you ever been diagnosed as having a learning difficulty in any academic area?  
If so, when were you diagnosed and in what area(s)?
5. Have you ever been enrolled in a class designed for students with learning difficulties? How long have you been in these types of classes? Please describe.
6. Are you currently enrolled in any developmental studies courses? List the area(s).  
\_\_\_\_\_  
\_\_\_\_\_

Would you like to be notified of your results? Yes No

Code number \_\_\_\_\_

Date \_\_\_\_\_

\*Permission granted to acquire test scores from University file.

## VITA

Jennifer Ann Etnyre was born in Peoria, IL on August 7, 1970. She graduated from Academy of Our Lady/Spalding Institute High School in Peoria on May 13, 1988. Jennifer completed degree requirements for her Bachelors of Arts in psychology at Eastern Illinois University on May 9, 1992. Jennifer will complete her Masters of Arts degree at Austin Peay State University in psychology with a concentration in school psychology on May 12, 1995.

AUSTIN PEAY STATE UNIVERSITY

CHECKLIST FOR RESEARCH INVOLVING HUMAN SUBJECTS

TITLE: A comparison of Kaufman Adolescent and Adult Intelligence Test (KAIT) profiles of typical college undergraduates and college students with learning difficulties.

PRINCIPAL INVESTIGATOR: Jennifer Etnyre

DEPARTMENT: Psychology

SPONSOR: Dr. Herman Brock

1. Give a brief description or outline of your research procedures as they relate to the use of human subjects. This should include a description of the subjects themselves, instructions given to them, activities in which they engage, special incentives, and tests and questionnaires. If new or non-standard tests or questionnaires are used, copies should be attached to this form. Make notation if the subjects are minors or "vulnerable" (i.e., children, prisoners, mentally or physically infirm, etc.)

The purpose of this investigation is to compare the Kaufman Adolescent and Adult Intelligence Test (KAIT) profiles (Crystallized Intelligence Scales, Fluid Intelligence Scales, and Composite Intelligence Scales) of typical college undergraduate students without identified learning difficulties and college students with learning difficulties.

2. Does this research entail possible risk to psychic, legal, physical, or social harm to the subjects? Please explain. What steps have been taken to minimize these risks? What provisions have been made to insure that appropriate facilities and professional attention necessary for the health and safety of the subjects are available and will be utilized?

There are no foreseen hazards which may occur from participation in this research.



3. The potential benefits of this activity to the subjects and to mankind in general outweigh any possible risks. This opinion is justified by the following reasons:

This research may assist in assessing college students who display learning difficulties, through patterns of functioning in different areas of intelligence.

4. Will legally effective, informed consent be obtained from all subjects or their legally authorized representative?

Yes, all students will be of legal age and will sign a written consent form.

5. Will the confidentiality/anonymity of all subjects be maintained? How is this accomplished? (If not, has a formal release been obtained? Attach.) (a) If data will be stored by electronic media, what steps will be taken to assure confidentiality/anonymity? (b) If data will be stored by non-electronic media, what steps will be taken to assure confidentiality/anonymity?

Each subject will be assigned a number which will appear beside his or her name on a separate log sheet to be kept confidential by the investigators. The number will be the only means of identifying the subject that will appear on the KAIT Individual Test Record.

6. Do the data to be collected relate to illegal activities? If yes, explain.

The data does not relate to illegal activities.

7. Are all subjects protected from the future potentially harmful use of the data collected in this investigation? How is this accomplished?

No identifying information will appear on the KAIT Individual Teat Records and no one other than the investigators will have access to the subjects responses.

I have read the Austin Peay State University Policies and Procedures on Human Research and agree to abide by them. I also agree to report to the Human Research Review Committee any significant and relevant changes in procedures and instruments as they relate to subjects.

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Student Signature

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Date

Student research directed by faculty should be co-signed by faculty supervisor.

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Faculty Signature