

# International Journal of Special Education

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- **Book Review: From Autistic to Awesome: A Journey of Spiritual Growth through Life with My Special Needs Child**
- **Book Review: Teaching and Learning Bilingual Students Who are Deaf and Hard of Hearing: Eugene Garcia**
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- **The Relationship Between Letter Fluency Measures and Arabic GPA**
- **What is behind the diagnosis of Learning Disability in Austrian schools? An empirical evaluation of the results of the diagnostic process**

## International Journal of Special Education

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## **A STUDY OF GIFTED HIGH, MODERATE, AND LOW ACHIEVERS IN THEIR PERSONAL CHARACTERISTICS AND ATTITUDES TOWARD SCHOOL AND TEACHERS**

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*This study examines the problem of underachievement among gifted high school students. Low achievers were compared to high and moderate achievers on their motivation, self-regulation, and attitudes toward their school and teachers. Participants were all highly able students from grades 10 and 11 in an academically selective gifted high school in Australia (n=197). Teachers were asked to rank the students into high, moderate, and low achievers in terms of their performance in two subjects English and Mathematics. Participants were asked to respond to two surveys that measured their personality characteristics. The results indicate that math achievement and not language achievement may be used with confidence to classify gifted students; high achiever had higher mean scores than moderate and low achievers on all study variables; intrinsic motivation then extrinsic motivation had the highest correlation with math achievement and can be used to differentiate males and females performance.*

Gifted underachievement has been a focus of research for over 35 years, with many researchers pointing to the tremendous waste of human potential, socially as well as personally, that it represents (Emerick, 1992). Statistics have shown that as many as 50% of gifted students underachieve (Heacox, 1991; Hoffman, Wasson, & Christianson, 1985). Personality factors have been considered one of the significant factors that lead gifted students to underachieve (Reis & McCoach, 2000). Research has shown, for example, that motivation and self-regulation are important characteristics in differentiating gifted high achievers from low achievers (Ablard & Lipschultz, 1998; Albaili, 2003; Lau & Chan, 2001b; McCoach & Siegle, 2003a).

Defining intelligence and giftedness are considered a challenge for many psychologists and researchers. Through the literature there are many definitions of giftedness. In fact, the definition of giftedness varies from one country to another and even from one state to another (Reis & McCoach, 2000). One recent definition that has influenced the literature on giftedness is the Differentiated Model of Giftedness and Talent by Gagné (1995).

Gagné (1995) proposed a set of aptitudes or gifts which the child develops into talents through interaction with a range of intrapersonal and environmental catalysts. In the intrapersonal catalysts, motivation plays a crucial role in initiating, guiding and sustaining the process of talent development. In the environmental catalysts, school environment and teachers play an integral role in recognizing and developing giftedness. Gagné (1995) describes giftedness as the possession and use of untrained and spontaneously expressed superior natural abilities or aptitudes at levels significantly above average in one or more of the following domains of human ability: intellectual, creative, social and physical. Gagné (1995) suggested that at least 10% of the population could be considered gifted in the intellectual domain. In contrast, talent is linked to being above average in one or more areas of the following domains of human performance: arts in all forms, business and commerce, caring services, communications, media, science, technology and sport (Gagné, 1995). This definition provides a key to understanding underachievement, suggesting that gifts that do not develop into talents represent underachievement.

Most researchers agreed that underachievement was related to a discrepancy between expected and actual performance (Clark, 1992; Davis & Rimm, 1998; Dowdall & Colangelo, 1982; Emerick, 1992; Lau & Chan, 2001a; McCoach & Siegle, 2003a; Reis & McCoach, 2000; Rimm, 1995, 1997; Seely, 1993; Supplee, 1990; Stoeger & Ziegler, 2005; Whitmore, 1980). The problem in operationalizing this definition of underachievement is related to the complexity of measuring both ability and performance, along with the discrepancy between them (McCall, Beach, & Lau, 2000; Peters, Grager- Loidl, & Supplee, 2000).

In the literature, a number of contributing factors to gifted underachievement have been identified. Researchers attribute underachievement to a combination of several factors that come together and cause students to underachieve (Baker, Bridger, & Evans, 1998; Clark, 1992; Davis & Rimm, 1998; Emerick, 1992; Pendarvis, Howley, & Howley, 1990; Peters et al., 2000; Seely, 1993). Therefore, the causes of underachievement can be organized as follows: first, researchers have suggested that underachievement might be related to school factors (Baker et al., 1998; Davis & Rimm, 1998; Emerick, 1992; Matthews & McBee, 2007; McCoach & Siegle, 2003a; Rimm, 1997; Seely, 1993; Whitmore, 1980). Second, other researchers argued that underachievement might be related to family factors (Baker, et al., 1998; Clark, 1992; Reis & McCoach, 2000; Rimm, 1997). Third, other groups of researchers indicated that underachievement might be related to more serious physical, cognitive, or emotional issues such as learning disabilities, attention deficits, emotional disturbances, psychological disorders, or other health impairments (Dowdall & Colangelo, 1982; Pendarvis, et al., 1990; Reis & McCoach, 2000). Fourth, underachievement might be related to peer influence (Reis & McCoach, 2000; Peters et al., 2000). Finally, underachievement might be related the personality characteristic of gifted students such as low motivation, low self-regulation, and low self-efficacy (McCoach & Siegle, 2003a; Peterson & Colangelo, 1996; Reis & McCoach, 2000). Indeed, personality factors like motivation and self-regulation were considered important variables in gifted achievement for two reasons. First, these variables were emphasized in the definitions of giftedness such as in Renzulli's (1978) and Sternberg's (1997) definitions. Second, the literature has shown the importance of these variables in differentiating gifted underachievers from achievers (McCoach & Siegle, 2003a).

This study seeks to investigate differences among high achieving, moderate achieving, and low achieving high school students in terms of motivation, self-regulation and attitudes of gifted students toward school and teachers. This study was intended to examine the problem of underachievement among gifted high school students. Low achievers were compared to high and moderate achievers on their personality characteristics. Participants were all highly able students from grades 10 and 11 in an academically selective high school in Australia. Participants were chosen from these grades since research has shown that students' motivation, interest in subject area, and achievement decreased in high school (Eccles & Midgely, 1989; Gottfried, Marcoulides, Oliver & Guerin, 2007).

#### *Significance of the Study*

Although numerous studies have investigated personality factors such as motivation and self-regulation using a comparison design, most of these studies compared gifted achievers and underachievers (McCoach & Siegle, 2003a), or compared gifted students and non-gifted students (Davis & Connell, 1985; Ford, 1995). In contrast, little research has compared three levels of gifted achievers. Also, most of these studies either focused on one variable such as motivation (Valhovick-Stetic, Vidovic, & Arambasic, 1999), self-regulatory strategies (Muir-Broadbent, 1995; Ruban & Reis, 2006), or goal orientations (Dai, 2000; Mattern, 2005) or combined two variables such as motivation and self-regulation (Lau & Chan, 2001b; Yumusak, Sungur, & Cakiroglu, 2007) or self-regulation and goals (Ablard & Lipschultz, 1998; Albaili, 1998). By contrast, little research has compared high achievers, moderate achievers, and low achievers combining motivation, self-regulation, and attitudes toward school and teachers then explore how these variables are related to gifted students' achievement.

The present study will be an important study in the literature on gifted students' education for several reasons. First, it represents an important step toward identifying the differences among high, moderate, and low achievers on motivation, self-regulation, and attitudes toward the school and teachers. Second, the outcomes of this study may help educators to create programs that meet the needs of gifted students. Also, investigating motivation and self-regulation together will help to understand more clearly the picture of gifted students' achievement since all these variables are related and may combine in explaining gifted students' achievement (Pintrich & De Groot, 1990; Pintrich, Roeser, & De Groot, 1994). Finally, investigating the feeling of belonging to school and the relationship between teachers and

students based on the students' attitudes will help these schools to work on these issues that affect students' achievement.

#### *Purpose of the Study*

The main purpose of this study was to investigate the differences among tenth and eleventh grade high achieving, moderate achieving, and low achieving gifted students in terms of motivation, self-regulation, and their attitudes toward school and teachers. This study addressed the following questions:

Q1: *To what extent do high achievers, moderate achievers, and low achievers differ in their motivation, self-regulation, and attitudes toward school and teachers?*

Q2: *What are the relationships among math achievement, language achievement, motivation, self-regulation, and attitudes toward school and teachers?*

Q3: *Which set of the personal characteristics factors best predicts students' achievement?*

Q4: *To what extent there will be mean differences between males and females in the variables measured in this study?*

#### **Method**

Two standardized tests were used to assess students' motivation, self-regulation, and attitudes toward their school and teachers. The explanatory variables are achievement in terms of English and Mathematics in Australia and gender. The responses variables are motivation, self-regulation, and attitudes toward their school and teachers.

#### *Participants*

The sample was drawn from a selective high school in regional New South Wales (NSW). Selective high schools in NSW have specific criteria for entry. Entry into these schools is determined by the student's results in the Selective High Schools Test in English (including reading and writing), Mathematics, and general ability, together with their primary school's assessment of their performance in English and Mathematics. The curriculum at the school has been described as a broad, sound and balanced curriculum. The development of the curriculum model was based upon the desire to allow students to progress at their own rate through a course of study rather than being locked into a specific year group throughout their secondary education.

The sample of the study consisted of 197 gifted high school students from grades 10 and 11 in an academically selective high school. These students enrolled in the second semester of 2007/2008. There were 94 participants from grade 11 and 103 participants from grade 10. Regarding their age, there were 92 participants who were 16 years old, 73 who were 15 years old, 31 participants who were 17 years old and 1 participant who was 14 years old. The mean age of the participants was 15.78. English and Mathematics teachers were asked to rank the participants into high, moderate and low achievers. They were told to consider the top 5% of the class as high achievers and the low 5% of the class as low achievers. In fact, if it is asked who is the best who can evaluate students' achievement? The answer will be teachers particularly the one who are teaching them. Accordingly, five teachers were involved in the study two of them were math teachers and the other two were English teachers in addition to the contact teacher. To insure that teachers' ranking was not biased students were asked to rank themselves into three levels of achievers in terms of their achievement in Math and English. The results show that students' ranking was highly correlated to the teachers' ranking. In terms of their achievement in English, there were 39 low achievers, 87 moderate achievers, and 71 high achievers. In terms of their achievement in Mathematics there were 41 low achievers, 88 moderate achievers, and 68 high achievers. Overall, there were 101 males and 96 females.

#### *Measures*

In this study, two instruments were used to assess students' motivation, self-regulation, and their attitudes toward school and teachers. First, intrinsic motivation, extrinsic motivation, and participants' learning strategies were measured using the Motivated Strategies for Learning Questionnaire (MSLQ-R: Pintrich, Smith, Garcia & McKeachie, 1991). Second, participants' attitudes and preferences toward school and teachers were measured using the School Attitude Assessment Survey-R (SAAS-R: McCoach & Siegle, 2003b). Brief descriptions of the measures are followed:

*The Motivated Strategies for Learning Questionnaire (MSLQ-R).* The MSLQ is a self-report instrument designed to assess students' motivational orientations and their use of different learning strategies (Pintrich, Smith, Garcia, & McKeachie, 1993). The MSLQ consists of two main scales: the Motivation scale and the Self-Regulation scale. The instrument utilizes a 7-point Likert scale ranging from 'not at all

true of me' to 'very true of me'. The Motivational scale proposes three general motivational constructs: expectancy, value, and affect (Pintrich et al, 1993). For the purpose of this study, the self regulation skills of rehearsal, organization, elaboration, critical thinking, and meta-cognition were measured. In addition, self regulation average was obtained by calculating the sum of self regulation skills and then dividing by the number of the skills, in this case five. Motivation average was calculated by adding the intrinsic motivation to the extrinsic motivation then divide them by two. Research showed the coefficient alphas for all the scales demonstrate good internal consistency that varied from (.90) to (.54) (Pintrich et al., 1991; Pintrich et al., 1993; Yumusak, et al., 2007).

*The School Attitude Assessment Survey (SAAS-R).* The SAAS-R contains 43 items designed to measure students' attitudes toward school and teachers, motivation, self-regulation, goal valuation, and academic self-perception. The instrument utilizes a 7-point Likert-scale. It ranges from strongly disagree to strongly agree. In this study only attitudes toward teachers and attitudes toward school scales were used. Attitudes average was calculated by adding the school attitude to the teachers' attitude then divide them by two. The attitudes toward school and teacher factors measure students' self-reported satisfaction with their school environments by measuring the intensity of their positive or negative affect for or against school and objects associated with school (McCoach & Siegle, 2003b).

Researchers (McCoach & Siegle, 2003b; McCoach, 2002; Suldo, Shaffer, & Shaunessy, 2008) provided evidence of the construct validity and reliability of the instrument. It was 0.85 for the 4-item attitude toward teachers subscale and 0.92 for attitude toward school subscale (McCoach & Siegle, 2003b). Most importantly, this instrument was able to differentiate between gifted achievers and underachievers. Finally, Table 1 presents a summary of all the above mentioned variables in order.

#### *Procedures of Data Collection*

Prior to the implementation of the study, the researchers obtained permission from a number of different parties for conducting the study. Permission was sought from NSW Department of Education, from the participating school's principals and participants' approval. English and Mathematics teachers in Australia were asked to rank the students into high, moderate, and low achievers in terms of their performance in class. The contact teachers in the selective school facilitated the distribution and collection of the informed consent forms with the students' parents or guardians. Students' participation was voluntary and parental consents were provided. The Questionnaires were completed under the supervision of the first author and teachers in the school during one regular class periods. Standardized instructions were read aloud to students and they could ask questions. Students were reassured that all the collected data would be confidential and used for research only. The whole procedure took about 40 minutes. The participants completed the questionnaires at the beginning of the second semester in July of 2007.

#### *Procedures of Data Analysis*

Data was entered into the Statistical Package for the Social Sciences (SPSS Inc., Chicago IL, 2008). The first step in the data analysis strategy was to compute descriptive statistics for all questions. The second step was conducting the reliability analysis of all the scales used in this study. Third, we conducted a series of one-way independent analysis of variance (ANOVA) tests to compare the means of the three levels of gifted achievers on each of the three scales and their sub skills (12 factors). Then, Pearson moment correlations were conducted to determine the relationship among the study variables. Next, hierarchical regression analyses were used to determine the best predictive model for students' achievement. Finally, several independent *t* tests were performed to examine the mean differences between males and females in the variables measured in this study.

### **Results**

Overall, all the scales used in this study were reliable. Table 1 shows the internal consistency estimates of reliability for the scales and subscales used in this study. Generally speaking, the scales used in this study showed moderate to high internal consistency, as indicated by Cronbach's coefficient alpha. The highest Alpha was recorded in the School Attitude Assessment Survey particularly in the Students' Attitudes toward School subscale, which was .94. Similarly, the Students' Attitudes toward Teachers subscale was also high (.91). Finally, all the scales in the Motivated Strategy for Learning Questionnaire showed high internal consistency which ranged from .81 to .72. The highest alpha was recorded in the Extrinsic Motivation subscale (.81) and the lowest alpha was recorded in the Rehearsal subscale (.72).



Several analyses explored the differences among gifted high, moderate, and low achievers on motivation, self-regulation, and attitudes toward school and teachers. First, to assure that there were no violations of assumptions in ANOVA tests, a set of statistical tests were administered. No violations of normality and homogeneity of variance were detected. Then, we conducted a series of ANOVA tests to compare the means of gifted achievers with the three levels on each of the three scales and their sub skills (12 factors). The ANOVA tests of all related factors to the math achievement indicated that high achievers, moderate achievers, and low achievers exhibited statistically significantly different scale scores on each of the 12 factors ( $p < .001$ ). In every case, high

**Table 1. Reliability of the School Attitude Assessment Survey and the Motivated Strategies for Learning Questionnaire**

<b>The school Attitude Assessment Survey</b>	<b>Cronbach's Alpha</b>	<b>Number of Items</b>
1. Students' attitudes toward school	.942	7
2. Students' attitudes toward teachers	.905	8
<b>The Motivated Strategies for Learning Questionnaire</b>	<b>Cronbach's Alpha</b>	<b>Number of Items</b>
1. Intrinsic Motivation	.764	4
2. Extrinsic Motivation	.814	4
3. Rehearsal	.719	4
4. Elaboration	.780	6
5. Organization	.789	4
6. Critical Thinking	.781	5
7. Meta-cognition	.767	12

achievers had higher mean scores than moderate and low achievers. For example, high and moderate achievers were more positive in their attitudes toward school and teachers than low achievers. Furthermore, the mean differences of all achievers on all factors exhibited medium to large effect sizes. Table 2 depicts the results of the ANOVA tests, including effect sizes for each of the factors.

On the other hand, the ANOVA tests of all related factors to the language achievement indicated that high achievers, moderate achievers, and low achievers exhibited very comparable performance. The differences observed on the 12 factors among the three groups were not statistically significant ( $p > .01$ ). Table 3 reports the results of this analysis.

Pearson correlations among the study variables were presented in Table 4. In general, all study variables had significant correlations but language achievement. The correlation matrix is extremely useful for getting a rough idea of the relationships between predictors and the outcome. The results indicate that motivation variables correlate best with the outcome (math achievement) and so it is likely that these variables will predict math achievement in the regression analyses.

Next, several hierarchical regression analyses were performed to find out the best predicted model of math achievement using the personal characteristics factors and attitudes. Assumptions were tested by examining normal probability plots of residuals and a scatter diagram of residual versus predicted residual. No violations of normality, linearity, or homoscedasticity of residuals were detected. In addition, box plots revealed no evidence of outliers. Intrinsic motivation was entered in the first block. Motivation average, self regulation average, and attitudes average were entered in the second block. Regression analyses revealed that just using intrinsic motivation was good enough to predict math achievement and the motivation average, self regulation average, and attitudes average did not add a

significant contribution to this model.  $R^2 = .24$  for Step 1, and R square change = .01 for Step 2. Table 5 reports the results of this analysis.

**Table 2. ANOVA Tests on Each of the 12 Factors According to Math Achievement**

Factors	High Achievers (n=68)		Moderate Achievers (n=88)		Low Achievers (n=41)		<i>F</i>	<i>P</i>	<i>r</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
MOTIVATION	5.26	.92	4.86	.94	3.56	1.32	32.25	<.001	.52
Intrinsic Motivation	5.01	1.01	4.37	1.06	3.29	1.21	26.64	<.001	.50
Extrinsic Motivation	5.52	1.12	5.36	1.17	3.95	1.65	20.71	<.001	.43
SELF REGULATION	4.26	.86	3.92	.85	3.29	1.04	13.00	<.001	.37
Rehearsal	4.08	1.13	3.92	1.14	3.13	1.46	7.46	<.001	.28
Elaboration	4.32	1.03	3.85	1.11	3.42	1.09	8.24	<.001	.29
Organization	4.32	1.23	4.03	1.19	3.15	1.49	10.25	<.001	.32
Critical Thinking	4.14	1.11	3.82	1.03	3.30	1.14	6.97	<.001	.27
Meta-cognition	4.25	.80	3.98	.79	3.41	.94	12.37	<.001	.35
ATTITUDES	5.58	.82	5.32	1.07	4.95	1.00	4.84	<.001	.23
School Attitudes	5.80	.87	5.64	1.25	5.15	1.26	4.08	<.001	.21
Teacher Attitudes	5.36	.89	5.02	1.00	4.76	.97	4.66	<.001	.22

Note. M=Mean, SD=Standard Deviation, F=Observed F Value, p= Significance Level, r=Effect Size.

**Table 3. ANOVA Tests on Each of the 12 Factors According to Language Achievement**

Factors	High Achievers (n=71)		Moderate Achievers (n=87)		Low Achievers (n=39)		<i>F</i>	<i>P</i>	<i>r</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
MOTIVATION	4.73	1.21	4.81	1.18	4.34	1.16	1.13	.32	.10
Intrinsic Motivation	4.34	1.27	4.41	1.31	3.95	1.05	1.01	.36	.10
Extrinsic Motivation	5.12	1.43	5.24	1.27	4.75	1.54	.94	.39	.09
SELF REGULATION	3.98	1.01	3.92	.92	3.45	1.04	2.37	.09	.15
Rehearsal	3.92	1.34	3.72	1.18	3.50	1.45	1.12	.32	.10
Elaboration	3.92	1.24	4.05	1.06	3.50	1.21	1.65	.19	.13
Organization	4.14	1.46	3.81	1.22	3.34	1.37	3.27	.04	.18
Critical Thinking	3.77	1.12	4.04	1.11	3.46	.99	2.38	.09	.15
Meta-cognition	3.99	.87	3.98	.82	3.45	1.00	3.22	.04	.18
ATTITUDES	5.39	1.01	5.40	1.01	4.76	1.04	3.36	.03	.20
School Attitudes	5.64	1.16	5.60	1.21	5.05	1.27	1.99	.13	.18
Teacher Attitudes	5.15	1.01	5.40	1.01	4.47	.97	4.26	.02	.14

Note. M=Mean, SD=Standard Deviation, F=Observed F Value, p= Significance Level, r=Effect Size.

Independent *t*-tests were conducted to examine the mean differences between males and females in the variables measured in this study (see Table 6). All assumptions of performing independent *t*-tests were examined. No violations of normality and homogeneity of variance were detected. On average, females scored lower than males in all study variables but organizational skills. However, significant differences between the two groups were just detected for motivation average, intrinsic motivation, extrinsic motivation, and critical thinking.

### Discussion

The purposes of this study were to: (a) to investigate the differences among high achieving, moderate achieving, and low achieving gifted students in terms of motivation, self-regulation, and their attitudes toward school and teachers; (b) explore the relationships among all study variables; (c) find out the best model for predicting students' achievement; and (d) examine the mean differences between males and females in the variables measured in this study.

**Table 4. Correlation Matrix for All Study Variables**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1-Math Achievement	1.0													
2-Language Achievement	.30**	1.0												
3-MOTIVATION	.49**	.05	1.0											
4-Intrinsic Motivation	.49**	.05	.88*	1.0										
5-Extrinsic Motivation	.38**	.03	.90**	.61**	1.0									
6-SELF REGULATION	.36**	.13	.64**	.65**	.50**	1.0								
7-Rehearsal	.25**	.10	.52**	.52**	.41**	.85**	1.0							
8-Elaboration	.29**	.05	.54**	.54**	.44**	.88**	.62**	1.0						
9-Organization	.30**	.18*	.51**	.52**	.41**	.85**	.71**	.70**	1.0					
10-Critical Thinking	.27**	.00	.51**	.55**	.38**	.72**	.48**	.60**	.38**	1.0				
11-Meta-Cognition	.34**	.13	.57**	.58**	.46**	.88**	.69**	.75**	.71**	.62**	1.0			
12-ATTITUDES	.23**	.13	.38**	.36**	.31**	.39**	.33**	.37**	.33**	.25**	.30**	1.0		
13-School Attitudes	.20**	.11	.39**	.31**	.25**	.33**	.31**	.29**	.27**	.19**	.23**	.93**	1.0	
14-Teacher Attitudes	.22**	.13	.31**	.36**	.33**	.40**	.30**	.39**	.34**	.28**	.34**	.91**	.71**	1.0

Note. \*\* $p < .001$

The results indicated that math achievement may be used with confidence to classify gifted students to high achievers, moderate achievers, and low achievers. Furthermore, high achiever had higher mean scores than moderate and low achievers on all study variables. Contradictory results were found for language achievement. High achievers, moderate achievers, and low achievers gifted students exhibited very comparable performance. The differences observed on the 12 factors among the three groups were not statistically significant when using language achievement to classify them. These results can be explained by the fact that participants were selected from a school acclaimed for academic achievement. This indicates that Mathematics is highly appreciated in the school. In addition, high achievers are more likely to be involved in external competition such as Mathematics Olympiad. Furthermore, teachers in the school indicated that school's policy is to give a great focus to math achievement more than language achievement. Some teachers stated that *Mathematics is highly appreciated in the school*. Regarding the attitudes' results, it seems that high and moderate achievers were more positive in their attitudes toward

school and teachers than low achievers. This finding is consistent with the literature (Baslanti & McCoach, 2006; McCoach & Siegle, 2003a).

Next, all study variables had significant correlations with each one but language achievement. Language Achievement had very weak correlations with other variables. This could be attributed to the discussion above. On the other hand, intrinsic motivation then extrinsic motivation had the highest correlation with math achievement. Then, the hierarchical regression analyses revealed that just using intrinsic motivation was good enough to predict math achievement. Moreover, significant differences between females and males were detected for motivation average, intrinsic motivation, and extrinsic motivation. The fact that higher levels of intrinsic and extrinsic motivation were related to high achievers was consistent with the literature and suggested that intrinsic and extrinsic motivation contribute to the academic success of gifted secondary students (Philips & Lindsay, 2006; Street, 2001). Further, this study illustrates that intrinsic and extrinsic motivation could coexist to promote gifted students' achievement in a selective school environment. This indicates that intrinsic motivation and extrinsic motivation are not mutually exclusive; they are not necessarily in conflict. This suggests that school should consider both types of motivation when teaching gifted students. Students use both types of motivation to boost their achievement. It is possible to say that teachers make learning more interesting and enjoyable by encouraging extrinsically motivated students through rewarding them and recognizing their achievement. Therefore, this encourages all students whether they are extrinsically motivated or intrinsically motivated to become more involve in learning environment.

**Table 5. Results of the Hierarchical Regression Analyses**

Predictor Variables	Zero-order r	B	SEB	$\beta$
Step 1		-.16	.19	
Constant				
Intrinsic Motivation	.49	.29	.04	.49
Step 2		-.46	.31	
Constant				
Intrinsic Motivation	.49	.15	.09	.25
MOTIVATION AVERAGE	.48	.13	.09	.21
SELF REGULATION AVERAGE	.36	.04	.07	.06
ATTITUDES AVERAGE	.24	.01	.05	.02

*Note.* n = 197. Zero-order r = The ordinary correlations coefficient, B = The un-standardized regression coefficients, SEB = The standard error of B,  $\beta$  = The standardized regression coefficients,  $R^2$  = .24 for Step 1 and  $\Delta R^2$  (R square change) = .01 for Step 2.

Finally, females scored lower than males in all study variables but organizational skills. Findings in this study were incongruent with the literature. The literature suggested that females would score higher than males in motivation (Tallent-Runnels, Olivárez, Walsh, & Irons, 1994). Also, the literature suggested that gifted girls would use more self-regulatory strategies than gifted boys (Ablard & Lipschultz, 1998; Wolters & Pintrich, 1998; Zimmerman & Martinez-Pons, 1990). Classifying the students based on math achievement may explain these results. In general, males tend to do better in math than females. In addition, it seems that male students in high school focus more on self regulation skills and have higher motivation in school. However, it is expected that females will be more organized than males and then use more organizational skills.

#### *Implications and Future Research*

The findings in this study indicate a number of theoretical and practical implications. Low achievers in this study reported low levels of intrinsic motivation, extrinsic motivation, self-regulatory strategies, and negative attitudes toward the school and teachers. Therefore, school educators and psychologists are urged to consider different ways to enhance the learning environment based on these variables to establish an adaptive behavior. Also the results indicate that intrinsic motivation is important in the use of self-regulatory strategies. Most importantly, teachers need to consider both motivation and cognition simultaneously and not simply focus on motivating the students without considering the cognitive consequences of motivational enhancement. Therefore, intervention programs must be targeted to increase low achievers' knowledge of self-regulatory strategies.

Also, teachers' instructional strategies should promote awareness of their affective orientations in learning, how to implement the instructional strategies that develop quality social environment in the class to reduce the negative attitudes toward the school. Teachers and counselors should explore ways to measure factors that may contribute to low motivation, self-regulation among gifted students. Similarly, teachers should evaluate different approaches used in teaching and how a particular approach might affect students' motivation and self-regulation. In terms of research, this study should be validated with other participants from same age and across multiple grades. In addition, future research needs to investigate the role of gender in terms of all study variables. Future studies should replicate this research with larger samples across different cultures.

**Table 6. Differences between Females and Males in Motivation, Self-Regulation, and Attitudes**

Variables	Gender	N	M	SD	p	d
MOTIVATION AVERAGE	Female	96	4.40	1.34		
	Male	101	5.02	.95	.000	.52
	Total	197	4.72	1.19		
Intrinsic Motivation	Female	96	3.98	1.36		
	Male	101	4.67	1.06	.000	.54
	Total	197	4.33	1.26		
Extrinsic Motivation	Female	96	4.86	1.59		
	Male	101	5.38	1.11	.009	.37
	Total	197	5.13	1.39		
SELF REGULATION AVERAGE	Female	96	3.82	1.06		
	Male	101	3.98	.91	.278	.16
	Total	197	3.90	.99		
Rehearsal	Female	96	3.79	1.39		
	Male	101	3.82	1.21	.865	.02
	Total	197	3.81	1.30		
Elaboration	Female	96	3.76	1.25		
	Male	101	4.08	1.09	.070	.27
	Total	197	3.93	1.18		
Organization	Female	96	4.09	1.50		
	Male	101	3.81	1.26	.155	.20
	Total	197	3.94	1.39		
Critical Thinking	Female	96	3.50	1.09		
	Male	101	4.15	1.05	.000	.58
	Total	197	3.84	1.11		
Meta-cognition	Female	96	3.83	.93		
	Male	101	4.03	.81	.112	.22
	Total	197	3.93	.88		
ATTITUDE AVERAGE	Female	96	5.23	1.12		
	Male	101	5.43	.93	.177	.19
	Total	197	5.33	1.03		
School Attitudes	Female	96	5.45	1.36		
	Male	101	5.68	1.02	.184	.19
	Total	197	5.57	1.20		
Teacher Attitudes	Female	96	5.23	1.12		
	Male	101	5.43	.93	.259	.19
	Total	197	5.10	1.01		

Note. M=Mean, SD=Standard Deviation, p= Significance Level, d= Effect Size according to Cohen's formula

### Limitations

The results of this study must be interpreted cautiously in the light of the limitations. First, students' abilities were not classified based on intelligence score. In this study, we used the teachers subjective judgment to classify them. Second, this study focused on investigating personality characteristics of gifted students among three levels of achievers. Evidence related to students' learning disability, emotional or psychological problems were not included, even though, literature has shown that underachievement might be related to these factors (Dowdall & Colangelo, 1982; Pendarvis, et al., 1990; Reis & McCoach, 2000). Similarly, other information related to socioeconomic backgrounds was not included and it is possible that socioeconomic background might affect the results. Additional limitation related to the small sample size. Therefore, generalization must be taken cautiously.

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**BOOK REVIEW****FROM AUTISTIC TO AWESOME: A JOURNEY OF SPIRITUAL GROWTH THROUGH LIFE WITH MY SPECIAL NEEDS CHILD****Elaine Rodriguez**

At a time when there has been such an immense rise in the population of children with disabilities and the word “autism” causes a bad connotation, Paul M. Powell brings a positive yet realistic parents point of view. So many children are being diagnosed with Autism and even though we are more familiarized with the diagnosis there is still much to learn. The book, *From Autism to Awesome: A Journey of Spiritual Growth through Life with My Special Needs Child* brings to life what many parents with children with autism endure on a daily basis and most do not dare to say. Paul M. Powell retells his story as a parent of a child with autism from the moment he suspected his child had a disability to being able to accept it. With today’s stigma many parents experience great difficulty because their child is different; Paul M. Powell’s book serves as a go to guide for how to deal or not to deal with certain situations that they may undergo and with many resource ideas. The book is made up of twelve chapters and is set up chronologically, in the order in which events occurred. Throughout the book Paul M. Powell focus heavily on the importance of having a belief and support system, the stress on his marriage, and the impact on his social everyday activities.

Just like in many parts of our lives, we always look for some type of support to help us deal with unbearable days or to help us believe that there will be better days. Throughout the book, Powell includes his religion has a main factor in the way he decides or perceives things going on in his life. As a matter of fact, each chapter begins with a bible verse that leads to the rests of the segment. In a study conducted by Clifford and Minnes (2012), one hundred and forty-nine parents of children with disabilities were given questionnaires to see if they were part of any parent support system and asked them questions of how they manage certain situations. The results showed that parents that are involved in some sort of group support, whether it be for religious beliefs or not, were able to use adaptive coping skills. In addition to having a religious support system, Powell discusses the idea of having man resources of information and the important of having a group of people as a support system. Powell’s book is full of a wealth of knowledge for parents that have recently had a child diagnosed with autism and may serve as a step by step guide of some measures that need to be taken in order to find the best help for the child.

In addition to having external support systems, one of the main and most strained support systems a parent can have is their spouse. Hock, Ramisch, and Timm (2011), discuss the notion that parents with children with autism experience a time known as a “crucible” in order to illustrate the stress inputted into their marriage because of autism. During this time their marriage is put under a great amount of strain and is tested with emotionally and physically. In Powell’s book he describes going through different emotions with his wife and at times not quite understanding his spouse. Parents of children with special needs most definitely can relate and reading Powell’s book will help ease the stress of their relationship by knowing that they are not the only ones feeling and sustaining the same emotions. Powell’s book also demonstrates ways to help facilitate marriage issues, such as going to a therapist and discussing your issues with another professional that can give you an outside point of view and advice.

One of the main problems many parents with disabilities must overcome is the ability to continue daily social activities with their child. Something as simple as going to do some groceries or going to the park can become extremely strenuous to a parent with a child with disability. Powell (2012) discusses in his book of the experience of taking his son with autism to bible classes on Sunday and the reaction of the teachers caused him to leave his church and continue the bible study classes at home. Ebeling, Kuusikko-Gauffin, Jussila, Mattila, Moilanen, Pauls, and Pollack-Wurman (2012) conducted a study where parents with and without students with autism were given an assessment that measures social phobias and their level of anxiety. The results demonstrated that parents of children with autism have a high level of anxiety and a higher level of social phobias. It is important for the need of support in these areas to



parents of children with autism to be further explored. Powell's book does a great job at giving examples and details of just how much tension parents of children with autism must endure on a daily basis.

Powell's book, *From Autistic to Awesome*, is a demonstration of not only the negative experiences parents with children with disabilities endure but it also highlights the positive experiences. So many research and studies focus on the negative aspects of autism and many parents get discouraged. Powell's powerful words of encouragement and his ability to find "peace" with his child's disability is great motivation for many parents that are going through what he has gone through.

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**BOOK REVIEW****EUGENE GARCIA'S TEACHING AND LEARNING BILINGUAL STUDENTS WHO ARE DEAF AND HARD OF HEARING****Tiffany L. Pauling**

Theories of instructional practices in the education and schooling of bilingual students can promote a change in the field of deaf education. Many books discuss the ongoing debate of the education of bilingual students and the ever growing population of students whose native language is not English in education. Debates, still exists on which instructional practice or method is best for students who are deaf and hard of hearing. However, when you are faced with the combination of both factors: bilingual and deaf or hard of hearing, what is the best method that educators should use to ensure that the student is receiving an appropriate education? Thus, children who are both deaf and Hispanic present an educational challenge: in addition to their sensory handicap, which affects speech and language learning and thus academic achievement, their cultural and linguistic differences also must be considered in educational planning (Delgado 1984). Too often many of children with these types of disabilities are overlooked as members of the bilingual population or the deaf population.

Eugene Garcia states that a bilingual/bicultural model seems to be the optimal practice or method in supporting the social and academic development of "bilingual" children. This model for education of deaf students which includes both the use of American Sign Language (ASL) and English is slowly becoming popular in many educational settings. This situation faced by Hispanic hearing impaired children is truly unique: the acquisition of any language is a formidable task for them; and the language to which they are exposed during most of their waking hours is different from the language of the school (Delgado 1984). It is important for teachers to become sensitive the fact that many of their students suffer hardships from three specific areas: language barriers, hearing impairments, and poverty. As teachers we must take on many roles in order to develop academic achievement. Educators need to be teachers of hearing impaired children, teachers of children from various non-English speaking backgrounds, teachers/ counselors of hearing impaired infants and their parents, and teachers of the economically deprived. It is very rare for a teacher to teach in the setting that he or she prepared; therefore there is a need for programs that will provide staff with the information needed to satisfy the distinct needs of this population.

Some literature of useful information for teachers of deaf and hard of hearing students whose primary language is not English or American Sign Language is not completely applicable to hearing impaired children because of the lack of language skills or strategies to acquire language. However, hearing impaired children do possess the ability to obtain language. As a result, any strategy used to promote the fluency of language for a hearing impaired child should be modified to accommodate the language deficit that exists for these children. I have a young lady in my class who has only been in the United States for two years. She arrived from Guatemala in 2007 only speaking Spanish and some broken English, the inability to form sentences using English word order, and possessed no form of manual communication. She did have some residual hearing, meaning she would benefit from a Total Communication approach. According to the author which is the use of multiple communication forms including signing, finger-spelling, and speaking, lip-reading, and amplification to provide linguistic input to deaf students based on their communication needs. While in my class I incorporated this approach by making sure to make use of the language that she possess and combine this language with English and then incorporating the use of American Sign Language when we were discussing various topics or items. In the beginning of the school year she was very lonely and finger-spelled a lot of information and spoke to me using her native language which I lacked in background knowledge and comprehension. However now with only two months left in the school year she is using more English than Spanish along with ASL in the classroom and is now socializing with her friends using ASL. She still has a long way to go, but she has come so far.

With a rise in Hispanic deaf and hard of hearing students coming to this country speaking Spanish and possessing no type of manual communication there are now challenges in the classrooms for the deaf, and as a result many of these students too often are educationally invisible during discussions about the schooling of bilingual deaf students. It is important as educators to make sure that this population is included in discussions related to bilingualism in the U.S. schooling process. Garcia states that despite linguistic equality among dialects, a student's primary language may influence his or her chances for success in their classroom.

The significance in generating schooling responses that are comprehensive, that focus on the linguistic, cultural, and circumstances of deaf bilingual student in the United States, is extremely important in meeting the needs of each individual student. In order to have a responsive learning community the author has provided various school-wide practices along with teacher/instructional practices to ensure academic success. Unfortunately, schools fail to accept and recognize the numerous diverse contributions that each member of diverse families and communities can make in teaching and learning. In addition teachers of Hispanic hearing impaired children need knowledge and skills in addition to those obtained in most Deaf Education programs if they are to deal competently with the additional disabilities that this population often presents (Delgado 1984).

Eugene Garcia addresses the issues of culture and linguistic diversity and schools in America. He reinforces the importance of forming educational environments which are conducive to a student's linguistic and cultural diversity, along with implementing the use of educational and instructional practices that correlate to one's background or ancestry. Similarly he focuses on an increasingly important challenge faced by schools in the United States: educating students from diverse language, culture, and social-class groups. The author provides practices and theories which emphasize the linguistic and cultural diversity, that I believe would aid any educator of deaf and hard of hearing students of Hispanic descent; ensuring the academic success of deaf bilingual students in and out of the educational setting.

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## COMPARING TWO STORY-WRITING MNEMONIC STRATEGIES: A RANDOMIZED CONTROL TRIAL STUDY

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*Educators often use mnemonic strategies as a prime method to help children who struggle with writing. This study analyzed 12 fourth-grade students' stories during their participation in one of three groups. The first group learned the Ask, Reflect, Text (ART) mnemonic strategy with art media in the pre-writing/planning phase. The second group used Think-Talk-Text (T3) to verbalize aloud their story ideas before encoding text. The control group participated only in general education classroom instruction. The results indicated significant differences between the ART and T3 groups for story content; T3 also was significant different for story quality. The effect size scores indicated that ART students performed better with story content and number of words written. T3 students had the largest effect size for story quality.*

Writing may be one of the most challenging of the core academic tasks. Not only does a writer have to read drafts but also initially generate the text. Agatha Christie (1977), the famed novelist and playwright, described herself as having difficulties with writing as a child. *Writing and spelling were always terribly difficult for me. My letters were without originality. I was . . . an extraordinarily bad speller and have remained so until this day* (p. 42). Generating ideas, spelling the words, and organizing her texts were a challenge; yet, she learned to manage them. Today, we know much more about how to help struggling writers. To further explore this issue, the author of this study investigated how 12 fourth-graders' writing ability would change after learning and applying two mnemonic strategies for writing in a randomized control trial format over 17 forty-five minute sessions.

### *The Rationale For an Empirical Comparison*

National Assessment of Educational Progress (2007) results documented that writing is a challenge for many students; about 40% of fourth grade students could not write at a basic level. With many students struggling with writing tasks, mnemonic strategy-instruction has renewed visibility given the implementation of response to intervention (RTI) in many schools across the United States, Canada, and other countries where teachers provide research-based, targeted programming to children who struggle with core academic skills such as writing (Gresham, 2002; Haager, Klingner & Vaughn, 2007; Jiménez-Glez & Rodrigo-López, 1994). RTI is an instructional paradigm where teachers provide research-based programming to students and at more intensive levels as children demonstrate higher levels of need. The data resulting from curriculum-based measures collected once or twice weekly can provide the basis for special education classification, if deemed warranted by the school's multidisciplinary team. With this study's two strategies (i.e., ART and T3) that focus on visual and auditory modalities, their comparative analysis would add to the existing body of writing-intervention research literature (e.g., Graham & Perrin, 2007a, 2007b).

### *The Challenges that Struggling Writers can Face*

The underlying difficulties of struggling writers indicate a variety of characteristics about developing a schema for story structure and the physical acts of producing text (Baker, Chard, Ketterlin-Geller, Apichatabutra, & Doabler, 2009). Struggling writers do not read as much as typically achieving children (Shanahan, 2006). Having minimal exposure to reading and reviewing published texts can result in more difficulties with idea generation and how to plan ideas when struggling writers are asked to initiate composing a story. For example, a story is to have structure: a beginning (introduction), middle (main event[s]), and end (summary; Donovan & Smolkin, 2006). As struggling writers try to organizationally manage and encode their ideas, spelling and grammar becomes a challenge for expressing thoughts into

phrases and sentences (Saddler, Behforooz, & Asaro, 2008). To measure progress, the *number of words written* in a student's text as well as measures of story content and quality can help document change in ability following the child's learning a mnemonic strategy; these curriculum based measures provide formative curriculum-specific data that is reflective of classroom tasks and instruction (Deno, 2003). The schema-oriented aspects of writing may be compounded by challenges that can exist within a child's body and brain systems.

The physical process of writing is referred to as the visual-motor integration process: having a proper flow of messages from the eyes to the brain to the arm, hand, and fingers to physically manuscript print or handwritten text on the page (Pollaway, Patton, & Serna, 2005). For struggling writers, these processes really tax resources from the brain and its memory functions—leaving less than what is needed for the normal writing planning, editing, and final-draft process to occur. The result is a shorter text than that of peers with minimal ideas and storyline progression (Berninger, Richards, Stock, Abbott, Trivedi, Altemeier, et al., 2008; Dockrell, Lindsay, Connelly, & Mackie, 2007; McCutchen, 2006). Given these challenges, a means to plan a story without needing to note ideas as in a traditional story web or outline would alleviate the need to spell and compose phrases. This would allow for struggling writers to devote more mental and energy resources to idea generation and story structure/progression. Two example alternative methods would be: 1) having students illustrate their story ideas before encoding them into text, or 2) verbalizing their story ideas in oral language before writing them.

#### *Example Writing Interventions for Story Writing*

Mnemonic-strategy instruction provides an effective means to help children manage story writing as a step-by-step process (Graham & Perin, 2007a, 2007b). In a single-subject design study, Mason, Kubina, and Taft (2011) offered middle school students two mnemonic strategies: the Plan, Organize and Write (POW), and Topic Sentence, Reasons (three or more), Examine, and Ending (TREE). Although the 16 participants improved their story content and quality performance during the intervention's timeline, their *number of words written* scores were lower by the end of the study. Mason et al., attributed this to participants' focusing on writing more topical sentences as opposed to more general phrases. However, total words and quality are not always related (Graham, Harris, & Mason, 2005; Harris, Graham, & Mason, 2006). While focusing on story content, students may pay less attention to quality, which was the case in Mason et al., study. As previously discussed, story quality can be addressed through review of published stories, analysis the texts, as well as practicing spelling, grammar and syntax (Donovan & Smolkin, 2006; Saddler et al., 2008). Story content can be improved by students' focusing on key story ideas (e.g., location, characters, progression of events).

Graham and Harris (1989) created the WWW, W=2, H=2 cue questions to help struggling writers focus their writing on the key content of a narrative story. Each W and H specifies a story-content related question: Who is in the story? Where does the story take place? When does the story take place? What do the characters do? What do the other characters do? How does the story end? How do the characters feel? In Saddler and colleagues (2004) study, six students' use of WWW, W=2, H=2 resulted in their producing more elaborate story content; they doubled baseline performance to including all seven WWW, W=2, H=2 cue questions. Doing art can be an alternative means to help students note ideas during story planning.

Danko-McGhee and Slutsky (2007) suggest that students' illustrating their story ideas can help them visualize and note their story's content without needing to use words during pre-writing. This too can help provide the mental energy needed for idea generation while still noting ideas but without writing and spelling text. Offering these students the option to first illustrate their own story ideas before devoting mental energy to handwriting and spelling could help them generate more text. Students would not need to initially write; rather, they could demonstrate their ideas through visual imagery (Coleman, 2010). They would not need to read words in an outline or web as they later encode their prose. The aesthetic representation of their story would offer a visual reference, which they could use to later generate sentences for their text. Watanabe and Hall-Kenyon (2011) found that a kindergarten student who struggled with writing effectively used art as means to encode ideas although the quality of the prose was not well represented in the final product.

#### *Strategy 1: The Ask, Reflect, Text (ART) Strategy*

Author and colleague (2008) used a mnemonic strategy with typically achieving second- to seventh-grade students in a summer arts-based/integrated-curriculum program and found that they benefited from using art to initially illustrate story-component ideas. Based on the writers workshop (Calkins, 1986;

Graves, 1983) and Ernst (1993) and Olshanky's (1994) artists' workshop, the Ask, Reflect, Text (ART) Strategy includes three steps: 1) students Asked themselves the WWW, W=2, H=2 cue questions (Graham & Harris, 1989; e.g., who is in the story? where does it take place? what happens? how does the story end?) to begin thinking of what they would like to include in their story's topic; 2) as students **Reflected** on their answers, they illustrated their ideas with art media such as markers, watercolor paints, or play dough; and 3) students then used their aesthetic story plan to generate sentences for their story's **Text**. Through an analysis of students' stories, observing them while writing, and a short exit interview, the authors concluded that participants using art in the pre-writing phase could help them with the writing process and produce more elaborate stories. Author (2011; 2012a; 2012b) completed four studies with ART in a single subject design format. All studies indicated improved story content after baseline, but story quality improved little or only to some extent (1-2 points higher than baseline on a seven-point scale).

#### *Strategy 2: The Think, Talk, Text (T3) Strategy*

Initially verbalizing story ideas could help alleviate the encoding process as students plan their texts. Traweek (1993) worked to address her kindergarten students' low literacy scores on state assessments in a low income and racially diverse neighborhood. She wanted her approach to engage all the cognitive processes of writing in the Hayes and Flower (1980) model: idea generation (expressed in oral language), translation (transforming thoughts into oral language and then, via transcription, into written language), reviewing (writer orally reading what was just written to classmates), and revising (for book published at the end of the school year; Berninger, 2009).

Traweek (1993), with Dr Ginger Berninger at a local university, developed the *What I think, I can say, I can write* (or Think-Talk-Text; T3) mnemonic strategy: what I *think*, I can *tell* to others (i.e., verbalize aloud), and then write as *text* (Katahira, 2012). Students reflected on their ideas as in the ART strategy, but there was no schema for how to organize these ideas in terms of the structure of a story (i.e., no WWW, W=2, H=2 questions; Graham & Harris, 1989). Children also illustrated their texts after writing them. Traweek (1993) observed that the children improved with writing and also reading (by the end of kindergarten, the children read at the 90th percentile or above except for one at the 70th percentile) even without formal reading instruction. Vygotsky's (1986) theory of child development supported the idea of talking as a tool of the mind. Self-talk can help children strategize through a challenging task such as idea generation for a struggling writer.

#### *Research Questions*

To assess the efficacy of the ART and T3 mnemonic strategies in this study, the author designed a small-scale randomized control trial study with three groups: ART, T3, and a control group. The research questions were: 1) which of the three groups (ART, T3, or control) would attain higher scores on: a) story content, b) story quality, and c) number of words written (NWW)? 2) What would the comparative effect size be between the ART and T3 strategies across the three measures?

#### **Method**

The author employed randomized control trial methods. Analysis techniques included: comparing baseline and intervention story content, quality, and number of words written (NWW) probe scores (i.e., paired-samples t-tests); differences between groups (i.e., MANOVA) for each variable type (e.g., intervention story content scores between groups); and calculating effect sizes (Vogt, 2007). These quantitative methods allowed for each groups' pre- and post-test scores to be compared within and across groups. ART and T3 participants also completed exit interviews about their assigned strategy at the end of the data collection timeline.

#### *Setting*

The study took place at a suburban elementary school in a northwestern US state during October-December of 2010. The racial demographics for the school were as follows: 0.7% American Indian/Alaskan Native, 5.0% Asian, 1.9% Pacific Islander, 6.9% Asian/Pacific Islander, 2.3% Black, 9.6% Hispanic, and 74.7% White. A total of 55.8% of the student population participated in the school's free or reduced lunch program.

The author asked the school's principal to inquire with the fourth-grade general education teachers, who agreed to help facilitate the project by completing a universal screening. In the general-education classroom, the teacher asked all students to write a story about a simple black and white cartoon picture using any previously-learned strategies. The children could have 10 minutes to plan their story and 15

minutes to write their text. Using these story products, the teachers and author met to choose possible participants. The teachers then explained the project to the participants, attained parental consent forms, and received students' verbal assent. The general education teachers' professional experience ranged from 8-19 years ( $M=12$  years). They each devoted 90 minutes per day for literacy (60 minutes specifically for writing). The teachers used Calkins, Martinelli, Kessler, and Gillette's (2006) *Units of Study for Teaching Writing* which included writing practices such as teacher modeling (e.g., prewriting (rehearse/brainstorm), rough draft, make revisions and edits for the publishable copy), minilessons, and student conferencing.

#### *Participants*

The 12 fourth-grade participants included 11 White and one child of Hispanic descent; all were proficient in oral English. The author, in cooperation with the general education teachers, selected these students as participants based on their universal screening assessment results of writing a story about a simple cartoon picture using any strategy(ies) that they had previously learned (see description of Phase A baseline in the next section). The general education teachers stated that the selected participants also had low-writing ability as demonstrated in classroom activities: being in the bottom 20% of their class for writing skills, needing intervention programming, and possibly in need of special education services in the future. After the project had ended, one student was later classified with a learning disability that school year.

#### *Procedures*

The author, with funding from a university campus mini-grant, hired and trained an intervention specialist, a recent university education graduate, to be the students' instructor. Students attended 45-minute sessions across 17 school days.

*Experimental groups* consisted of an ART and a T3 group. Each completed four Phase A baseline sessions, four Phase B sessions of mnemonic-strategy instruction, and nine Phase C sessions for students' application of their assigned strategy.

*Control group.* These students remained in their general education classroom. Writing instruction consisted of mini-lessons offered by the teacher, students working in small groups to plan and draft texts, and then individually composing a final copy at their desk. As a summative activity, the teacher asked for individual students to share their composition with the class. On selected days, this study's control group participants met with the first author just outside their classroom to complete story probe assessments.

To help minimize diffusion of the ART and T3 strategies' content, the author randomly assigned students as a class group to one of the experimental groups or control. In this way, no one classroom would have children learning and talking about each other's strategy. The ART and T3 groups met with the intervention specialist in the media center in groups of two. The first 20 minutes of each Phase A and C session consisted of systematic instruction activities: meet and greet (1 minute), story reading (5 minutes), spelling (4 minutes), sentence creation about a picture (5 minutes), and combining two simple sentences into one using *and/ but/or* (5 minutes). During the last 25 minutes, the writing activity depended on the phase. For Phase A, participants completed either a 25-minute probe assessment of story-writing skills on designated days or did a writing activity that did not focus on a story topic such as writing a recipe or the directions from points A to B. (During Phase B, the intervention specialist used all 45 minutes for ART and T3 students to learn and practice their assigned strategy). In Phase C, students used the last 25 minutes of each session for writing more stories with ART, T3, or doing a probe assessment on designated days. These 45-minute daily sessions supplanted part of the participants' literacy instruction in the general education classroom, which included writing.

*Phase A (baseline).* Using a cartoon-picture prompt (with no dialogue balloons), each student wrote a story at each session to establish pretreatment performance. The intervention specialist directed the students to write a story using any strategy(ies) that they had previously learned. The intervention specialist did not provide help with spelling or sentence creation. The author assessed control group participants in a location near their classroom but not near the media center. This prevented control-group students from hearing ART and T3 instruction. All students were given paper for planning, told the directions of 10 minutes to plan their text and up to 15 minutes to write, and provided with art media to illustrate their story if they so chose. The author aimed to keep the use of art media consistent across the timeline of the study so as to clarify that the ART and T3 mnemonic strategies' processes were the change agents.

*Phase B (training).* Following each participant's establishment of a stable baseline of writing-skills performance, the intervention specialist provided instruction in the ART/T3 mnemonic strategies, as applicable to students' assigned group, over four sessions. The intervention specialist, during the first Phase B session, asked the students about how they managed writing and discussed any previously learned strategies. In the second session, she presented ART/T3 to the participants and discussed with them how learning this mnemonic strategy could be beneficial for them.

With the children's affirming their commitment in the third Phase B session to learning their mnemonic strategy's components and applying them to their story writing practices, the intervention specialist then modeled the ART/T3 strategy processes for the students. She offered them the opportunity to contribute to her story ideas to help keep them engaged in the activity. Students then tried applying ART/T3 on their own with the intervention specialist's feedback. In the fourth session, she first modeled the strategy again and then offered feedback on students' independent use of their assigned strategy. They ended the fourth session by discussing ideas for applying ART/T3 in other types of writing tasks.

*Phase C (application of the intervention strategies).* In the remaining nine of the study's 17-sessions timeline, experimental-group students continued with the same reading, spelling, and sentence-creation activities as they had done during Phase A. This provided for consistency amongst Phases A and B as well as defining ART and T3 as the change agents in the study. In the remaining 25 minutes of each session, the participants then continued employing the ART/T3 mnemonic strategies. The intervention specialist faded her assistance from sessions nine to 17. At designated sessions (e.g., every third), children from experimental and control groups completed additional cartoon-picture probes to demonstrate their story writing ability in terms of the number of WWW, W=2, H=2 cue questions addressed in their texts, story quality, and number of words written. A table with the WWW, W=2, H=2 cue questions (Graham & Harris, 1989) was provided to the students as a reference.

*Assessing participants' writing ability over time.* Students were assessed in three ways: story content, story quality, and number of words written. First, all students' stories received a score (i.e., 0-7) for story content using Graham and Harris' (1989) WWW, W=2, H=2 cue questions e.g., WWW: who is in the story? Where does it take place? Where does it take place? W=2: what happens? What happens next? H=2: how does the story end? How do the characters feel?). Second, students' stories received a score for story quality (also 0-7; with a rubric crafted by the author from Harris and Graham's [1996] rubric as well as the 6+1 Traits of Writing [Education Northwest, 2012]; see appendix). Third, WORD (2010) provided a *number of words written* (NWW) for each participant's story product. For inter-rater reliability, the author trained a graduate student in scoring the story probes for story content as well as quality. After initially scoring the stories on our own, we then discussed disagreements until we attained 100% agreement.

*Fidelity of implementation* was addressed in two ways. First, the author and intervention specialist communicated daily about the students' story writing and what the next lesson would entail. Second, the author observed the ART and T3 groups for eight sessions (about 33% of the overall timeline of the study) and found that the intervention specialist implemented 99% of the intervention's components. The author's two observations (40-60 minutes each) of general-education writing teacher's instruction helped document that neither ART nor T3 were employed in classroom programming; the teachers had students do webbing, outlining, or free-writing (often in small groups) as a means to plan and generate texts.

*Exit interviews.* The intervention specialist interviewed students at the end of the project to ascertain their feedback about the strategies and what, if anything, they would change. Example questions included what did you like or not like about your strategy, and how would you change it to make it better for students to improve their story writing?

After Session 17, the end of data collection, the intervention specialist offered ART and T3 students a session to learn the other group's strategy. Control group students also completed a session to learn the two strategies.

## Results

The author analyzed participants' baseline and intervention story content, quality, and number of words written (NWW) scores within each group using paired-samples t-tests (Vogt, 2007). Probe categories (i.e., story content and quality as well as number of words written) were analyzed using MANOVA to



assess for differences amongst groups within a given measure. See Table 1. Given the small sample size (N=12), the author employed a .25 alpha level.

Table 1  
*Mean Writing-Component Scores by Group*

<u>Group Name</u>	<u>Baseline Stories' Content</u>	<u>Baseline Stories' Quality</u>	<u>Baseline Stories' NWW</u>	<u>Intervention Stories' Content</u>	<u>Intervention Stories' Quality</u>	<u>Intervention Stories' NWW</u>
Ask, Reflect, Text	3.38 (Range: 2.25-5.00; SD 1.16)	3.00 (Range: 2.25-3.75; SD .54)	41.25 (Range: 32.75-51.00; SD 8.78)	5.56* (Range: 4.50-6.50; SD .83)	3.75 (Range: 2.50-4.50; SD .87)	62.88 (Range: 32.50-92.75; SD 24.88)
Think-Talk-Text	4.19 (Range: 2.25-5.50; SD 1.39)	3.75 (Range: 1.75-5.00; SD 1.49)	52.56 (Range: 15.00-78.50; SD 27.59)	4.25* (Range: 2.25-5.50; SD 1.40)	4.19** (Range: 3.00-5.25; SD .94)	60.13 (Range: 32.50-87.00; SD 24.15)
Control	3.94 (Range: 2.25-4.75; SD 1.4)	3.50 (Range: 2.25-4.50; SD 1.06)	41.88 (Range: 4.00-63.75; SD 24.60)	3.94* (Range: 3.00-4.50; SD .68)	2.94** (Range: 2.00-4.25; SD .97)	41.31 (Range: 23.00-60.25; SD 16.40)

\*There were significant differences for story content during the intervention phase between the ART and T3 groups as well as between the ART and Control Groups.

\*\*There was a significant difference between the T3 and Control Group for story quality during the intervention phase. There were no baseline- to intervention-phase (i.e., repeated measures) significant differences within each group.

Significant differences computed amongst groups resulted between ART (Dunn & Finley, 2008) and T3 (Katahira, 2012) for intervention story content; T3 also had a significant difference for story quality.

The author computed effect sizes (Cohen's *d*; Vogt, 2007; see Table 2) with the following formula: (Mean of the experimental group - Mean of the control group) / standard deviation of ART or T3 (depending on the strategy group being analyzed) and control group subjects.

**Table 2. Effect Sizes**

<u>Group Name</u>	<u>Story Content</u>	<u>Story Quality</u>	<u>NWW</u>
Ask, Reflect, Text	1.46	.85	.95
Think-Talk-Text	.30	1.13	.87

ART students achieved larger effect sizes for story content and number of words written. T3 students achieved the largest effect size for story quality.

Tables 3 and 4 offer examples of how students demonstrated their use of the ART and T3 strategies. The story prompt was a black and white cartoon picture of a boy looking at a huge pumpkin in his suburban backyard.

In the exit interviews, ART and T3 participants stated that they liked their assigned strategy. Tom, a T3 student, responded this way when asked if he thought his strategy was useful: *Yes, because if other children do not think or talk about their ideas first, they would not know how to write a story* (December 15, 2010). When Dave was asked if he thought ART could help other children become better writers, he said: *Yes. ART would help them use art to plan for writing* (December 16, 2010).

## Discussion

This study's purpose was to analyze the story-writing content and quality as well as number of words written of twelve randomly-assigned (ART, T3, and control) fourth-grade students. Significant differences amongst groups for story content and number of words written can be attributed to the ART strategy's including the WWW, W=2, H=2 cue questions (Graham & Harris, 1989). This component of ART focused children's attention to specific aspects of their story that needed to be included and helped some of them attain perfect content scores. Improving story quality to a score near seven, however, can pose challenges within the timeline of an intervention study even with 17 sessions.

Table 3  
Example ART Story (Wendy, Session 17)



<u>Ask</u>	<u>Reflect</u>	<u>Text</u>
Who is in the story? Where does it take place? When does it take place?		There was a boy that had a pumpkin on Halloween, but when he went to his backyard, he was really impressed. He never had a big pumpkin in his backyard. "But it is just morning," he said. Then he thought, "What can I do?" He never saw a big pumpkin. In the end, he left it in his backyard, and it started growing bigger and bigger. Then he felt happy.
What happens? What happens next?		
How does the story end?		
How does the main character feel; how do the other characters feel?		
(Graham & Harris, 1989)		

Table 4  
Example T3 Story (Tom, session 17)

<u>Think</u>	<u>Talk</u>	<u>Text</u>
	There was a boy. He didn't have any friends. So he grew a pumpkin. Then he got his science water, put it in the ground, and waited. And then he waited until it got bigger. And then he poured more water on it for it to get bigger. He did not want anyone to know. And then he guarded it while everyone was sleeping. And then he sold it and was happy because he now had money to buy things.	Once there lived a boy. He didn't have any friends, so he decided to grow a pumpkin, and he did. Then he took out his science water. Hut put it on the ground and waited, but when the little pumpkin was a little bit bigger, he poured the water on it, and it made the pumpkin bigger. So it was a big secret. He didn't want anybody to know. So when everybody was sleeping, he was guarding it. But then he sold it, and he lived happily because he had a lot of money to buy something.
(Katahira, 2012)		

Writing quality is a challenging task which may require multiple intervention phases (such as in RTI; Gresham, 2002; Haager et al., 2007; Jiménez-Glez & Rodrigo-López, 1994) to see improvement in that of typically-achieving peers and for this level of writing proficiency to be sustained over time.

T3's significant difference for intervention story quality indicated that verbalizing aloud ideas during pre-writing helped the struggling writers with this aspect of writing. When a student hears a story before writing, the auditory intake can help the child finesse ideas and story structure (Donovan & Smolkin, 2006; Vygotsky, 1986), and in the process, promote story quality. In past research (Author, 2011; 2012a; 2012b), there was little or no improvement in story quality. T3's significant difference on this measure helps provide insight as to what can help struggling writers in this area.

All of the effect sizes were large (.80 or greater) except for T3's story content. T3 did not provide students with the specific WWW, W=2, H=2 story content cue questions (Graham & Harris, 1989). The Ask component of ART likely contributed to the larger story content and *number of words written* effect sizes for this group. However, T3 had a very large effect size for story quality. It would seem, then, that

for struggling writers, planning in a verbal format where no visual-motor integration processes are used offer more memory and energy resources to the students to focus on idea generation, phrasing thoughts, and generating more elaborate prose.

The possibility of an alternative or combined ART and T3 mnemonic strategy's having interaction effect between the Ask and Talk components could offer struggling writers an even stronger means for writing more elaborate sentences (Saddler et al., 2008) and overall text (Polloway et al., 2005). If struggling writers first had time to verbalize with self-talk about the cue questions for text planning, they could use their mental resources more efficiently for these purposes (Berninger et al., 2008; Lindsay et al., 2007; McCutchen, 2006). This would be a logical topic for a follow-up study.

#### *Limitations*

Although students were grouped based on class membership, diffusion (i.e., one group's learning about another's strategy) may have occurred while students conversed in common areas or times such as recess. Having student groups at separate schools could have addressed this issue.

Given the small sample size and its having almost only White children as the participant sample, the results should be generalized with caution. The analyses of this project indicate that the strategies were effective for these participants. This does not automatically mean that a more heterogeneous sample would have the same results.

#### *Implications for Practice*

Based on the results of this study, this author would suggest two implications for teacher practice. First, both strategies can be implemented in classrooms with no real added monetary cost. This would apply to second-grade classrooms, where story writing typically begins, or older grades. The materials needed involve art media, pencils/pens, and paper, which should all be readily available in classrooms to some extent. Teachers could read about and discuss the two strategies at a grade- or division-level meeting.

Secondly, the results of the study confirm that mnemonic strategy instruction produces gains for struggling writers. They can benefit from explicit instruction as offered in RTI's paradigm. In the process, offering students time for planning (e.g., art and verbal dialogue) can help them improve their story writing. As writing is part of literacy curriculum for students in many countries, a teacher's step-by-step instruction can help children learn and self-regulate this highly complex task. The language and content of a story may vary, but the process of writing is very similar.

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**Appendix Table**  
**Story Quality Rubric**

0	<blank>	<ul style="list-style-type: none"> <li>▪ No text</li> </ul>
1	John go fishing. Happy	<ul style="list-style-type: none"> <li>▪ Very short or no text</li> </ul>
2	The egg is fit to crack. The egg is beside the tree. The grass is green. The dots is black. It is black lines. It is with stuff. People is with them.	<ul style="list-style-type: none"> <li>▪ Simply describes the picture prompt.</li> <li>▪ No sense of story line.</li> <li>▪ Uses simple sentences.</li> <li>▪ Short amount of text.</li> </ul>
3	There is a house. The people in the house are looking out. There is a space thing. It landed in the people's yard. So the people are looking out. One person is looking out of the door. The other is looking out the window. They are wondering what it is doing there. They are wondering if it will go away. There are stairs and someone is coming out. It looks like there is a door too. There is a window on it too. And it was going to have to go sometime.	<ul style="list-style-type: none"> <li>▪ Simply describes the picture prompt.</li> <li>▪ No sense of story line.</li> <li>▪ Uses simple sentences.</li> </ul>
4	Me and my friend was watching TV. Then I heard a noise. I looked out the door. My friend looked out the window. We both saw a little spaceship and the little door opened and some stairs came down. On the grass and four little aliens came down the stairs and they was making noise. They came down off the grass and on my porch. They saw someone coming. They thought I was their dad	<ul style="list-style-type: none"> <li>▪ Provides some sense of a story line/story structure, but lacks a clear intro and conclusion.</li> <li>▪ Grammatical and syntactical errors evident.</li> </ul>
5	It was winter break, and Jack, Peter, and I were having fun. We had just gotten out of school. We were headed for the hills to go sledding. We had our sleds grasped in our hands. We knew we were going to have fun. We were bundled up in scarves, sock hats, mittens, socks, and snow boots. It was really cold outside. We started sledding down the icy hill. Lucy went up the hill, but didn't make it far. She went down the hill backwards. Carlos and Suzanne ran after her to catch her. After Lucy hits a tree she said it was fun. We ran and played in the snow for hours.	<ul style="list-style-type: none"> <li>▪ Some evidence of an introduction, main event, and conclusion.</li> <li>▪ No use of paragraphs.</li> <li>▪ No use of voice.</li> <li>▪ Grammar and punctuation mostly correct.</li> </ul>

6	<p>On Saturday, while walking at the park, Paul found a strange egg. <i>This is huge!</i> He said.</p> <p>The next day, he went back to check on the egg. Before his very eyes, the egg hatched. Out came a baby dinosaur! He fed and watered it every day. He fed it some meat scraps from dinner. Later, he found a map. It showed a buried treasure! He quickly rode his bike there. He went inside a cave. He slowly proceeded with caution. He found a spade and started to dig around. After a while, He found an iron chest plated with copper. It asked Sharp Tooth, my dinosaur, to open the chest. He did. Inside was a magnificent emerald gem. It started glowing. Suddenly, his pet dinosaur, Sharp Tooth, started growing and sprouting wings. He flew Paul and his bike back home. Then Sharp Tooth flew off to a distant land. Paul hurried home to find a magnificent sapphire gem. He grinned. He went to the local gem trader and priced the gem. It was worth millions! Of course, he sold it and became a happy rich man.</p>	<ul style="list-style-type: none"> <li>▪ Introduction, main event, and conclusion are evident.</li> <li>▪ May employ some use of paragraphing.</li> <li>▪ Some use of voice.</li> <li>▪ Grammar and punctuation mostly correct.</li> </ul>
7	<p>Jack's Trip to the Fair</p> <p>For his tenth birthday, Jack wanted to invite two of his friends, Ben and Larry, to go to the fair that coming Saturday. With his mother's help, Jack wrote the words and made the illustrations on the cards. He took them to school the next day to give to his friends. Ben and Larry told Jack the next day that their parents were ok with them going to the fair.</p> <p>On Saturday morning, Jack ran outside to check the weather and was relieved to see a bright blue sky. His mother said, <i>Well, it looks like a perfect day for a day at the fair. After breakfast, we can drive to your friends' homes to pick them up.</i></p> <p>As Jack and his mother drove to the Ben and Larry's street, Jack noticed some dark clouds forming in the sky. <i>Oh, I hope it isn't going to rain,</i> he said, remembering that the fair was no fun last year when it rained.</p> <p>The rain and wind began as Jack and his mom pulled into Ben's driveway, he and Larry got in the car. By the time they arrived at the fair, it was sprinkling but the clouds were passing and sunshine was in sight.</p> <p><i>Get your tickets to enter the fair here!</i> a man yelled as he pointed to the entrance gate. Jack's mother gave him a hug and said, <i>I am so pleased that the rain has ended and the sunshine is back. I know how much you wanted t come to the fair today with Larry and Ben.</i></p> <p>After passing through the entrance gate, Jack saw four more of his friends gathered at the ice cream tent. When they spotted Jack, they cheered and began to sing <i>Happy Birthday</i>. Jack, Ben, and Larry ran to greet their classmates. Jack was surprised to find a table with an ice cream cake and some presents. After eating some hot dogs and some cake, the boys began going on some of the rides and visiting the animal barns. Jack had a great day with all of his friends! <i>I love going to he fair,</i> Jack told them. <i>We do too!</i> They all agreed that they wanted to come back another time someday.</p>	<ul style="list-style-type: none"> <li>▪ Clear introduction, main event, and conclusion.</li> <li>▪ Use of paragraphs.</li> <li>▪ Use of voice.</li> <li>▪ Almost completely correct use of grammar and syntax.</li> </ul>

## EFFECTS OF ENVIRONMENTAL STIMULATION ON STUDENTS DEMONSTRATING BEHAVIORS RELATED TO ATTENTION DEFICIT/HYPERACTIVITY DISORDER: A REVIEW OF THE LITERATURE

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*Behaviors characteristic of attention deficit/hyperactivity disorder (ADHD) often interfere with students' and their classmates' learning, and interventions targeting these behaviors may be particularly important in schools. This article reviews studies in which researchers manipulated environmental stimulation during task presentation with school-age students displaying symptoms of ADHD. Using optimal stimulation theory (Zentall, 1975; Leuba, 1955) as a theoretical framework, studies were examined to determine the tasks, intensity, dependent variables, and stimulation topography. Results indicated that the impact of visual stimulation on academic tasks has been the most frequently examined phenomenon in studies meeting inclusion criteria. Stimulation typically improved academic productivity and reduced nonacademic activity; novel stimuli produced initial effects that attenuated during sessions. Implications for intervention and future research directions are suggested.*

Attention-Deficit/Hyperactivity Disorder (ADHD) affects children worldwide; estimates suggest that anywhere from .85% to 10% of children and adolescents may be diagnosed with ADHD (Seixas, Weiss, & Miller, 2012). Internationally, children who have been diagnosed with ADHD are likely to have comorbid disorders, including a variety of mental health problems (e.g., anxiety disorders, depressive disorders) as well as learning problems (Ter-Stepanian, Grizenko, Zappitelli, & Joobar, 2010). In learning, for example, some evidence indicates that regardless of native language, children diagnosed with ADHD are likely to have deficits in reading (Alvarado, Puente, Jimenez, & Arrebillaga, 2011). In the United States, estimates between 3% and 5% of the school-age population are accepted (Barkley, 2006), and many of these students qualify for accommodations and/or services under Section 504 of the Vocational Rehabilitation Act or the Individuals with Disabilities Act (IDEA; Reid & Katsiyannis, 1995). Worldwide, the large numbers of students who present ADHD symptoms suggests that educational professionals need effective strategies to address behaviors related to the disorder.

Behaviors symptomatic of ADHD include hyperactivity, impulsivity, and inattention (Barkley, 2006), and ADHD has been linked to academic underachievement (Barry, Lyman, & Klinger, 2002; Raggi & Chronis, 2006). This underachievement may result from performance deficits, rather than skill deficits (Reid, Trout, & Schwartz, 2005). Stated differently, students with ADHD may possess the skills necessary for academic achievement, but fail to persist long enough at tasks in order to display those skills. Without intervention, hyperactive-impulsive behaviors often interfere with students'—and their classmates'—learning (DuPaul, 2007). These behaviors reduce opportunities to learn, inhibit school engagement, and may contribute to students with the most severe symptoms of ADHD demonstrating a higher probability than peers of dropping out of school (Frazier, Youngstrom, Glutting, & Watkins, 2007).



### *Explanations of ADHD*

International researchers have attempted to explain the characteristics that underlie ADHD. Some of these explanations have focused on cognitive theories. For example, *executive dysfunction theory* suggests that structural, functional, and biochemical abnormalities in neural networks (Johnson, Wiersma, & Kuntsi, 2009) lead to deficits in attention-related problems of working memory and response inhibition (Barkley, 1997; Kuntsi & Stevenson, 2000). *Delay aversion theory* (Sonuga-Barke, 1994) and *dual pathway theory* (Sonuga-Barke, 2003) suggest that ADHD-related deficits hinge on aversion to delayed rewards. In classrooms, where grades and other rewards are often separated by the passage of time from task completion, students with ADHD may find this delay particularly aversive.

Other theories suggest that symptoms of ADHD are grounded in children's physiological arousal. For example, *state-regulation theory* suggests that impulsivity serves a sensation-seeking role (Van der Meere, 1996). *Moderate brain arousal* suggests that persons with ADHD are hypersensitive to environmental stimuli, and either too much or too little attenuate cognitive performance (Sikström & Söderlund, 2007). Both can be viewed as extensions of *optimal stimulation theory* (Zentall, 1975, Leuba, 1955), which suggests that behaviors associated with ADHD help those individuals achieve a global state of arousal.

### *Optimal Stimulation Theory*

Optimal stimulation theory (OST) proposes that organisms maintain an optimal level of stimulation through stimulation-seeking activity. Zentall (Zentall, 1975; 2005) proposed that a wide focus of attention and increased activity served self-regulatory purposes for students demonstrating behaviors associated with ADHD. Essentially, OST suggested that individuals seek input when stimulation falls below optimum; much the same way organisms search for food when hungry, they search for stimulation when under-stimulated (Zentall, 1977). Thus, stimulation-seeking behaviors could be viewed as adaptive, and OST provided a rationale for counteracting hyperactivity, impulsivity, and inattentiveness through increased stimulation.

### *ADHD and OST in the Classroom*

Traditionally, school-based treatment for students with ADHD focused on reducing environmental distractions (e.g., place students away from windows; remove colorful bulletin boards, limit physical activity; Reid, 1999). Predominantly, however, these strategies were not found to have empirical support (Conners, 2000).

Internationally, some authors suggest that schools are not well prepared to address the needs of children with ADHD (Ek, Westerlund, Holmberg, & Fernell, 2012). It is possible that OST, the basic physiological patterns that it explains, could provide some direction for school-based interventions. When developing programs for students with ADHD, OST suggested that rather than reducing stimulation, it should be increased (Zentall, 1975). Students with ADHD might achieve optimal stimulation through: (a) stimulant medication (e.g., methylphenidate), (b) physical activity, or (c) sensory input (Zentall & Zentall, 1983). Certainly, stimulant medication has been shown to be effective for individuals with ADHD on measures of behavior (e.g., inattention, impulsivity, hyperactivity; Forness & Kavale, 2001), and OST suggests medication may increase overall arousal. Heightened arousal may increase the likelihood that a person obtains sufficient stimulation from the typical environmental. Nevertheless, stimulant medication and decisions about who receives it are typically beyond teachers' control (Trout, Lienemann, Reid, & Epstein, 2007). While they may be asked to complete inventories concerning medication as part of diagnosis and treatment, teachers do not have the expertise to make recommendations (Snider, Busch, & Arrowood, 2003). On the other hand, physical and sensory stimulation in the classroom *are* within teachers' control. Coupled with reports that many parents and teachers prefer behavioral interventions over stimulant medication (DuPaul, 2007), interventions providing added stimulation could benefit students with ADHD.

To that end, the purpose of this review was to examine studies with school-age children with ADHD-like behaviors (i.e., inattention, impulsivity, hyperactivity) in which environmental stimulation was added during tasks. To describe studies, we asked what tasks students were given, how many sessions were provided, and what variables were measured. Then, to determine if added environmental stimulation produced positive effects on students' productivity and activity, we asked what kind of stimulation was manipulated (e.g., visual, auditory) and what effects were recorded on behavior and academic outcomes.

## Method

Studies met five criteria. First, studies were published in peer-reviewed, English-language journals between 1975 (i.e., the year Zentall proposed OST) and 2011. Second, participants were between 5-18 years old (i.e., representative of students' ages in most classrooms), possessed at least average intellectual functioning (i.e., representative of students with or at-risk for high-incidence disabilities), and were diagnosed with ADHD (or appropriate DSM diagnosis for the time the study was published) *or* displayed behaviors typical of ADHD and were identified for the study through the use of standardized rating scales often used as part of an ADHD diagnosis (e.g., Conner's Rating Scale for Teachers; Conners, 1969). Studies including participants with co-morbid emotional disturbance (ED) or learning disabilities (LD) were included because of the high co-morbidity with ADHD (Crawford et al., 2006; Schnoes, Reid, Wagner, & Marder, 2006). Third, researchers concurrently added environmental stimulation (i.e., auditory, kinesthetic, or visual stimulation) with dependent variable measurement. Dependent variables measured immediately following intervention were considered concurrent (e.g., comprehension questions asked after reading a passage in which stimulation was added). Because the focus of this review was on understanding beneficial aspects of environmental stimulation for students with ADHD applicable in schools, studies in which stimulation matched Sikström and Söderlund's (2007) definition of attention-removing stimuli (i.e., sudden changes in environmental stimuli designed solely to disrupt responding) and those that manipulated inter-stimulus intervals (e.g., altering latency between stimuli) during clinical tasks were excluded. Fourth, dependent variables directly measured operant behaviors. Studies in which respondent behaviors were measured (e.g., eye blinks, event related potentials measured by electroencephalogram) and those that used rating scales were excluded. Fifth, research designs compared stimulation within or between participants. Case studies were excluded.

## Search Procedures

To identify studies that fit these criteria, we conducted an electronic search in the databases ERIC and PsychInfo. The terms *attention deficit*, *ADHD*, and *hyperactivity* were initially combined with *visual stimulation*, *auditory stimulation*, and *physical activity*, returning 741 citations. We examined abstracts and procedures for inclusion criteria. Next, we conducted ancestral and descendent searches of reference lists of studies meeting criteria. Finally, we conducted a hand-search of the most recent decade of issues from the following journals, selected because of their prevalence among identified articles: *Journal of Abnormal Psychology*, *Journal of Abnormal Child Psychology*, *Journal of Behavioral Education*, *Journal of Educational Psychology*, and *Journal of Learning Disabilities*.

## Interobserver Agreement

We used the point-by-point approach (i.e., number of agreements divided by number of disagreements plus the number of agreements multiplied by 100; Kazdin, 1982) to calculate interobserver agreement for inclusion. From the initial electronic search, 10% ( $n = 74$ ) of citations were chosen randomly and abstracts reviewed for inclusion by the first author and a graduate student. From the sample identified as meeting criteria during the electronic search, two authors reviewed procedures for 20% ( $n = 20$ ). Interobserver agreement during both stages was 100%. Finally, authors reviewed all articles identified for inclusion. When disagreements occurred, we discussed the article and reached consensus on inclusion.

## Coding

Articles were coded for the following variables: (a) tasks, (b) intensity, (c) dependent variables, and (d) stimulation topography. See Table 1 for coding definitions.

## Results

The initial electronic search resulted in 101 studies that presented abstracts suggesting they would meet criteria. After authors reviewed procedures for these articles, 37 articles presented 41 separate studies meeting criteria. Table 2 presents a summary of these studies.

## Attributes of the Studies

**Tasks.** Some studies included more than one task, resulting in 45 tasks across the 41 studies (see Table 2). For example, Zentall and Meyer (1987) included both a continuous performance task (CPT) and a word identification task. Academic tasks comprised 53.3% ( $n = 24$ ) of the studies, including math (i.e., arithmetic), reading (i.e., word identification, passage reading), spelling, and handwriting. Among clinical tasks, vigilance, choice-making, and matching were examined. Among social-recreational tasks, television viewing was most prevalent.

**Table 1. Definitions of Coding Variables Used in the Review**

Coding Variable	Definition
Tasks	
Academic	Reading, writing, spelling, or math
Clinical	Activity indicative of a psychological construct
Social-Recreational	Interactions with people, leisure activities, or tasks that may be required in school settings, but are not academic
Intensity	Frequency and duration of intervention sessions
Dependent Variables	
Productivity	Frequency or rate of correct responses, attempts, or errors
Activity	Movement, on- or off-task behaviors, or visual attention
Combined	Measured both productivity and activity
Stimulation Topography	
Auditory	Sounds in the environment
Kinesthetic	Physical movement or items to manipulate
Visual Distal	Stimuli not embedded within visual framework of the task
Visual Proximal	Stimuli embedded within visual framework of the task
Combined	More than one form of stimulation added, specifying each

**Table 2. Studies Investigating Effects of Environmental Stimulation on Students with ADHD**

Authors, Year	Tasks	Intensity	Measures	Topography
Abikoff, Courtney, Szeibel, & Koplewicz (1996)	AC: Math	1 S, 30 min	Pro	AU
Antrop, Roeyers, Van Oost, & Buysse (2000)	SR: Waiting	1 S, 15 min	Act	VD, AU
Antrop, Stock, Verte, & Wiersma (2006)	CL: Choice	2 S	Pro	VD, K
Belfiore, Grskovic, Murphy, & Zentall (1996, Ex 1)	AC: Reading	20 S, 5 min	Pro	VP
Belfiore, Grskovic, Murphy, & Zentall (1996, Ex 2)	AC: Reading	--	Pro	VP
Bailey, Lorch, Milich, & Charnigo (2009)	SR: Television viewing	4 S, 18 min	Com	VD, K
Flake, Lorch, & Milich (2007)	SR: Television viewing	1 S	Com	VD, K
Greenhop & Kann (2007)	AC: Math	2 S, 10 min	Pro	AU
Hall & Zentall (2000)	AC: Homework	23 S, 8-37 m	Pro	VD
Imhoff (2004)	AC: Writing	2 S, 15 min	Pro	VP
Iovino, et al. (1998)	AC: Reading	1 S	Pro	VP
Kercood, et al. (2007)	AC: Math	10 S, 20 min	Com	VD, K
Landau, Lorch, & Milich (1992)	SR: Television viewing	4 S, 7 min	Com	VD, K
Lee & Asplen (2004)	AC: Math	20 S, 10 min	Com	VP
Lee & Zentall (2002; Ex 1)	AC: Math	2 S, 20 min	Com	VP
Lee & Zentall (2002; Ex 2)	AC: Math	2 S, 20 min	Com	VD

Leung, Leung, & Tang (2000)	CL: Vigilance	4 S, 4.5 min	Com	VD
Lorch, Eastham, Milich, Lemberger, et al. (2004)	SR: Television viewing	1 S	Com	VD, K
Lorch, Milich, Sanchez, Vanden Broek, Baer et al. (2000, Ex 1)	SR: Television viewing	2 S, 23 min	Com	VD, K
Lorch, Milich, Sanchez, Vanden Broek, Baer et al. (2000, Ex 2)	SR: Television viewing	2 S, 23 min	Com	VD, K
Lorch, Sanchez, Vanden Broek, Milich Murphy et al. (1999)	SR: Television viewing	1 S, 28 min	Com	VD, K
Radosh & Gittelman (1981)	AC: Math	1 S, 15 min	Pro	VD
Schweitzer & Sulzer-Azaroff (1995)	CL: Choice	6 S, 14 min	Com	VD, K, AU
Shaw, Grayson, & Lewis (2005)	CL: Vigilance	2 S, 14 min	Com	VP
Shaw & Lewis (2005)	AC: Reading	4 S	Com	VP, K
Söderlund, Sikström, & Smart (2007)	CL: Memory	1 S, 45 min	Pro	AU
Steinkamp (1980)	CL: Concept; AC: Math; SR: Coloring	4 S, 60 min	Com	VD, AU, K
Williams, Littell, Reinoso, & Greve (1994)	CL: Problem-solving	4 S	Pro	VP
Zentall (1986)	CL: Vigilance, Concept	2 S	Com	VP
Zentall (1989)	AC: Spelling	1 S, 40 min	Com	VP
Zentall & Dwyer (1980)	CL: Matching	2 S	Com	VP
Zentall, Falkenberg, & Smith (1985)	AC: Writing	2 S, 30 min	Com	VP
Zentall, Grskovic, Javorsky, & Hall (2000)	AC: Reading	2 S, 25-30 min	Pro	VP
Zentall, Hall, & Lee (1998)	AC: Spelling	2 S, 25-40 min	Com	VD
Zentall & Kruczek (1988)	AC: Writing	2 S, 30 min	Com	VP
Zentall & Meyer (1987)	CL: Vigilance; AC: Reading	2 S	Com	VD, K
Zentall & Shaw (1980, Ex 1)	AC: Math	2 S, 25 min	Com	AU
Zentall & Shaw (1980, Ex 2)	AC: Spelling	2 S	Com	AU
Zentall & Zentall (1976)	SR: Waiting; AC: Spelling	2 S, 20 min	Com	VD, AU
Zentall, Zentall, & Barack (1978)	SR: Drawing, naming shapes	2 S	Pro	VP
Zentall, Zentall, & Booth (1978)	AC: Spelling	5 S, 15 min	Com	VP, K

AC= Academic Task; Act = Activity measures; AU = Auditory; CL = Clinical Task; Com = Combined activity and productivity measures; CPT = Continuous Performance Task; Ex = Experiment; K = Kinesthetic; S = sessions; SR = Social Recreational Task; VD = Visual Distal; VP = Visual Proximal

*Intensity.* Authors of 40 studies reported number of sessions. The shortest session was 4.5 min (Leung et al., 2000) and the longest was 60 min (Steinkamp, 1980). Belfiore, Grskovic, Murphy, and Zentall (1996, Ex 2) did not report number of sessions or session-duration. Only six studies (Abikoff et al., 1996; Belfiore et al., Lee & Zentall, 2002, Ex. 1; Zentall, 1986; Zentall, 1989; Zentall et al., 1985) reported intra-session effects of added stimulation, while others reported effects between sessions.

*Dependent variables.* Both productivity and activity were measured in 63.4% (n = 26) of studies, while productivity only was measured in 34.1% (n=14), and activity only was measured in one study (Antrop, Roeyers, Van Oost, & Buysse, 2000). Frequently, global observations of on- or off-task behavior (e.g., Shaw et al., 2005) were used. Ten studies reported productivity measures that described task engagement. For example, Abikoff, et al. (1996) measured problems attempted, and Zentall, Falkenberg, and Smith (1985) measured problems completed.

#### *Stimulation Topography*

Our primary research question examined stimulation topography and its effects on behavior and academic outcomes. This section reports prevalence of stimulation topography in the reviewed studies and highlights results indicative of those studies within each topography.

*Auditory.* Auditory stimulation was added in five studies (see Table 2). Abikoff et al. (1996) and Greenhop and Kann (2007) added music while participants completed math problems, resulting in more correct answers. In both studies, participants selected their music. Zentall and Shaw (1980) added spoken words in two studies. When classroom sounds were presented, participants were more active and performed worse on a math task. When recess sounds were presented, students made more errors. Söderlund, Sikstrom, and Smart (2007) added white noise during participants' completion of verbal or physical memory tasks (i.e., participants had to remember a series of spoken sentences that either included physical action or did not). White noise improved correct answers in free recall for participants with ADHD. In sum, constant, low-level sounds (i.e., preferred music, white noise) were beneficial, but distinct sounds (i.e., spoken words) were detrimental to task performance.

*Visual Distal.* Visual distal stimulation was added in four studies. Radosh and Gittleman (1981) added task-irrelevant borders around math problems, and participants with ADHD made more errors than the control group. Similarly, Lee and Zentall (2002, Ex 2) reported reduced task production when a computer monitor displayed pictures next to a monitor displaying a mathematics task. Mirrors provided visual distal stimulation in two studies (Hall & Zentall, 2000; Zentall, Hall, & Lee, 1998). In Hall and Zentall, two of three participants increased frequency and accuracy of homework completion when mirrors were part of a *learning station* (i.e., a colorful three-sided cubicle containing self-monitoring tools). In Zentall, Hall, and Lee, a mirror was placed on the table in front of students while they worked in a secluded conference room. Participants with ADHD-like behaviors who looked at the mirror increased productivity to a level comparable to participants without ADHD. In sum, stimulation that prompted participants to look away from tasks was detrimental, unless looking away allowed students to view themselves.

*Visual Proximal.* Visual proximal stimulation was added in 15 studies. Novel colors within tasks were common (see Table 2). For example, Zentall (1989) colored portions of words during spelling. When colored words were presented in the latter half of the session, participants made fewer errors. Similarly, Belfiore et al. (1996; Ex 2) added colors to task-irrelevant chunks of text in a reading task. Participants improved accuracy on comprehension questions early in sessions, but this effect appeared to *wash out* as sessions progressed. In Zentall, Grskovic, Javorsky, and Hall (2000), colors were added to task-irrelevant portions of text, and results showed colors introduced late in reading passages improved accuracy, but not comprehension. Authors of four studies added color and another form of visual proximal stimulation. For example, Zentall et al. (1985) added color and font width to portions of letters during a handwriting task; participants reduced errors initially, but effects washed out.

When color was added evenly to all portions of the task (i.e., rather than specific words or sections) results were mixed. Two studies examined colored overlays in reading (Iovino, Fletcher, Breitmeyer, & Foorman, 1998; Williams, Little, Rienoso, & Greve, 1994). Iovino et al. reported participants with

ADHD improved reading comprehension and word reading, while Williams et al. found no significant effects of colored overlays. Similar to colored overlays, Lee and Asplen (2004) presented math problems on a variety of brightly colored papers and found improved mean digits correct for participants and reduced off-task behavior. Taken together, stimulation embedded within the visual framework of tasks was beneficial when it highlighted task-relevant information or presented some novelty, but initial benefits tended to dissipate within sessions.

*Combined.* Two stimulation topographies were manipulated in fifteen (36.6%) studies. All studies to manipulate kinesthetic stimulation also manipulated visual distal stimulation. In these studies, participants often had access to toys. For example, during television viewing, Lorch and colleagues (2000, Ex 1; 2000, Ex 2) found participants spent less time looking at monitors when a variety of toys were present. Participants answered more free recall questions with toys present, but fewer causal questions. Conversely, in Kercood, Grskovic, Lee, and Emmert (2007), participants manipulated a single toy while working on a math task; participants were more on-task and answered more problems correctly. In Zentall and Meyer (1987) and Leung et al. (2000) participants committed fewer errors on auditory CPT with added visual distal and kinesthetic stimulation (i.e., participants pressed a button to advance pictures that were unrelated to the auditory task). In sum, when added stimulation included a variety of options, it generally hindered task performance, but when added stimulation was restricted to a single activity, it generally improved task performance.

## Discussion

The purpose of this review was to examine effects of environmental stimulation during task completion on students with ADHD-like behaviors. Optimal stimulation theory explained hyperactivity, impulsivity, and inattention as forms of stimulation-seeking behavior (Zentall, 1975). Adding environmental stimulation, therefore, should help students with ADHD to achieve the necessary stimulation to increase productivity and reduce problem activity.

### *Tasks and Intensity*

More than half of the tasks in studies meeting criteria were academic ( $n = 24$ ), which suggested recognition of the predictable underachievement among students with ADHD (Barry et al., 2002). Writing addressed in these studies, however, included only handwriting, and not tasks related to planning or organizing compositions. While difficulties with transcription are clear among students with ADHD (Imhof, 2004, Tucha & Lange, 2004), the absence of more complex writing tasks provides a clear focus for additional research in this area.

In addition to academics, studies examined social-recreational and clinical tasks. While these tasks may not seem directly applicable to educational interventions, they offer insight into how students with ADHD interact with experiences they encounter in schools. For example, teachers may present instructional videos as a means of extending content coverage. Studies by Lorch and colleagues suggested that physical manipulatives would distract students' attention. Similarly, auditory vigilance studies might be compared to class lectures. Even when provided guided notes, students with ADHD-like behaviors need help attending to relevant stimuli, in much the way participants attended to specific letters in a CPT (e.g., Leung et al., 2000). While results from these studies do not offer evidence for specific educational applications, they inform potential interventions directed at similar school-based tasks. That is, students with ADHD should not have access manipulatives during movies, but during lectures, manipulatives may increase students' attention.

Also informing potential interventions, the intensity with which stimulation was presented was important. Belfiore et al. (1996, Ex. 2) indicated that stimulation effects dissipated within sessions, speculating that its novelty may have worn off. Of course, novelty itself could be construed as a form of environmental stimulation in which unusual stimuli direct attention (Zentall, 2005). When novelty was embedded within tasks, attention was momentarily directed toward those tasks. Contrary novelty effects that may wash out, Abikoff et al. reported positive effects when student-preferred music was presented early. Overall, these results suggested that students with ADHD-like behaviors habituated to static visual stimulation fairly rapidly, though demonstrated greater task persistence when it was added late, and that auditory stimulation—at least during visual tasks—offered longer-lasting effects.

### *Stimulation Topography*

Results suggested that when environmental stimulation competed with tasks, students' productivity was hindered. Mirrors and white noise, however, were exceptions. When mirrors created stimulation,

students' productivity was not hindered. It is possible that this stimulation served as a form of self-monitoring, prompting students to engage in tasks. When white noise provided auditory stimulation, participants' productivity improved during a listening task. The added low-level auditory stimulation did not appear to distract attention during the auditory task. Of course, it is possible that the white noise blocked other sounds that could have distracted participants, though authors suggested findings were explained best by moderate brain arousal (MBA) created by *stochastic resonance*, noise in the environment that creates beneficial noise within the neural system leading to improved cognitive performance (i.e., Sikström & Söderlund, 2007). Clearly, however, white noise is indicative of added auditory stimulation that does not provide distracting novelty. Taken together, these results suggested that low-levels of stimulation might be beneficial even when experienced through the same sense as tasks.

When stimulation was stronger, however, participants attended to added stimulation more than tasks and productivity suffered. Lee and Zentall (2002) described these results in terms of the *matching law* (Herrnstein, 1961), which states that individuals select one behavior over others based on the amount of reinforcement available contingent on those behaviors. So, if stimulation acts as a reinforcer for students with ADHD, students may be able to access higher levels of reinforcement with less effort from task-competing stimulation, which would decrease engagement in assigned tasks (Lee & Zentall).

When added stimulation and tasks were experienced through *different* senses, however, studies often reported beneficial results. For example, pushing buttons to advance pictures during auditory tasks improved productivity, as did listening to preferred music during math tasks. These benefits were eliminated, however, when multiple sources of stimulation were present. Educational implications seem clear: providing non-competing stimulation outside of tasks could benefit students with ADHD, but only when that stimulation is carefully controlled. Adding sound during written tasks or small-motor activity during listening tasks could be important interventions for students with ADHD, but choices between numerous stimuli would likely distract their attention.

#### *Intervention Implications*

Based on the findings of this review, two implications for the use of environmental stimulation were indicated. First, the effects of added stimulation within tasks may be more beneficial when added late to those tasks. Any new task, because of its inherent novelty, might initially offer sufficient stimulation to maintain engagement. For example, a student might engage in a new math task for a short time, but added stimulation later in the task might help him persist. Added stimulation that directs students' attention to task-relevant information is beneficial, but task-irrelevant stimulation—because it is novel—may also offer benefits for students if that stimulation does not force attention away from tasks.

A second intervention implication is that stimulation outside of tasks requires careful pairing between tasks and stimulation topography. Stimulation not embedded in tasks should be experienced through a different sense than that used for task presentation and should be at a consistent level. For example, allowing students with ADHD to listen to preferred music, perhaps through headphones, would be a simple intervention supported by the findings in this review. It would not be entirely clear whether music actually optimized stimulation or blocked out distractions, but from an intervention standpoint this distinction may not matter. When employing kinesthetic stimulation during visual or auditory tasks, it is important that the stimulation involve a single option (e.g., a single manipulative) because multiple options distract attention sufficiently to hinder performance. A single manipulative, however, seemed to promote productive kinesthetic stimulation.

#### *Limitations and Future Directions*

Results of this review should be interpreted through consideration of its limitations. First, the diversity of research designs in studies limited our ability to conduct a quantitative synthesis of results. Meta-analysis of the effects of added environmental stimulation would be informative, but because studies often did not include comparable, relevant data (e.g., correlation coefficients among scores for effect size estimates from repeated measures designs), effect size estimation could have been biased, thus rendering results uninterpretable. Second, we did not include studies in which inter-stimulus intervals (ISI) were the sole stimulation manipulated. There is well-documented evidence that persons with ADHD are particularly susceptible to variations in rates of presentation (see Sikström & Söderlund, 2007 for a review), and these rates may change within-task stimulation. Nevertheless, presentation rates of the magnitude shown to affect persons with ADHD (i.e., variations of seconds between stimuli) do not seem to lend themselves to traditional classroom interventions. Third, we did not differentiate between studies

that included participants who received clinical diagnoses of ADHD and those who presented ADHD-like behaviors, nor those studies that included participants with co-morbid identifications (e.g., LD and ED). Since the purpose of this review was to identify practices and areas for future research that could be directly relevant in educational contexts (i.e., where strict identification practices may not always be congruent with the variety of students with whom teachers interact) no distinction in diagnostic status of participants was made. This enhanced the external validity of review findings, though it did not identify subtle differences in how participants with differing identifications were affected by environmental stimulation. Finally, the fact that Zentall and her research team conducted the majority of studies may be viewed as a limitation to this emerging research base. However, studies examining arousal-based views of ADHD continue to appear in the literature (e.g., Sikström & Söderlund, 2007; Van der Meere, 1996), and other researchers have explored environmental stimulation directly, and some of these (e.g., Leung et al., 2000) have conducted studies to test the viability of OST specifically.

Even in light of these limitations, results of this review emphasize the need for further research to clarify the benefits of environmental stimulation. On a theoretical level, researchers should continue to rule out other causal mechanisms that may have contributed to results. While experimental control was present in all studies (i.e., functional relations were established between interventions and dependent variables), other theoretical models may add to the validity of OST. For example, effects that could be attributed to novelty may indicate a competing explanation to OST. On the other hand, novel stimuli are certainly a form of stimulation. The fact that the stimulation *washed out* as individuals became accustomed to novelty does not refute that it initially provided stimulation. Future studies should directly test novelty effects to separate them from other forms of environmental stimulation. Similarly, studies showing that mirrors improved performance can be explained through self-management (i.e., the mirrors facilitated a form of self-monitoring) and through OST (i.e., the mirrors provided visual distal stimulation). Future studies could attempt to separate these causal mechanisms in order to direct further intervention development.

Another area of future research might combine added environmental stimulation with other interventions. Studies in this review typically employed minimally intrusive interventions (i.e., adding color to text). If these interventions reduced performance deficits connected with ADHD-like behaviors, could they be added to interventions shown to be effective for instruction? For example, studies by Reid and colleagues (e.g., Reid & Lienemann, 2006; Lienemann & Reid, 2008) have shown that instruction based on self-regulated strategy development (SRSD; Harris & Graham, 1996) benefits students with ADHD. Could added environmental stimulation increase the effects of this instruction? Might added environmental stimulation increase the density of reinforcement during interventions, thus increasing students' task engagement?

Research examining added environmental stimulation within the context of empirically validated instruction offers fertile ground for more effective interventions for students with ADHD. Ultimately, this line of research may demonstrate the most promise. Interventions could incorporate environmental stimulation, harnessing the power of the OST model, while remaining firmly rooted in validated instruction. For example, while listening to preferred music might increase task persistence, it doesn't make students better at math. But introducing preferred music during practice might be helpful. Interventions that combine effective instruction with elements specifically targeting task persistence may best address the performance deficits inherent in ADHD and the skill deficits that may result from co-morbid conditions such as ED or LD.

For now and on a more applied level, added stimulation may provide practitioners with a relatively low effort intervention that can decrease extraneous behaviors and increase task completion. Based on the results of our review the stimulation should not directly compete with task demands, should be added later in tasks (i.e., when inattention is more likely), and should be varied in order to decrease habituation.

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## EVIDENCE-BASED PRACTICE GUIDELINES FOR FETAL ALCOHOL SPECTRUM DISORDER AND LITERACY AND LEARNING

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*Evidence-based Practice Guidelines for Fetal Alcohol Spectrum Disorder (FASD) and Literacy and Learning are derived from an inductive analysis of qualitative data collected in field research. FASD is the umbrella term for a spectrum of neurocognitive and physical disabilities caused by prenatal exposure to alcohol. Data from a sample of N=150 was collected using sharing circles with Aboriginal elders and community members; conversational interviews with parents and their children with FASD; and interviews and focus groups with professionals who support children with FASD and their families. Special protocols were followed in collaboratively planning and participating in research involving Aboriginal communities. Aboriginal research methodologies utilized are situated among emerging, multi-disciplinary, qualitative research methodologies suitable for understanding the complexity of natural phenomena such as FASD. The goal of dissemination is to further translation of research findings regarding evidence-based guidelines for FASD to the clinical or practice levels, across disciplines and sectors, as well as across the life cycle, in order to prevent adverse life outcomes.*

### **Introduction**

The current qualitative research study explored the impact of Fetal Alcohol Spectrum Disorder (FASD) on the lives of individuals with FASD, families, caregivers, elders, professionals and communities. FASD refers to a range of diagnoses for physical, cognitive and neurobehavioral disorders that can result from prenatal alcohol exposure (PAE). FASD is an umbrella term for various diagnoses including fetal alcohol syndrome (FAS), partial fetal alcohol syndrome (pFAS) and alcohol related neurodevelopmental disorder (ARND) (Chudley et al., 2005). The present qualitative research study focussed on what practices and approaches worked well for individuals with FASD, their families and caregivers. The research was undertaken in partnership with elders, Aboriginal communities, and a parent led FASD Support Group, in compliance with the *CIHR Guidelines for Health Research Involving Aboriginal People* (Canadian Institutes of Health Research, 2008). The research is an attempt to address the gap in formulating an FASD and Holistic Literacy and Learning framework, useful as guidelines for effective practice across disciplines and sectors, as well as across the life cycle. Six interrelated themes constituting *FASD and Literacy and Learning Practice Guidelines* emerged from an inductive analysis of participants' transcribed interview data, as well as field notes, informed by the literature review and the researcher's experiences with children diagnosed with a condition within FASD, including her three adopted children who have diagnoses within FASD. The interviews or discussions took place in Aboriginal sharing circles, family groups, professional focus groups or individual interviews.

### **Method**

#### *Participants*

The Social Sciences and Humanities Research Council (SSHRC) funded a three year project (with a two year extension) for a qualitative research study of literacy and learning needs of individuals with FASD. Although no national prevalence data is available for Canada, FASD comprises 2-5% of the school-age population of younger children in United States and some western European countries (May et al., 2009). Participants and key informants for the current study were recruited through calls distributed by community partners, such as the FASD Support Network of Saskatchewan at its various conferences, workshops and other events, or on its web-site, as well as through a First Nations tribal council and a Métis federation. In order to protect anonymity, participants were asked to contact the researcher

directly and accordingly researcher contact information was provided in the notices. Each community partner provided a letter of support for the research, as well as negotiating and signing a research partnership agreement. The community partners, particularly elders from the tribal council, were active participants in the design of the research methodology and in the conduct of the research. Elders were insistent in wanting qualitative, not quantitative research data, as they felt the latter might further stigmatize their children. Therefore, a quantitative approach was to be used only for global numbers, but was to be avoided for individual cells for the themes arising from data analysis. Such an approach is in compliance with *CIHR Guidelines (Ibid.)* requiring both community and individual consent, and respect for Aboriginal protocols, including a preference for a qualitative, participatory research.

Of the individuals interviewed in sharing circles, focus groups, or conversational interviews, although there is some overlap among categories which is corrected for in the total number of active participants, the group tallies are as follows: 13 adults with FASD ages 19 to 30 years; nine children with FASD, ages several months to 18 years, present at the interview with parent(s), mentors or in a family group; 16 parents or caregivers of individuals with FASD, five of whom are also individuals with FASD, that is the condition was intergenerational (note that 10 children with FASD were discussed by these parents, but were not present at the interviews); nine mentors of individuals with FASD including two court workers; four teacher-educators; two lawyers; four medical doctors; four occupational therapists (two also being parents of children with FASD); four FASD researchers (two also being parents of children with FASD); one Director of an inner city supported housing complex, onsite, who supervised 67 high-risk residents, many of whom had FASD or other co-occurring behavior problems including mental health and addiction issues; and one Director of a downtown, drop-in youth centre on-site, which also provided home-style, supported housing for 40 young women ages 12-18 years who were at risk of being victimized in the sex trade, both facilities including individuals with FASD.

Focus groups and circles were organized by respective governing bodies or delegated to administrative personnel, including a focus group of seven who worked as an interdisciplinary, professional health team to assess, diagnose, and provide supports to children with FASD in a northern Saskatchewan health district. After discussion and planning meetings with the Director of Justice, as well as the General Manager of Services at an urban tribal council, a two-day circle of 19 First Nations elders was held at the tribal council's board room. This circle of elders further led to a two-day circle comprised of four elders, 10 parents of children with FASD, as well as three individuals with FASD, at the White Buffalo Youth Lodge, an inner city venue which was accessible to families and more conducive to protecting their identity and privacy than the tribal council's board room. Following discussions and meetings with the President of an urban Métis federation and the Director of a Métis health and wellness centre, a two day circle was held at the health and wellness centre. The participants in the circle included seven Métis elders, seven FASD mentors, and an adult, male client with FASD.

Subsequent to a half-day meeting and interview with a Justice Coordinator of a rural First Nations, a one day Circle of 27 community members of a remote, rural reserve, two of whom were elders, was attended, with a representative of the Ministry of Justice participating, as well as the Justice Coordinator who acted as facilitator.

Four Elders played a further leading role in meeting individually or in pairs with the researcher in order to advise, plan and facilitate the various circles. When two day circles were held, one was a follow-up circle held a few months after the initial circle, to review the results of the first circle and to communicate further. The conversational interviews generally lasted up to two hours; however, the sharing circles took place over several days, the focus group one-half day, and the community group, one day. Overall, a considerable degree of gender balance was maintained in the various categories comprising the active participants in the interviews, sharing circles and focus group. A global N = 150 for active participants was arrived at by correcting for any overlap among the categories by not counting participants twice if they fit more than one category. Please refer to Table 1, Participants in Research by Category.

Most of the participants were from Western Canada (130), with a contingent from the Eastern Canada (four), as well as a global component of participants from United States (six), Australia (one), New Zealand (one), and South Africa (eight) as part of a planned research visit to South Africa, the country with the highest measured prevalence of FASD.

The goal of the research was to gather experiential data observing participants and their children in their natural surroundings (as opposed to a laboratory or clinic) and through open-ended conversational

interviews, focus groups or sharing circles to elicit participants' first hand experiences, including what practices and approaches worked and did not work for them in relation to FASD and literacy and learning across sectors and the life span.

**Table 1: Participants in Research by Category**

<u>Category of Participants</u>	<u>Number of Participants</u>	<u>Overlap Among Categories</u>	<u>Net Total Tally</u>
<b>Adults with FASD</b>	<b>13</b>		<b>13</b>
<b>Children with FASD</b>	<b>9</b>		<b>9</b>
<b>Parents of children with FASD</b>	<b>16</b>	<b>5</b>	<b>11</b>
<b>FASD Mentors</b>	<b>9</b>		<b>9</b>
<b>Teacher-Educators</b>	<b>4</b>		<b>4</b>
<b>Lawyers</b>	<b>2</b>		<b>2</b>
<b>Medical Doctors</b>	<b>4</b>		<b>4</b>
<b>Occupational Therapists</b>	<b>4</b>	<b>2</b>	<b>2</b>
<b>FASD Researchers</b>	<b>4</b>	<b>2</b>	<b>2</b>
<b>Directors/Officials</b>	<b>7</b>		<b>7</b>
<b>Professional Diagnostic Team Focus Group</b>	<b>7</b>		<b>7</b>

#### Circle Participants

<b>Métis elders + 7 FASD mentors + 1 adult with FAS</b>	<b>15</b>
<b>1 Facilitator + 1 Justice official + 27 community members, 2 of whom are elders, at a remote reserve</b>	<b>29</b>
<b>4 First Nations elders + 10 parents + 3 individuals with FASD</b>	<b>17</b>
<b>19 First Nations Elder</b>	<b>19</b>
<b>TOTAL PARTICIPANTS</b>	<b>150</b>

#### *Data Collection*

##### *Conversational interviews, focus groups and sharing circles.*

The present researcher established a relationship of trust with the community partners, elders, individuals with FASD, families, caregivers, professionals and service providers before they consented to participate in the conversational interviews, focus groups, sharing circles or field notes. Conversational interviews were employed with individuals diagnosed with an FASD and their families; a focus group was used with an interdisciplinary diagnostic and treatment team; and two-day long sharing circles were the choice of elders who, in turn, convened and facilitated such circles with parents and individuals with FASD whom they invited. Following First Nations protocols, gifts of tobacco, coloured cloth, prayer, smudging, or a pipe ceremony commenced the sharing circles. Elders gave advice and prior approval about questions to be discussed at the circles and notes of the proceedings were recorded with coloured markers on large, mounted experience charts for all participants to see. Notes could be corrected in real time if they did not represent what the circle participants had intended to share. Interviews and focus group sessions were audiotaped and transcribed for approval by participants, while elders' sharing circle notes were transcribed and printed for their distribution and approval.

A community group met on a remote, rural reserve in Saskatchewan, as a follow-up to a sentencing circle. Twenty-seven participants attended the full day circle, lunch was served, and notes of the proceedings were recorded by hand and then transcribed and approved.

##### *Observations and field notes.*

A morning was spent in an urban, inner-city school which operated two dedicated FASD classrooms. The researcher observed two teachers, two educational assistants and 15 students going about their daily routine of teaching and learning, including interactions among and between teachers and students in the environments of specialized primary and intermediate classrooms, as well as a music room. There were nine students present in the intermediate classroom and six in attendance in the primary classroom, as well as a teacher and teacher aides or helpers in both classrooms. All students in the dedicated classrooms had diagnoses within FASD. Aboriginal children comprised 95-98% of the students in the school, along with a complement of immigrant and refugee children. In addition, a meeting was held

with the principal to discuss the FASD dedicated program and to clarify any queries. A support team consisting of a psychologist, social worker, occupational therapist and speech and language pathologist was available to support the teachers and students in the FASD dedicated program. Field notes of the visit were recorded by hand and then transcribed.

The 20 subjects observed or consulted in the school, but not interviewed either individually or in a group forum, were not included in the participant tally of  $N = 150$  for the conversational interviews, focus groups, or sharing circles, but are in addition to that.

#### *Data Analysis*

The data consists of qualitative data collected through observation and direct experience gathered during conversational interviews, focus groups, sharing circles and field notes. Transcribed data from these sources was then coded, collated and grouped into interrelated, recurring themes and patterns as discerned by the current researcher through an inductive process. The method of constant comparison was used to compare new data to be sorted with existing data and categories to approach a best fit when selecting, merging and refining coding categories or themes and in making connections between them. Data triangulation assisted in validating the categories or themes by comparison to related data derived across the data-collection spectrum (e.g. various interviews, focus groups, sharing circles and field notes) (Cohen et al., 2007). Such multiple data collection strategies lend legitimacy to research because when data from multiple sources are triangulated, validity and reliability of results increases (Kanu, 2002). Induction *per se* is the scientific process of deriving general principles, theories, themes, models or frameworks from a large array of data, informed by the researcher's knowledge and understandings of the data and field of study. In order to ensure consistency, only one researcher, the current researcher, analyzed, coded and collated all the data into six inductively derived themes which function as *FASD Literacy and Learning Practice Guidelines*. As noted by Wilkinson (2000) the number of categories or themes which inductively emerge from data depends on a number of variables, such as the amount of data collected and the breadth of views it contains, as well as whether only a broad view or a more detailed picture of the complexity inherent in the phenomenon the data represents is required. The complexity and diversity of the effects of FASD on learning and behaviour, and the implications of that complexity for instructional planning for the individual learner with FASD have been well documented (Kalberg et al., 2006; Ryan, 2006; Ryan et al., 2006; Bredburg, 2010; Koren et al., 2010; Mitten, 2011).

#### **Results and Interpretation**

Six inductively derived themes (along with a number of sub-themes) collectively termed *FASD Literacy and Learning Practice Guidelines* emerged from an inductive data analysis which was informed by the researcher's background knowledge, research and experience with individuals with FASD, including being a parent of three children with FASD.

##### *Theme 1: Multi-modal Learning*

Multi-modal learning involves as many senses as possible, as well as a variety of modes and media (Jewitt & Kress, 2003; New London Group, 1996). Multimodal, holistic approaches to learning engage and stimulate children, accommodating their learning styles, whether visual (images, page or screen), auditory (music, speech, noise and other sounds), spatial (three dimensional), kinesthetic (movement) or multimodal (involving more than one sense modality), rather than relying mainly on didactic oral or textual modes. For children with FASD, visual, spatial or kinesthetic stimulation may be particularly important to activate certain parts of the brain to find or generate new, alternate neural pathways to replace those damaged by prenatal exposure to alcohol. The latter process is termed neuroplasticity of the brain (Kolb et al., 2003).

In the opinion of a teacher-educator interviewed, flash cards, workbooks and commercial tests do not assist very much with diagnosing and developing engaging literacy programming for children with FASD. What does work is qualitatively observing and listening to children as they read, to determine the metacognitive strategies they use, and particularly the approximations or miscues they make as they read. Miscues are the exciting, teachable moments that occur when a learner is challenged to progress to the next step in learning. Miscues illustrate the learner's zone of proximal development, as coined by Vygotsky (1962) and should not be coded as errors or mistakes. Rather these are approximations learners make as their reading strategies progress. Teachers can model metacognitive skills for students at these critical points, using problem solving self-talk through which students can learn to make their own meaning of the text. For instance, in response to miscues, the teacher educator interviewed

recommended responding *Good try, you're using a strategy, or you're a problem-solver. Can you suggest what else the word or meaning could be?*

As the English language does not make phonetic sense consistently (Smith, 2003), children must learn to read using a variety of complementary strategies to include cues related to the context and structure of the story, such as visual cues presented in the story, and the child's own background knowledge, culture and vocabulary. A study in the Western Cape of South Africa provides supporting evidence for Smith's contention that phonics alone is not sufficient in learning to read. After nine months of treatment and training one hour a week on phonological awareness, a group of children with FASD aged 9- 10 years in their third formal year of schooling improved in tests of phoneme knowledge and pre-literacy skills compared to an age- matched control group with FASD who received no such training. However, their reading scores and other general scholastic tests dependent on reading skills did not improve significantly in comparison to the control group (Adnams et al., 2007) as Smith would have predicted.

According to Gardner (1993) there are multiple intelligences, including but not limited to linguistic, mathematical, musical, kinesthetic, spatial and interpersonal intelligences, all of which need to be recognized in learning. In the opinion of the teacher-educator interviewed, learning must be multi-sensory and include visual arts, practical and applied arts, apprenticeships, physical activity, outdoor activities, adventures and field trips, social interactions and other forms of experiential learning, in addition to the conventional text-centered and oral or language-centered processes.

Engagement, demonstration and immersion are key conditions for learning (Cambourne, c1988). According to the teacher-educator, the first step is to engage learners with demonstrations, field trips, concrete visuals and artifacts. Otherwise, it is unlikely that learning will be set in motion, especially for children with FASD, Attention Deficit Disorder (ADD) and Attention Deficit Hyperactivity Disorder (ADHD). Picture-walks through a storybook before reading the story can engage the child. Drawing before, during and after reading can scaffold memory, sequencing and meaning making. Accompanying text can be added to students' drawings, with the help of the teacher if necessary or by reference to a word wall, to describe what is happening in these series of drawings, creating a storyboard. A word wall is an organized collection of frequently used words prominently displayed in the classroom. It is an interactive tool for teaching reading, writing and spelling to children as they can refer to the word wall when trying to compose their own text, as on a storyboard. Storyboards are graphic organizers which utilize a series of illustrations or images displayed in sequence to tell a story, while text is added to supplement the images.

#### *Experiential Learning.*

John Dewey (1938) recognized the intimate relationship between experience and learning, and the need for teachers to actively construct interactive processes involving hands-on, experiential learning for students, as well as through social interaction with teachers and peers. For instance it is best to learn mathematical relationships,  $3 + 3 = 2 + 2 + 2$ , concepts like number, length, quantity and volume, through making muffins, or playing in the sandbox, than through flash cards, workbooks or computer drills. Moreover, through stories or play, children learn self-restraint, taking turns, collaboration and cooperation. Brain development is varied and stretches out for a long time so children should not be hurried nor discouraged (Wolf, 2007). They learn best through being active, not passive, through integrated learning that is social, creative and innovative. The natural trajectory of experiential learning is trans-disciplinary or interdisciplinary inquiry, the making of connections rather than fragmentations, building meaning, acquiring self-regulation through flexible pacing, which is especially important for those with FASD who have slower auditory processing speeds as well as requiring more time for memory retrieval (Shanker, 2010, and Shanker & al., 2012).

An adoptive mother of a son diagnosed with FAS, (age 4.5 years when adopted, age 18 at time of interview) and a daughter diagnosed with pFAS, (age 27 months at the time of adoption and age 15 years at time of interview) was interviewed. The mother was a key informant, as not only was she the adoptive mother of two children who had diagnoses within FASD, but she was also an occupational therapist working in early childhood special education. In fact, both adopted parents in this case were very active in engaging their children in various family and community literacy and learning experiences, such as visits to a children's museum for hands on learning experiences from an early age (weighing and measuring items, motion and speed activities, mixing colors, obstacle courses involving motor planning, experimenting with textures, cutting, colouring, pasting and creating) as well as re-enacting certain historical events using period costumes and props. In the home they measured food and liquid items and



read recipes when helping their parents in the kitchen; helped to build tree forts at the cottage; took trumpet and piano lessons, as well as Tae Kwon Do; engaged in many art activities using a wide variety of media; and worked with their father in his workshop, measuring, sawing, painting and making things, and taking care of the cars. Through these activities they learned functional math, reading, music and motor skills as well as basic mechanics and construction. However, the adoptive mother cautioned about the need for on-going supervision during experiential learning for children with FASD, because they do not understand boundaries as evidenced when her children started experimenting with cell phones. Problems ensued, including incurring large telephone bills as well as getting onto trouble with the law.

Participants in the elders and parents circle noted that individuals with FASD are *hands-on* learners, that is, they learn by watching and doing. Traditionally this was accomplished by working side by side with a parent, grandparent or other family member. Individuals with FASD like culturally relevant activities such as sewing, beading, and learning how to make moss bags which are traditional baby carriers. Sports are important as individuals with FASD function better when physically active, and, additionally, sports have built in reward systems to motivate them. Playing on a team and team sports are important for them. By watching and doing, they learn how to be team players, how to do things together, how to make friends, and how to follow rules, so that they can gradually come to cope with these important social skills. They don't learn these things if they are excluded. They also learn from puzzles and board games, if done together as a family in an intergenerational group. Again, they watch and do, and learn sharing, rules of the games, social skills, manual skills, spatial perception, organization and communication skills. Family activities also facilitate emotional attachment and bonding, which can be lacking in children with FASD, particularly if they have experienced multiple placements.

*Holistic language and literacy approach to integrating drawing and other visuals with storytelling, reading and writing.*

Holistic language and literacy approaches view notions of reading and oracy as components of an overall process of language development; they view children as natural, active learners as they develop their own conceptualizations of the world and learn language. Children do not learn alone, but rather in a social context of family, community, peers and teachers, whether in play, on a field trip, or in a didactic setting. Just as they learn language through hearing it and using it, through conversation, storytelling and narrative, similarly they learn to read through being read to and through reading itself, in a kind of transaction among reader, text and language. An instructional approach recommended by the teacher-educator interviewed is one of stimulating meaningful experiences through play, activity, story, or field trip, then drawing a picture of the experience, and telling a story based on the picture, followed by writing (or printing) the story, at first with the teacher's assistance, and finally reading aloud the story they have written, while utilizing cues from the picture they have drawn. In addition to visual cues, they also make use of vocabulary, semantic and syntactic cues, as well as phonics. For a longer story, they could draw a series of pictures, illustrating beginning, middle and end of the story, and inscribe a story underneath each picture, forming a storyboard. For children with FASD, this method can scaffold deficits in memory, attention, sequencing, processing speed (encoding and decoding) and comprehension. The key is to begin with their strongest learning mode, usually visual learning, then progress to reading and writing in an integrated manner.

Alternatively, those who do not like to draw may enjoy finding pictures on the internet, printing them and using them in their stories. A teacher-educator interviewed had a group of boys with FASD she taught who liked to find pictures of vehicles from the internet to use in their storyboards, their favorites being about motor bikes and monster trucks.

*Theme 2: Scaffolding Memory, Processing Speed and Sequencing Skills*

Memory depends on neural pathways in the brain. The development of these networks or pathways in the brain is dynamic and flexible, constantly changing with experience and simulation, thus allowing the network to grow, strengthen, or to rewire itself if damaged. Neuroscientists term this phenomenon *plasticity of the brain* (Kolb et al., 2003.). A stimulating environment, including multi-modal and experiential learning, is important for building neural networks or pathways in the brain, including those damaged by prenatal alcohol exposure (PAE).

These complex neural networks are needed for the development of memory and abstract thought, but may be delayed in developing due to PAE. Moreover, thoughts need to be held in memory long enough to connect to one another, so that problem-solving and other executive functioning can occur. A sense of time, a temporal sense, is abstract, therefore sequencing or organizing memories in a sequential order of

steps, or identifying stages of a plot or a story (such as beginning, middle and end) may be challenging for learners with FASD who are largely concrete thinkers. Moreover, individuals with FASD may not be able to discern what needs to be done first, second and third to complete a task, such as when brushing one's teeth, getting ready for school, or the steps involved in reading a story, telling a story, or solving a mathematical problem. Visual anchor charts and lists of steps, or storyboards, may serve to sequence the steps and prompt memory. Generally, directions and instructions using visual cues and fewer and simpler words will be understood more readily by those with auditory processing delays characteristic of many individuals with FASD.

The key informant mother, special education teacher and occupational therapist related how she used magnetic picture lists for chores on the fridge door, with a *do* and a *done* column. Pictures of what was expected were in the *do* list, so the children could look at the picture list to see what needed to be done, do the task, and then move this picture to the *done* column, thus reducing frustration and power struggles. At school her daughter keeps a daily schedule book of homework which needs to be done and gets help to maintain this by a teacher aid and a social worker. She brings the book home, shows her mother each piece of work completed, and then her mother signs both the work and the homework book, and the child takes both back to school. The mother also makes a copy of the homework done, as the child has been forgetful about handing things in at school and then gets into trouble for not having it completed.

### *Theme 3: Sensory Integration and Self-Regulation*

Certain pinpointed areas of the brain respond selectively to various types of stimuli, whether visual (sight), auditory (hearing), olfactory (smell), kinesthetic (physical movement), tactile (touch), proprioceptive (sense of one's position in space, vertical or horizontal) or vestibular (sense of balance). The brain has to respond to continuing feedback from all these senses. At birth, the brain is immature and integration of sensory input is not complete, but develops with maturity, although such immaturity persists in disabilities such as Autism Spectrum Disorder (ASD) and FASD. Individuals in which sensory integration is not complete may exhibit sensory defensiveness (an aversive response to stimuli), tactile defensiveness, an over- or under-responsiveness to stimuli, and a resulting inability to regulate arousal states or to control impulses. With proper control of stimuli, affected areas of the brain can mature and adapt and the brain can begin to function as an integrated, self-regulating whole (Ayres, 2005; and Shanker et al., 2012).

A First Nations woman interviewed who practices as an FASD mentor suggested various accommodations to better serve those with sensory integration issues in the classroom. These included using natural light rather than fluorescent lighting which constantly flickers, having fewer distracting displays and posters in the classroom, controlling for noise, having the student sit at the front near the teacher, and minimizing change in the classroom routine and seating arrangements. She stressed that it was important that a student with FASD be prepared ahead of time for any changes in classroom organization or routine so that the student could prepare for the transition and learn new cues required. Because individuals with FASD may have slower information processing speeds, one needs to be patient with them, and should not rush or overload them, otherwise one is setting them up for failure. She recommended only 10 to 15 minutes of homework a day because learners with FASD have to try harder to accomplish the same task as someone without a disability, and their brains tire from the increased effort. She further recommended only a few simple questions on a page, for instance, only three or four math problems that are plain and simple. Students with FASD will stay calmer and better able to perform whereas a page full of questions may be overwhelming. Oral testing is recommended to reduce anxiety and to ensure that they understand the questions, as well as open book testing to calm them and to scaffold their memory problems. If they do their work in the resource room, they should also be tested in the resource room, so that environmental cues and learning associations are the same in both cases, and they feel more relaxed in a familiar setting.

The adopted mother of a female student diagnosed with pFAS reported that her daughter, now age 16, was easily distracted in a busy environment. She learned to cope by using headphones to screen out noise, and special music which is calming to her. At school she takes her tests in a quiet area and does homework/assignments away from the noise of the classroom. She also pays better attention if she has something to fiddle with, so has fidgets to use at home and at school, such as squishy porcupine balls, and stretchy animals and bracelets. Fidgets need to be quiet and small to be permitted in school, but they are important as *calming crutches*. Gum or chewy candy provides oral stimulation which calms her daughter and helps focus her attention, but gum may not be allowed in schools. When engaged in

conversation her daughter flips from topic to topic and needs reminders to slow down her thoughts and speech. The adopted son in the family was diagnosed with FAS, and later with ADD. He was put on medication for a brief period of time. Medication did seem to help him focus better and pay more attention to detail, however when he became a runaway, *meds* were terminated as he was doing street drugs.

A First Nations adult male with FAS, living on his own, learned to shop at night when stores are less crowded, as he gets over-stimulated and panicky trying to function in crowds. He described the experience as trying to take in everything all at once and becoming overwhelmed. Because of his sensory integration issues, he avoids crowds, often stays at home or goes to his sister's place. Because his sister has children he stays downstairs out of the commotion, not because he is anti-social but as a defensive reaction against sensory over-stimulation. He had a job he liked working in a restaurant, but when management changed, the new management kept changing the work schedules, staffing and menu. He would confuse whether he worked Saturday from 7 to 12 or Sunday from 4 to 7, and other changes, and as a result lost his job, then his apartment, and was on the street again for a time, until he met his FASD mentor.

A First Nations adult male in his thirties with PAE, married, and father of a 13 year old girl, a three year old boy, and an infant of several months, told how he is very sensitive to certain sounds. For instance, when his baby cries, her cries are so high-pitched and piercing that he cannot stand it. Once he even punched a hole in the wall because it hurt so much. Now he and his family have a two-storey house, so he can go to the other floor to get away from the crying sound. His wife and mother-in-law also live in the home and they help to manage his extreme defensiveness to high-pitched sounds, and he also has an FASD mentor.

Occupational therapists interviewed recommended *How does your Engine Run*, also known as the Alert program, as a useful program for helping learners to recognize, visualize and think aloud about their sensory issues, emotions and attention levels, thereby learning to self-regulate (Williams et al., 1996). Using the engine analogy, children can learn to *rev up* their engines if they are feeling tired or sad, or *gear down* or put on the brakes if they are feeling hyperactive or angry. Alternatively, or in addition, they can put on earphones, close the blinds or dim the lighting, select a wiggle seat, or a fidget toy, select a carrel or individual office to put on top of their desk tops to screen out visual distractions, or move to a comfortable, quiet, enclosed space with low lighting within the classroom, such as a small playhouse or teepee for that purpose, or even pull themselves around on a coaster board if they need physical activity. Some classrooms have introduced stationary bicycles or mini-trampolines for students to use briefly as required, in order to re-set student's internal engines so that they can resume their work more effectively. A smaller, segregated FASD classroom where these approaches are normalized and actively supported and monitored by an occupational therapist, teacher and teacher assistants appears to be the most efficacious circumstance for learning sensory-integration and self-regulation without stigmatization. Although these approaches also have been used in integrated classrooms, it is more difficult to normalize them in integrated settings.

#### *Theme 4: Attention and Related Issues*

Deficits in attention have long been associated with prenatal alcohol exposure. In Streissguth's prospective, longitudinal study of 415 individuals having diagnoses within FASD, 61% of the children and adolescents had attention deficits (1996, 2002). Children with FASD display deficits in focusing, selecting, encoding, maintaining and shifting attention, as well as an increase in impulsive responding and sometimes hyperactivity (Burden et al, 2011). Thus, according to teachers interviewed it is important to engage children before beginning to read a story, give instructions, or teach a lesson, in order to make sure their attention is focused, and then use interesting, relevant, visual, tactile or kinesthetic stimuli to sustain attention. Prepare and cue them for transitions from one activity to another, or from one classroom to another, through the use of visual schedules and visual clocks. If impulsive blurting out is an issue, use a talking stick or similar concrete, tactile device that can be passed around to indicate when it is each child's turn to speak. Coloured tape to demarcate personal boundaries may be used so that they do not intrude unduly on another student's space, such as when lining up. Many of these techniques can be modified for use with adults who have a diagnosis within FASD and accompanying attention issues.

Individuals with ADHD have problems focusing and sustaining attention, whereas individuals with FASD have particular problems encoding and decoding information, as well as shifting their attention

from one task or activity to another. They require more time for tasks such as auditory processing which requires encoding and decoding, as well as assistance in making transitions (Coles et al., 1997). However, ADHD and FASD may be co-occurring conditions in the same individual, so such individuals may experience many or all of the above challenges.

In an interview with a birth mother of a son, John, who was diagnosed with FAS and appeared younger than his 17 years, it was noted that John had trouble concentrating, understanding boundaries, had a slower auditory processing speed (so one should speak more slowly with fewer words when communicating with him) and had trouble shifting his attention in order to make transitions. Although he has a normal IQ, because of his attention deficit he could not complete assignments at school and thus had homework to bring home every day. A year earlier he was charged with sexual touching on the playground when reaching out to catch a ball his arm accidentally touched an adjacent female student's breast. John was not sexualized and did not understand why what he did was wrong. His mother (a single Mom) called the police wanting a male role model to explain these issues to John. Instead of explaining to John, the police charged John with sexual touching. He was very traumatized by the resulting court processes, including five to eight court appearances, even to the point of regression by standing up and urinating on his bed. A judicial reprimand was the outcome of his guilty plea, the mildest sentencing alternative available to the judge. It is very difficult to prepare individuals with FASD for a court appearance, but a visit to the court room beforehand as well as role playing to rehearse court processes could have been utilized to assist in preparing John. Otherwise, his problems with attention, including the processes of encoding and decoding, might raise his anxiety levels and interfere with his comprehension and behavior.

#### *Theme 5: Speech, Language, Communication and Social Skills*

Children with FASD usually exhibit some degree of language disability, either a language deficit or delayed language development. They may have problems learning to produce certain sounds correctly, or may have fluency problems such as stuttering, making their speech more difficult to understand. They may develop language skills and acquisition at a slower rate, and may have immature vocabulary, grammar or syntax. For instance, they may have trouble putting words together to make a phrase or sentence. Often they know a word but cannot retrieve it from memory or may substitute another word from the same general category, like *sheep* for *goat*. Neurocognitive and hearing deficits, or dental and craniofacial anomalies such as cleft lip or palate may affect speech (Wyper et al., 2011), impacting on social and other life adjustments.

#### *Expressive language skills exceed receptive language skills.*

In individuals with FASD, expressive language skills (what they say) tend to exceed their receptive language skills (what they can understand and apply). A retrospective clinical chart review of over 100 children under the age of three years, with prenatal alcohol exposure (PAE), confirmed this gap, as well as confirming the delay in both receptive and expressive language skills for children with PAE compared to children without PAE (Proven, 2011). On the other hand, Wyper et al. (*Ibid.*) studying an older group of 27 children with FASD ages five to 13 years found no difference between receptive and expressive language skills in these children, although they were lower in both skills compared to 23 normally developing controls.

Language deficits may persist into adulthood. Individuals with FASD may be able to repeat or parrot back what a parent, teacher, employer, police officer or judge says to them, but not understand the substance of what was said, and thus not be able to follow instructions nor to comply with a court order. They may neither understand nor remember without the use of concrete, visual, hands-on experience or supervision. They may need to be *walked through* instructions in order to be able to comply, and if instructions involve being on time, catching a bus or getting to a correct address they may need special aids or a mentor to accompany them, according to court workers interviewed.

Communication skills can affect social, academic and employment adjustments. Due to problems with auditory processing, they may require considerably more time to respond to instructions or to questions posed, according to a psychologist interviewed. The danger is that they may be passed over by the teacher, employer, judge or lawyer if they don't respond initially. Using fewer and simpler words for them to sort out usually helps to alleviate the auditory processing difficulties. In addition, one should ask them to repeat what was said to them as a rough gauge of their comprehension, although comprehension does not always imply being able to remember and apply what was said.

They often have problems with social cognition and communication, best assessed through formal or informal narrative discourse analysis (Coggins, Timler et al., 2007; Coggins, Friet et al., 1998). Executive functioning, or problem solving deficits, are associated with deficits that children with FASD have with social processing and development of related language skills. Modeling, role-playing, coaching and discussion in real life situations are useful techniques for teaching social skills. In a dedicated FASD classroom observed, the teacher ate lunch with a group of five students all seated comfortably around a small, circular table. Each student would respond, in turn, to a simple, non-intrusive question and would be coached to make eye contact while responding and to listen carefully to other students' responses when their turn came to speak. The students were coached to use appropriate language and tone of voice, to adapt their body language to show respect and interest, and to use polite table manners. Due to deficits in social cognition, communication, memory and self-regulation, these individuals have difficulty using language in more sophisticated social contexts. They may lack the problem-solving skills and critical communication abilities required to enter peer groups, resolve conflicts, negotiate compromises, and maintain friendships and primary relationships. Modeling, role-playing, coaching and discussion in real life situations are useful teaching techniques for learning these social skills (Olswang, Coggins et al., 2007; Olswang, Swensson et al., Dec., 2010; O'Malley, 2007; Kully-Martens et al., 2012; and Stevens et al., 2012.).

#### *Speech and language challenges.*

Children with an FASD may have speech and language challenges, such as a language deficit or delayed language development, including problems learning to produce certain sounds correctly and fluently, resulting in speech which may be difficult to understand.

An interview was scheduled with a First Nations mother of two boys diagnosed with FAS, ages seven and nine years. When the researcher arrived at the family residence for the morning interview, a knock on the door resulted in two little boys' heads peeping out the door. The researcher told them that she had arranged to meet with their mother that morning. They indicated that their mother was asleep, pointed to the bedroom, and then eventually went and got their mother. The researcher could not understand the speech of either child very well, although they were very polite and friendly, and really wanted to communicate, they did so mainly through smiles and gestures supplementing their speech. The mother said that one had begun and the other was beginning speech therapy through the school. While they understood what was said to them, and knew what they wanted to say, they could not coordinate the movements of lips, jaws, and tongue to articulate and speak clearly.

Another parent interviewed said that her adopted daughter diagnosed with pFAS had received speech therapy for the previous three years. She described her as talkative, but as having *marble mouth* and said the therapy helped her slow down and improve her enunciation and clarity of speech. Sometimes there is poor articulation when the front teeth need to contact the tongue in a certain way, or the lips are to come together, to make various sounds.

#### *Social skills, life skills and adaptive functioning levels.*

Due to emotional, social and language delays, as well as delays in executive functioning (planning, organizing and problem-solving) and memory problems (including slower processing speed) individuals with FASD lag in age-appropriate development, termed adaptive functioning level. There can be a great deal of variability in their adaptive functioning levels, known as dysmaturity. For instance an 18 year old may be physically mature with strong expressive language, but the individual's social maturity may be that of a 12 year old, with math skills of an eight year old and reading decoding skills at age 15, but reading comprehension at age nine (Malbin, 2002). When dealing with inappropriate behavior for FASD individuals it is recommended to *think younger* and to consider that problem behavior may be due to dysmaturity rather than non-compliance. Inconsistent performance is characteristic of individuals with FASD, having *on* and *off* days, or performance variability, which is also characteristic of those with memory problems. The gap between expectations and performance is greatest at adolescence, a time of rapid growth and development, along with increased freedom and responsibility.

A 29 year old First Nations single mother of two boys, ages seven and eight years old (both the mother and the two boys having diagnoses within FASD) explained how an Aboriginal sharing circle with other women her age helped her to adjust to the many demands and frustrations of being a single parent of two young boys having diagnoses within FASD. (She had separated from the father of the boys due to spousal abuse.) She learned how to deal with her emotions, such as anger and frustration, on the one hand, and depression, on the other. Life skills training in another program helped her to learn to deal

with budgeting and running a household, thus helping to create more stability in the lives of herself and her children.

Dysmaturity in adaptive level, social skills and life skills were evidenced in Mark, diagnosed with FAS, and Mary with pFAS. Mark was egocentric in development, characteristic of a person younger in age than his 18 years. At adolescence he started to become more dysfunctional in terms of social relations, addictions and problems with law enforcement agencies. Mary, on the other hand, at age 15 years liked to play with younger children, was not interested in boys nor personal appearance and grooming (the lack of grooming concerned her mother), again characteristic of a younger level of development than her chronological age.

#### *Theme 6: Motivation, Engagement and Retention in School*

In Streissguth's seminal research (1996, 2002), 60% of a prospective longitudinal study cohort of 415 individuals with FASD experienced problems with school, such as suspensions, expulsions and dropping out, and 60% experienced problems with the law. The reluctance of educational systems to come to terms with the medical model of disabilities such as FASD, may be a contributing factor which could be ameliorated by viewing an FASD diagnosis as something to contribute to eligibility criteria for special services, planning, programming, placement and retention of students with FASD at their respective levels of adaptive functioning (Bredburg, 2011). Moreover, according to an interviewee who was a researcher, occupational therapist and mother of two adopted Aboriginal adolescents with FASD, disciplinary measures need to be informed by and accommodate students' disabilities. Such measures need to include de-escalation and calming techniques, and an awareness that suspension and expulsion may lead to involvement with high risk elements in the community to which vulnerable individuals with FASD are more susceptible than their age peers, as Bredburg (*Ibid.*) has noted.

Another interviewee related that her teenage son diagnosed with FAS dropped out of school, followed by addiction to and warrant for arrest for making and selling crystal methamphetamine. It is often very difficult for parents to maintain children with an FASD diagnosis in school during the volatile years of adolescence. Special learning tools and strategies to ameliorate the problem include those that assist with sensory issues, meet the needs for multi-modal, active, experiential, one-to-one instructional support, full-time supervision, and the realization that learning and maturity may take longer for many of these students. In addition, mentors and advocates acting as *external brains* for those with FASD can help to retain them in school and community (Chudley et al., 2007). Otherwise, absent accommodation for their disabilities, individuals with FASD may fall by default into the justice system, where they are likely to be victimized and deteriorate further (Mitten, 2004).

Considering factors such as attention deficit disorder, sensory and self-regulatory problems, slower auditory processing speeds, and high rates of school leaving, ongoing motivation and engagement are necessary to assist individuals with FASD in focusing and maintaining their interest and attention in order to retain them in school. Motivation is more effective if it is intrinsic to the task, rather than extrinsic such as money, a token, or a piece of pizza, although both types of rewards have their roles. The key is to get to know the individual so as to discover interests, activities and modes of learning to which the individual can readily connect. If the individual cannot learn readily through textual and auditory modes, try visual, experiential, hands-on or interactive digital modalities, with supervision. Key to the success of experiential learning and interactive modes is the flexible pacing they provide which is especially important for successful learning and development of individuals with FASD who may be functioning at a younger age than their chronological age, have slower processing speeds, and require more time for memory retrieval, yet do not want to become stigmatized as less capable in front of their peers.

#### **Conclusion**

Through the vehicle of qualitative research the present researcher strove to understand the complexity of FASD and its impact on the lives of individuals, their families, schools and communities. The inductive themes emerging comprise clinical applications in the form of evolving FASD Literacy and Learning Practice Guidelines. According to Denzin and Lincoln (2000, 2005) qualitative research involves the studied and systematic use and collection of a variety of empirical materials, including interviews, observations and artifacts. The six inductive themes derived herein are a synthesis of both FASD and Literacy and are intended to do justice to the complexity of both phenomena, without either leaving significant gaps, on the one hand, or becoming too large and unwieldy in application, on the other. Extensive observations of teaching and learning applying the guidelines proposed, in various sectors

(home, school and community) and for various age groups, as well as a comparison of outcomes with conventional methods, are the next steps in moving from practice guidelines to full-fledged FASD pedagogy.

The inductive themes or guidelines derived from the qualitative data are meant to further the translation of research to the clinical or practice level. Moreover, the themes or guidelines are not meant to be applied in a formulaic or mechanistic manner, but rather require discretion of the teacher, parent, caregiver or service provider in selecting and applying the themes on an individual basis, alone or in combination. Often, an ongoing balancing process will be required in their application as the challenge is to balance sometimes disparate requirements of diagnostic brain domains (Lang, 2006) and background factors, with the need to fashion rich, dynamic, holistic literacy curricula and pedagogies for learners with FASD, from a culturally contingent perspective. The application of themes, as noted, may require balancing, for while a learner with FASD may be prone to sensory over-stimulation, he or she may, at the same time, also be attention deficit and so may need an amount of stimulation to become engaged in learning. In addition, the learner may have memory deficits and problems with abstract thinking that require visuals and hands-on activities to reinforce. Having a quiet, pleasant and partially enclosed place with low lighting for the individual to retreat to when over-stimulated may help the learner with FASD to calm down or *slow his or her engine* before incrementally introducing further enriching stimuli. An adjoining room or a partially enclosed, comfortable, softly illuminated playhouse or culturally relevant teepee within the classroom may serve this function.

Significantly, through metacognitive techniques such as modeling and thinking aloud about the strategies used, learners with FASD can progress to manage and monitor their own learning needs and with support gradually move along a gradient to greater independence. The inductively derived FASD and Literacy and Learning Guidelines are intended to be applicable across sectors (home, school, and community) as well as across the life span.

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**INDIVIDUAL EDUCATIONAL PLANS IN SWEDISH SCHOOLS – FORMING IDENTITY  
AND GOVERNING FUNCTIONS IN PUPILS’ DOCUMENTATION****Ingela Andreasson***University of Gothenburg***Maj Asplund Carlsson***University West*

*The documentation of pupils in Swedish schools is extensive and a documentation culture has come to characterize the schools in recent years. In the context of decentralization and changing governance, focus has increasingly been directed towards assessment, follow-up and evaluation of pupils’ learning and social development. This article examines the Individual Educational Plans (hereafter IEP) used for pupils with special educational needs in Swedish compulsory schools from the perspective of text analyses based on discourse theory. The aim of this study is to shed light on how pupils are constructed in the school’s documentation. The study examines how these IEPs are used as a pedagogical technique for new ways of governing in order to impose self-regulation, individual responsibility and social control. The documents, which comprise the empirical material in this article, are gathered from 14 different schools and consist of documents for a total of 136 pupils with special educational needs.*

In Sweden, there has been an increasing interest from schools and the whole educational system to use extensive documentation regularly for the assessment and follow up to control pupils’ individual progress. Since 1995, all Swedish compulsory schools have been required to establish Individual Educational Plans (IEPs) for pupils with special educational needs. IEPs should include written goals and strategies, which must be recorded and evaluated. Furthermore, while IEPs only target pupils with special educational needs, since 2006 an individual development plan has been required for all pupils, including summative assessments in all school subjects (Ministry of Education and Research, 2010). Thus, pupils with special educational needs must have two documents, a regular individual development plan as for every pupil and an additional IEP for their special needs documentation. One substantial consequence of these procedures is the massive amount of paperwork and documentation following every child through the compulsory school system. At least 18 documents in the form of Individual Development plans are established for every child and in several cases many more if called for. Since a written assessment is established for every child in every school subject as well as the individual development plan, and in some cases also an IEP, the amount of assessments becomes almost insurmountable.

Requirements for teachers to record students’ performance have greatly increased during the last 20 years and the documentation is now recorded in a number of ways, in the form of Individual Development Plans, Individual Educational Plans, Educational Action Plans, Individual Studies Plans, written assessments, portfolios, etc. (Andreasson & Asplund Carlsson, 2009; Vallberg Roth & Månsson, 2008; Isaksson, Lindquist & Bergström, 2007; & Hofvendahl, 2006). In these documents, school staffs write about qualities, abilities and subjectivities of all individuals from preschool to upper secondary school. The educational system has thus taken on the task of organizing *learning histories* or *student biographies* to quote Lindgren (2007). This amount of plans and written documents serve as a family of documents where official policy documents, the municipality, the institution of school, teaching and the pupil’s individual situation meet and sometimes even clash. The documents serve as an interpretation (Hall, 1996) to the child’s individual conception of him/herself as a school pupil, referring to success or failure in various subjects.

In this article we investigate how pupils with special educational needs have their identities formed and constructed through the documentation in school. The article also discusses the implications of the governing functions of IEP.

#### *Educational policy and the role of IEP in Sweden*

The school system in Sweden has a far-reaching commission and during the expanding period of the Swedish Welfare State, the school's responsibility for pupils who were assessed as having difficulties in school also increased. Equity is a cornerstone and founding value of the Swedish curricula and educational legislation. Equal opportunities for all children must be provided regardless of disability, socioeconomic background, creed, gender or ethnicity being a fundamental premise in education policy. Fostering values of equity and raising democratic citizens are principal functions of schools.

In the 1980s -90s Sweden changed the governing of the school system from steering by rules to steering by objectives. Responsibility for the progress of the pupil was thereby decentralized to the schools, while the demands for planning and documentation increased (Englund, 2004). The increased demand for evaluation and documentation has been explained and justified in various ways from policymakers. References are made to the opportunity of following and supporting each child over time, early identification of special support need, improving the individual information for continuity of learning, participation and parental influence (Ministry of Education and Research, 2001).

The phrase *a school for all* has for a long time been a goal in Swedish educational policies. The aim is to integrate all pupils within regular education, irrespective of disability or difficulties and to adjust teaching to individual needs. However, an increasing number of children in the ordinary comprehensive school are defined as having some form of difficulty and it is estimated that about 20% of all children in the compulsory school are in need of some form of special support (Giota & Emanuelsson, 2011). The reasons vary, but often pupils at risk do not achieve the educational targets in one or more subjects. Both knowledge and behavioural difficulties are stated as common causes of difficulties in school. Schools therefore need to deal with a range of learning and behavioural difficulties.

There is a strong argument in research literature and policy documents that pupils with special needs should be taught in mainstream settings as far as possible (see Artiles, Kozleski, Dorn & Christensen, 2006). However, research shows that more and more pupils with special needs, socially disadvantaged pupils, and pupils with immigrant backgrounds are marginalised from mainstream settings (Berhanu, 2008). The increased diversity among pupils, in recent years, has also placed additional demands upon teachers as they strive to raise the attainment outcomes of individual pupils. Thus, planning on an individual level has been a common argument from policymakers to meet this challenge. But research also shows that organising pupils into small groups according to their abilities and special needs has become a common response in the Swedish schools, representing a move away from whole group teaching (Giota & Emanuelsson, 2011).

According to the Swedish Education Act (Ministry of Education and Research, 2010) a pupil shall be given remedial tuition if there is an expectation that s/he will not reach the educational targets or if the pupil needs special support for other reasons. Additionally, IEP for the planning, follow-up and evaluation of the special support should be drawn up in consultation with the pupil and his/her parents. IEPs are thus drawn up in a special context with the goal of guiding a pupil's learning or behaviour in a certain direction. According to the guidelines from the National Agency for Education (2008) the IEP should contain information about the pupil's school situation including teaching and learning. It also states that the goals and interventions must be evaluated. Furthermore, the investigation of pupils' needs has to be done on both individual, group and school level. However, several studies show that difficulties are often described in the IEPs as individual shortcomings and deficiencies of the pupil and that the interventions have their roots in behavioural psychology. Other results from studies in Sweden in recent years, have showed that the IEPs often focused on pupils' own responsibility, self-regulatory assessments and that the personal review so these plans are plentiful although the National Agency in its general guidelines writes that the documents should not contain values of the pupil's personal characteristics (Andreasson, 2007; Aspönsjö, 2006; Isaksson, Lindqvist & Bergström, 2007; National Agency for Education, 2003; Persson, 2004; & Vallberg & Roth, 2008).

Results similar to the Swedish studies presented above, are also found in international studies (cf. Banks et al., 2001; & Shaddock et al., 2009). In an international review of almost 300 studies, Mitchell, Morton

and Hornby (2010) demonstrated that there is some general criticism against IEPs that seems to recur in different contexts. They point at the undue influence of behavioural psychology and the over-emphasis on the individual in the IEP's. They also found an overall criticism in the studies on the unproven efficacy of IEP's. Millward et al., (2002) also discuss the influence of behavioural psychology in the IEPs and note that it fits well with the emphasis on educational accountability. They are also critical against behavioural psychology as not updated by modern theoretical perspectives.

#### *Governing relations in the IEP*

One way of interpreting the intensified documentation and focus on progression and continuous control of the individual is to understand it as a form of education governance, using the documentation as a pedagogical technique. However, this eagerness to document in schools cannot be seen as an isolated phenomenon but is a characteristic feature in several areas in contemporary society and a result of the changing ways of governing in post industrialized, 'advanced', liberal democracies (Rose, 1998). Governing is done in an indirect way; it seeks to shape the conduct of others by structuring the field of possible action (Foucault, 1982). The state governs, but the individuals govern each other as well. Likewise, the individuals govern and conduct themselves through an act of subjection (Foucault, 1992), by an individual internalization of the norms of how to be, in order to become the expected subject. Thus, pupils' documentation can be seen as a pedagogical technique for governing in order to impose self-regulation, individual responsibility and social control.

This tendency intersects with current international debate on education from the perspective of governmentality that builds on an analysis of the exercise of power by focusing on the development of governmental rationalities and related governmental technologies. These studies look at ways in which individuals conduct and govern themselves and others in the light of specific *truth games*. The assumption is that there is an intrinsic relation between educational technologies on the one hand and the way in which political power is wielded in our societies and the way in which we govern ourselves on the other (Foucault 2000; 1991a; 1988; Burchell, Gordon & Miller 1991; Simons & Masschelein, 2006; & Pongratz, 2006). Furthermore, it intersects with the construction of identity (Hall 1996; 2003), as well as the influence of the experts and institutions, to form and govern the subject (Foucault, 2000; Rose, 1998).

According to Foucault, the exercise of power is not only a relation between individuals but also a way in which actions influence each other. But power relations are, according to Foucault (1990), simultaneously goal-oriented, i.e. there is no power that can be exercised without intentions and goals, although this does not mean that it is subject to an individual subject's choice or decision; instead, 'power's rationality is rationality in methods' (1990, p.105). It is thus a question of introducing technologies for regulating other people's actions. Such a political rationality strives to describe assumptions about what reality looks like in such a way that its truths are made amenable to intervention, i.e. control. The description of the problem in the documentation could be understood as one such technique for describing assumptions about what reality looks like to pupils who are assessed as having difficulties in order to legitimise a certain type of intervention.

The documents registering individual progress or achievement (or lack of these elements) are thus permeated by a control mentality, the purpose of which is to induce the pupils to think and act in a way the school considers necessary for their development into 'good' school pupils and members of society. The discourse is based on a number of conceptions and held-for-true statements from which difficulties in school are constructed. But the ability to utilise disciplinary techniques requires experts with knowledge of the individual and of people's behaviours. Based on ideas about pupils' needs and with a rhetoric concerning pupils' development, the pupils are categorised as *normal pupils* or *pupils with special educational needs*. But here there are also power processes at work on different levels within the institution, in interpersonal relations and based on normalising power techniques (Foucault, 1990).

#### *The Documents*

The documentation providing the empirical material in this article was gathered from 14 different compulsory schools. The documents were collected within the framework of two studies submitted by the Swedish National Agency for Education. The schools in the study were selected by Statistics Sweden (SCB) on the basis of geographical location, school year, size and principal. The empirical material consists of IEP: s for a total of 136 pupils, 86 boys and 50 girls, who were assessed as having difficulties in school. As several IEP: s could have been drawn up for one and the same pupil; the material consists of 358 documents (246 for boys and 112 for girls) in all. School staff, pupils and parents have been

rendered anonymous in the text material by the schools before it was collected. Only gender and age were given to us when the documents were collected.

The method of analysis could best be described as a text analysis based on discourse theory. After having read through the documents a number of times, we found certain recurring themes in the descriptions of the pupils. These themes were tested against the documents a second time and readjusted. Finally the adjusted themes were tried against the documents until further adjustment felt unnecessary and provided no more information. A further elaboration of the themes could claim that these themes articulate the identities of the Other (Hall, 1996). The underlying discourse is based on assumptions of the identity of the *good* or normal child, being academically, socially, behaviourally and physically (bodily) well adjusted, whereas the children described in the material are deficient in some ways and thus the identity articulated according to the discourse emanating from the plans is subject to reformation and correction.

The results emanating from the text analysis are presented herein after in the four different themes or discourses in terms of academic, social, behavioural and bodily features. The purpose of the documentation according to the Education Act should above all be knowledge related, since it mainly concerns the pupils' academic progress, however, the plans may also, if necessary, contain remarks on and assessments of the pupils' social development and progress. Thus, issues of knowledge development and social progress are to be expected in the plans. However, we also found several instances of remarks on behavioural problems and some even on bodily conduct with basis neither in the curriculum nor in the legislation. In the following section we analyse and critically examine the four discourses from our findings; academic achievement, social achievement and assessment, behavioural difficulties and bodily conduct.

#### *Academic Achievement*

Although academic achievement and knowledge based learning should be the main targets for the individual development of the pupil, this feature is not always the most salient in the plans. However, whenever academic achievement is focused, this is particularly the case when achievement towards goals in literacy (especially reading) and mathematics is absent and less often in other subjects, like history, geography or science, which can of course be explained by the fact that reading (and writing) and mathematics are considered being the basic subjects for learning in other areas.

Erik has problems with his learning to read and write. He finds it difficult to focus which does not make things better ... Erik thinks, in spite of his difficulties, that school is fun. Apart from the breaks, maths is most fun. He says he is good at woodwork.

Martin has difficulties with reading and writing. He changes the words, adds and substitutes letters. Martin stutters and repeats words he has already read. He adjusts the sentences. Martin reads real texts better than nonsense words. He finds longer words more difficult and needs more time. He is best at orthographical words.

On the whole, the assessment of the pupils is mainly summative, i.e. the writer of the documentation assesses the child's achievements as they present themselves in a status quo, or even makes a diagnosis of the child's difficulties. We also found that writers tend to avoid formative assessment, although it would be easy to take the difficulties as a point of departure and write about the child's possible development instead of repeating his/her problems.

Martin is a good example of how the attitude to the child shines through. The first four sentences describe Martin's difficulties and his reading strategies – substituting letters, repeating words and changing the sentences into his own language. However, as a possibly positive remark, the writer states that Martin prefers real texts from story books and meaningful reading assignments before the nonsense words which are part of the reading tests presented to him. On the other hand, this could also be interpreted as a weakness on Martin's part. According to teacher's guidelines, Martin's strategies could be seen as part of his reading development and the question now is how the teacher could support him in his development.

The whole issue of writing development plans in the Swedish school system has undergone a tremendous change with the new system of documentation, since both a summative and a formative assessment should be made in connection with and as a basis for the child's Individual Development Plan/Individual Educational Plan, and as a basis for an informative dialogue between teacher, child and parent(s) about future support and future achievement. Thus, Martin's teacher should focus more on his achievement and possible development and less on his failures and shortcomings, according to the instructions.

On the whole, the theme of academic achievement is the most elaborated in the documentation analysed in this study, which is not surprising. However, this overwhelming focus on difficulties and shortcomings ought to be supplemented with comments on further development and further support made available for the child, in accordance with the legislation.

#### *Social Achievement and Assessment*

Several children in the material, who were found lacking in their academic achievements, were also commented on their social shortcomings. The Swedish Curriculum (Ministry of Education and Research, 2011) contains a section where the school is obliged to give pupils an opportunity to become responsible of their own learning, to work together with their peers as well as on their own and show respect and tolerance towards others. This may be explained why so many plans contain comments on children's (lack of) social skills.

Social difficulties which can be shown in permanent troubles and violent oral attacks... (one target) could be social competence if he could learn to control his actions.

He seldom takes part in group activities but redraws or throws himself on the ground, refusing, screaming and opposing (target) to learn to adapt to social life in school if possible

These excerpts describe three different children out of the 48 who were found deficit in this aspect. On the one hand, it is understandable that schoolwork becomes much easier when the pupils behave in an accepted way, on the other hand, the recent changes in the legislation show that there is a limit to the evaluations of behaviour suitable to be mentioned in the IEP.

More often than not, the theme of social development contains no suggestions of support or of development at all, but frequently utterances of complaint, tediousness and in some cases desperate cries for help from teachers with the situation in the classroom. There will always be children who will not reach the social targets of being able to work in groups and this implies a failure to all concerned. However, the rather meagre comments on what kinds of support or interventions the school could or should provide are practically non-existent.

#### *Behavioural Difficulties*

An extensive theme in the IEP was the theme of behavioural difficulties.

Mike does not collaborate with schoolwork. His note book is not always at school and he does not use it.

Adults at school find it difficult to catch Owen's attention... often he is far off in his own thoughts.

Most of the time he pokes around with his pen or eraser. It takes a long time for him to get started with the simplest possible tasks.

In this theme, the child's behaviour is seen as a huge threshold in becoming a school pupil. These descriptions are fully context free, i.e. they do not describe anything about how the teaching situation looked like at the time. According to the national guidelines, the pupil's learning should be highlighted in relation to the teaching that takes place. With the intention of the documentation to serve as a plan for development of the individual, it is hard to see how children could benefit from these descriptions of their shortcomings and failures, especially since there are no real valid ideas about how development should take place and could be supported.

You could say that these comments on behavioural deficiency serve as interpellations (Hall 1996) where the identity afforded to the pupils is that of the Other, the misfit or the alienated outsider.

#### *Bodily Conduct*

The fourth theme found in the documents is far from legitimate according to the national guidelines and the legislation. The personal reviews are plentiful. The writers of these documents comment on children's bodies, their composure, their standard of hygiene, etc. These comments are meant as corrections of the children's bodily presence in the school room, the way they sit, the way they stand or run, how much they eat and how fast, their personal hygiene and their bodily functions at large.

A quick stand up in the classroom is OK but there is a demand on his own responsibility, practicing not to find the *wrong* friends or disturb the others working.

Provide good table manners and a good ground for daring to try different dishes and consistencies ... and always to wipe his mouth after dinner.

Sitting needs improvement with some aid to bring the chair closer (to the table) and the chair more straight, more *correct*...

To control his behaviour in the dining hall: He could eat big portions by swallowing the food too fast quickly.

The analysis shows that teachers construct a detailed learning history often including the social development for children in school. In these documents the pupils are made visible and deal with the development of the *whole child*. They include self-government, responsibility, participation and consciousness but also social dimensions such as to be happy and positive and not having a negative attitude towards school work.

#### *Tests and the Gaze*

In the results from this study, it emerges that pupils who are assessed as having knowledge-related difficulties are primarily identified by means of tests. By referring to statistical measurements of what is assessed as normal, the pupils are divided into normal or exceptional pupils. Power and knowledge are thus united in order to determine which pupils will be categorised as pupils in need of special support.

The teacher's normalising 'gaze' (Foucault, 1991b) instead identifies pupils, who are assessed as having difficulties of a behavioural nature. The norms according to which the pedagogue differentiates the pupils are part of a network of conceptions concerning childhood, development, ethics, learning, teaching, curricula, syllabi, etc. on which the discourse is based. Children are placed in different categories and end up within or outside the boundary of what is regarded as 'normal' in school. But these conceptions also create boundaries for what is possible to think and do and pupils, who are assessed as having difficulties, thus risk being placed in problem categories that have already been constructed (cf. Levinas, 1969). This means that pupils, who do not meet the expected knowledge requirements or transgress the school's behavioural norms, are more or less as a matter of course placed in a certain category and this is not questioned. Established courses of action and routines such as drawing up plans in an institution may then contribute to describing pupils in a certain way in the documentation without reflection and awareness from the writer's side.

The findings also show that the texts focus on the child and his/her characteristics rather than, for instance, the circumstances in the teaching or the organisation of the school leading up to the problems observed. Hjärne and Säljö (2004) found in an analysis of the work of pupil welfare teams in three comprehensive schools a consistent lack of argumentation and critical analysis when the team discussed a particular child.

The participants contribute by adding illustrations that confirm and extend the account that is evolving. This is followed by implying that there is a cause within the child itself that is likely to produce inappropriate behaviours. This is a very clear, and powerful rhetorical figure in the reasoning employed (Hjärne & Säljö, 2004 p.18)

There is a high degree of consensus in the description of the pupils in the documentation which indicates that the discourse is well established and accepted in the institutional practice. The same words and categories are often used in the construction of normality in the texts. In Bernstein's (1996) terms the instructive discourse in the classroom is embedded in a regulative discourse, *i.e.*, a discourse of moral and values is mixed with a discourse of what pupils should know, learn and do.

#### **Discussion**

At the policy level the aim for these documentation activities is to strengthen school-home relationships and support pupils' participation in school work for further achievement. However, the analysis shows that the pupils described in the plans are articulated as identities of the other. This means that the underlying discourse is based on assumptions of the identity of the *good* or normal child. Thus, as a conclusion one could say that *the good child* is constructed in the plans as the absent but desired pupil:

- Academically - working towards and reaching the target on time
- Socially - interacting with adults and peers

- Behaviourally - focused, with the right equipment, on time, in place
- Bodily – controlled and neat

In the present school discourse, the school should form self-regulating, independent, flexible, responsible and creative pupils who possess social competence and are able to seek their own knowledge (cf. Lundahl, 2002; Börjesson&Palmlblad, 2003). The pupils targeted in the documentation analysed here are constructed in the school discourse through differentiation, in relation to the other and based on how they are not in relation to the school discourse's ideal pupil. They are constructed by a clarification of their shortcomings and characteristics.

The ideal pupil described in the documentation, on which the pupils with the educational action plan should be modelled, is a self-regulating and autonomous individual who is expected to take responsibility for his or her learning. Important social fostering goals for the pupils with an IEP to achieve are thus taking responsibility for their schoolwork, being motivated, improving their social competence, becoming more independent but also becoming aware of their own learning process. And the body should also be controlled.

The pupils described in the analysed plans need to be changed and formed so that they can function in this *new* pedagogical discourse. There is a great need to satisfy this *new* pedagogical requirement concerning how pupils should be in the school practice, which could then result in the social fostering goals taking priority in the texts.

The results from this study also show that the pedagogical investigation that precedes a plan contains elements of *pastoral power* (Foucault, 1990). These dialogues, which take place at school in connection with drawing up a plan, can be compared with Foucault's 'practice of confession' and in part constitute the basis of pastoral power. Guidance or counselling is thus given by the schools' 'experts' to parents and the pupil and in this relation, a number of techniques can be utilised to form the pupil into a 'good school pupil'. A common support intervention found in the plans is having several adults around the pupil, e.g. a teacher assistant who stays with the pupil through a large part of the school day. Such an intervention provides many opportunities for heart-to-heart conversations with the pupils, which, from a Foucauldian perspective could be seen as part of this practice of confession. But according to Dean (1999), pastoral power does not solely involve exercising power over others but also reflecting on how we can control ourselves. The texts could then be a pedagogical technique used for this self-regulation.

As a result of this increase in teachers' control in the plans, pupils are continuously assessed and in the event of unacceptable behavior, the pupil is also able to reflect on his/her behaviour together with the adult, who can be said to be a part of the self-control. This notion may also be present as a target in the pupil's plan.

The reasoning about self-control includes ideas about autonomy and freedom and leads us to Foucault's concept of governmentality and liberal control. This control emphasises the 'free' subject who is expected to control his/her own behaviour in an appropriate way (Foucault, 1988). In the school's world, 'free' means an unspoken expectation that the pupils will form themselves in accordance with the school's order. According to Foucault, these 'technologies of the self' (1988,p.18) imply both greater knowledge of oneself but also working on oneself to become the 'good subject', *i.e.* self-control through self-knowledge and reflection.

We could state that this documentation is a governing practice. The results point to a number of different types of this self-control, which are present in the plans. These are the pupils' logbooks and different types of notes, although some of the proposed interventions in the plans can also be regarded as a type of self-control. For example, in the plans, the pupils could agree to practise a change in their behaviour in dialogues with an adult. But it is gentle governance, in the name of freedom (see Rose, 1998). The social control is thus a question of forming a desirable citizen in order to realise the ideas cherished by society about how individuals should be. The school participates in this social control, which aims to produce the discourse's ideal pupil. But society is constantly changing and the latest change in the Western societies is often described as a transition to late modern society. In late modern society, several significant changes which can be described with words such as globalisation, service production, decentralisation, disparity, cultural diversity, personal development, entrepreneurship, creativity and individuality, have been made apparent. Based on the analysis of the documentation in this study there is some uncertainty as to how the school practice is handling these ideological changes. The results indicate that varying



ideologies are present in the texts, which could thus indicate a certain amount of discontinuity. The problem formulations as well as the proposed interventions show that traditional approaches and ways of working dominate at the same time as the ideal pupil described as desirable is part of the *new* discourse.

This discussion thus brings up questions about the professional role of teachers. But from Foucault's governmentality perspective, the teacher is also subject to social governing. The teacher is thus not outside this held-for-true discourse and in this way, the discourse also has the function of disciplining the teacher. The ideological changes that have taken place thus mean that the teacher has less authority while pupils have more individual responsibility. This change, however, means that subjects must be responsible and self-regulating if pedagogues are to be able to carry out their knowledge mission in today's school. The pupils not belonging to this group, such as the pupils needing special support, may thus be regarded as obstacles to the school's and the teachers' mission as mediators of knowledge. The question then is whether the teachers have enough *tools* to reach all the pupils in accordance with the inclusive framework in the school and to be able to carry out their knowledge mission for the benefit of all pupils. This implies questions of how the pupils, who are not autonomous and self-regulating, can be given adequate supportive interventions by the school in order to achieve their knowledge goals without first having to be formed into this *new* subject. This implies making links beyond education and attends to broader issues of social inclusion.

We argue that, based on the results from this study, there is a need to bring out and discuss the school's role as a mediator of identity in the pupil documentation produced. This requires an awareness and knowledge of the importance of language for the formation of pupils' identity as well as a discussion about the ability of language to produce change. Being careful about how one describes another person could be extremely important when it comes to the individual pupil's encounter with him/herself as reflected by the other. In addition, the pupils involved most often read through and sign their plans and presumably it is difficult to resist an appropriation of the identity afforded in the document, since they are repeatedly, in one plan after the other, formulated based on the same behaviour and difficulties.

However, we must also be aware of the increasing amount of documentation for the teachers to write. Writing this documentation is included in the teacher's assignment according to the Education Act, but no extra time is allocated. Consequently, teachers have to take that time from something else. They may even have to take time from their teaching.

Although a complex issue, the power of the written word must nevertheless be acknowledged by teachers. Knowledge about the gender order and other social orders is also important as an understanding of the significance of providing descriptions of individuals in texts for immediate or later use and how this description can affect children's identity constructs.

In conclusion, the formulation of problems that emerges in the documentation concern pupils' knowledge, attitudes, abilities, skills and behaviours in many different areas. The written texts thus include not only knowledge-related and pedagogical issues but also documentation of social and ethical aspects and these different aspects (psychological, medical, pedagogical and ethical) are interwoven in the descriptions of the problems. The positioning of pupils in the IEPs illustrates the role of these plans as a technique of governance in contemporary societies. The plans produce discourses that regulate children and their families. Blurring the boundary between private and public, is an important ingredient in these processes. But it also means exercising power.

Finally we would like to quote Foucault (1991) in his notion of *docility*.

...a general theory of dressage, at the centre of which reigns the notion of 'docility', which joins the analysable body to the manipulable body. A body is docile that may be subjected, used, transformed and improved (Foucault, 1991b, p. 161)

Linked to the different types of goals in the plans, they are in line with the school's focus on knowledge and social improvement formulated in the Swedish legislation. The question is: When do they pass the limit?

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## POSTSECONDARY EDUCATIONAL EXPERIENCES OF ADULTS WITH FETAL ALCOHOL SPECTRUM DISORDER

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*The postsecondary experiences of adults diagnosed with Fetal Alcohol Spectrum Disorder (FASD) were examined in this qualitative research. Tinto's Student Integration Model (SIM) (1975, 1997) provided the theoretical framework that guided the study. Tinto posits that the interplay of background characteristics, academic integration, and social integration affect persistence in postsecondary education. The participants included four adults with FASD (3 males and 1 female) and their parents. In-depth interviews were conducted with the adults with FASD and their parents responded to open-ended questions in an online survey. Only one of the adults completed a postsecondary program. It was found that the background characteristic factor, and specifically having FASD, affected academic and social integration. Suggestions for revisions to the SIM are proposed, recommendations for postsecondary course instructors and academic counselors are made, and factors to consider when selecting a postsecondary program for an individual with FASD are described.*

Fetal Alcohol Spectrum Disorder (FASD) is an umbrella term that refers to a range of outcomes including mild to severe disturbances of physical, behavioural, emotional, and/or social functioning that have been observed among individuals with prenatal exposure to alcohol (Streissguth & O'Malley, 2000). It encompasses a range of different diagnoses including fetal alcohol syndrome (FAS), partial fetal alcohol syndrome (pFAS), alcohol-related birth defects (ARBD), and alcohol-related neurodevelopmental disorder (ARND). Although only FAS is associated with specific physical and facial characteristics, all of the diagnoses involve permanent brain damage. Researchers have reported that some individuals with FASD have below average IQs (Steinhausen, Willms, & Spohr, 1993) and that prenatal exposure to alcohol is the leading cause of developmental disability in Canada (Health Canada, 2003). However, other researchers have indicated that children exposed to alcohol in utero may score within the normal range of development, but below what would be expected given the child's environment and background (Chudley, Kilgour, Cranston, & Edwards, 2007; Clark, Lutke, Minnes & Ouellette-Kuntz, 2004; Mattson & Riley, 1998; Riley, Mattson, Li, Jacobson, Coles, Kodituwakku, Admans, & Korkman, 2003). Moreover, that potential ability is compromised by much lower scores on adaptive functioning (Odishaw & Snart, 2005) and significant cognitive deficits in attention, memory, and executive function (Kerns, Don, Mateer, & Streissguth, 1997).

The incidence of FASD in Canada is difficult to calculate due to problems in obtaining a diagnosis (complexity of the process and omission), the variance in the rates of FAS among populations, and different research methods used to study the problem (Chudley, Conry, Cook, Looock, Rosales, & LeBlanc, 2005; May & Gossage, 2001). However, Canada's Public Health Agency (2003) estimated the incidence of FASD to be approximately 9.1 per 1000 live births. Stade and her colleagues (2006) reported that the total adjusted annual costs associated with FASD per individual aged 1 to 21 years in this country were over \$14,000, depending on the severity of the child's condition and proximity to services. More severe cases of FASD may require surgeries to correct heart defects, skeletal problems, and sensory impairments, as well as specialized health and educational services (Stade, Unger, Stevens, Beyene, & Koren, 2006). When the individual resides in a remote area of Canada, travel to and from the service delivery facility is required and additional expenses are incurred. Over a lifetime, the costs associated with FASD are estimated to be \$1.5 million per person (Health Canada, 2003). These figures

point to the substantial direct and indirect costs of FASD and long-term economic impact of prenatal exposure to alcohol.

#### *FASD and Adulthood*

Although etiology, assessment, diagnosis and prevention have been studied (Clark, Lutke, Minnes, Ouellette-Kuntz, 2008), little attention has been paid to the issues faced by adolescents and adults with FASD (Rutman & Van Bibber, 2010). Most individuals with FASD do not receive a diagnosis until adulthood (Chudley, Kilgour, Cranston, & Edwards, 2007). Moreover, obtaining a diagnosis is often difficult for adults because in most cases there are no physical signs and there is no biological test available (Chudley, et al., 2007). For an assessment referral to be made, FASD must first be suspected and there is insufficient knowledge of FASD among physicians, social workers, psychologists and psychiatrists. Confirmation requires an assessment that is best carried out by a multi-disciplinary team and there is a shortage of personnel qualified to make a diagnosis (Ryan, Bonnett, & Gass, 2006). It has also been noted that adults with FASD are at substantial risk for mental health problems (Chudley et al., 2007; Clark, Lutke, & Minnes, 2004), which suggests that some individuals may be diagnosed with FASD following an initial diagnosis of mental illness (Streissguth & O'Malley, 2005).

Primary disabilities associated with FASD include disturbances in attention, cognition, learning, memory, language, motor coordination, complex problem-solving, and abstract thinking (Connor & Streissguth, 1996; Kerns, Don, Mateer, & Streissguth, 1997). They are unique to each individual and persist over the lifespan (Hartness, 1998; Streissguth et al., 1994). These primary disabilities refer to those problems directly associated with FASD, while secondary disabilities refer to the acquired difficulties individuals with FASD develop as they mature (Streissguth, Barr, Kogan, & Bookstein, 1996). Secondary disabilities include: one or more mental health problems; disrupted school experience (suspension, expulsion, dropping out); trouble with the police, being charged, convicted of a crime, confinement as an inpatient for mental health or substance abuse problems or incarceration for a crime; inappropriate sexual behaviour; substance abuse; and difficulties with living independently, getting a job, and maintaining employment (Streissguth, et al., 1996). Factors that may reduce the rate and severity of secondary disabilities include: an early diagnosis (before 6 years), appropriate interventions, living with a caregiver, requiring a minimal to low level of support (suggesting higher levels of adaptive functioning) and not being vulnerable to manipulation (Clark, Lutke, Minnes, Ouellette-Kuntz, 2008; Streissguth, 1997).

The outlook for adults with FASD is not full of hope. Although perceived as *normal*, they have neurological problems that result in functioning far below normal (Ryan, Bonnett, & Gass, 2006). Even with IQ scores in the normal range, they continue to exhibit clear deficits in attention, memory, verbal learning, and executive function (Kerns, Don, Mateer, & Streissguth, 1997). Given these challenges, it is not surprising that 60% of individuals with FAS either drop out or are suspended from high school (Streissguth, Barr, Kogan, & Bookstein, 1996). Additionally, a gap between adaptive skills and measured IQ contributes to the individual's difficulty performing day-to-day activities (Clark, Lutke, Minnes, Ouellette-Kuntz, 2004). Unemployment, inability to live independently, and trouble with the law have also been identified as problems for adults with FASD (Spohr, Willms, & Steinhausen, 2007; Streissguth, Barr, Kogan, & Bookstein, 1996).

However, other research has shown that living with a caregiver reduced the number of confinements (hospital or prison) and run-ins with the law (Clark, Lutke, & Minnes & Ouellette-Kuntz, 2004; Spohr, Willms, & Steinhausen, 2007). Duquette and her colleagues (2006) also found that parental advocacy was a protective factor against dropping out of high school and that some individuals with FASD do go on to postsecondary education (Duquette & Stodel, 2005). To date, there are no studies on adults with FASD who have engaged in courses after high school and their educational experiences. Therefore the main purpose of this research was to examine the postsecondary educational experiences of adults with FASD with a view to understanding their perceptions and persistence.

#### *Theoretical Framework*

Tinto's (1975, 1997) student integration model (SIM) provided the theoretical framework for this study. The SIM explains why postsecondary students drop out or persist and graduate. Tinto (1975) originally developed the SIM as a model of dropping out that presented three factors that explain the phenomenon. The SIM involves an interplay between (a) background characteristics (i.e., personal attributes such as ability; academic preparation; and family situations) which in turn affects the level of goal commitment, (b) level of academic integration (e.g., grades, intellectual development), and (c) level of social

integration into the institution (e.g., informal peer group associations, extracurricular activities, interaction with faculty) that determine whether or not a student will graduate. In 1997, Tinto revised the SIM and changed the focus from dropping out to persisting and posited that institutions should promote the development of learning communities in order to retain students.

Tinto's SIM has been used to predict persistence among university and college students. Academic integration and social integration were both reported as influencing persistence among 151 Russian immigrants attending an Israeli university (Sagy, 2000). However, academic influence appeared to be a stronger predictor as at this university there were relatively few opportunities to engage in campus social activities. In a study involving 2,236 freshmen in the US, Pascarella and Chapman (1983) found that the type of institution affected persistence. Specifically, for students in a four-year residential university, social integration had a greater influence on persistence than academic integration, but for individuals registered in four-year and two-year commuter institutions, academic integration was the most important factor affecting persistence.

The SIM has also been used in studies involving persistence among community college students. Nora (1987) surveyed 3,544 Chicano students and demonstrated that goal commitment was the most important factor affecting persistence. Academic integration was of lesser importance and social integration had little influence. In contrast, Bers and Smith (1991) reported that among 1,142 students in a community college, academic and social integration both influenced persistence, with social integration being more important. Napoli and Wortman's (1998) meta-analysis of studies involving persistence among college students showed that academic integration predicted term-to-term and year-to-year registration, whereas social integration only predicted term-to-term registration.

While the SIM has been used in many studies to examine persistence among various groups of postsecondary students, the research on students with disabilities is thin. DaDeppo (2009) used the SIM to guide her research involving 97 college freshmen and sophomores with learning disabilities (LD) who were registered in a four-year public institution in the US. The results of this quantitative study demonstrated that academic integration was a significant predictor of intent to persist, but social integration was the more powerful predictor of these students' intent to persist. In the only qualitative study involving the SIM, Duquette (2000) reported that goal commitment, academic preparation, and academic integration were more closely linked to persistence than social integration among the 36 Canadian university students with various disabilities (LD, hearing impairment, visual impairment, medical impairment, and physical disability). Almost none of them were involved in campus-based social activities and they did not socialize outside of school with their classmates. Instead, they relied on their families for emotional support.

As shown above, research involving the SIM show mixed results for postsecondary students in general and for university students with disabilities. In various contexts and with different groups of students, either academic or social integration was the stronger influence on persistence. What is clear, however, is that the literature on persistence consists mostly of quantitative studies and there is no research on the SIM among college students who have disabilities.

### *Research Questions*

The main objective of this qualitative research was to examine the postsecondary experiences of adults with FASD, and Tinto's (1975, 1997) SIM provided the theoretical framework from which to study this phenomenon. The research questions were as follows:

1. What are the background characteristics of the postsecondary students with FASD?
2. How are the students with FASD academically and socially integrated into postsecondary institutions?
3. What are the facilitators and barriers to persistence until graduation?

### **Methodology**

This qualitative study followed a phenomenological approach, as knowledge was socially constructed by the people active in the research process (Schwandt, 2000). The intent of this retrospective research was to understand and describe the events from the point of view of each of the participants (Creswell, 2007), using Tinto's (1975, 1997) SIM as a lens through which to view the phenomenon. This research is part of a larger study on the postsecondary educational experiences of individuals with FASD and their subsequent employment and individual living situations. It involved 12 parents in Canada and the US and four adults with FASD. Parents of adults with FASD who had attended postsecondary programs

responded to open-ended questions in an online survey; then four of these parents recruited their son or daughter to participate in an individual interview. Only the data on educational experiences gleaned from the questionnaires and the interviews are described and discussed in this research.

#### *Participants*

The participants of this study resided in Canada and the US and included four adults with FASD and their respective adoptive parents. A recruitment notice was sent across North America through the e-mail list serve of an Ontario FASD Support Group and FASlink. The selection criteria for the adults were (a) to have a diagnosis of some form of FASD and (b) to be enrolled in a postsecondary program (transition, apprentice, college, or university) or to have been enrolled in a postsecondary program. The selection criterion for parents was to have an adult child with a diagnosis of some form of FASD who is enrolled in a postsecondary program or who was enrolled in one. In all cases, a parent completed the online survey and four of them indicated that their son or daughter would be willing to participate in an interview. Early in the data collection process it became obvious to us that there were very few adults with FASD who had attended postsecondary programs, which is reflected in the small number of parent participants (12). Comments of parents who wanted to participate in the study suggested that (a) individuals with FASD leave high school with a certificate of attendance and not a diploma and (b) some young adults with FASD with a high school diploma decide not to pursue postsecondary studies. Additionally, it is possible that some people with FASD who are registered in postsecondary programs have another diagnosis, such as learning disabilities or mental illness.

#### *Data Collection*

Data were collected from the adults with FASD through in-depth interviews. The items for the interview schedule were written simply to facilitate understanding. Sample questions were *What accommodations do you need to be successful in your courses?* and *Were you involved in any school activities?* (see Appendix A). During the interviews, participants were given the opportunity to elaborate on their individual stories (Marshall & Rossman, 2006). The interviews were conducted in person or by telephone, lasted about an hour each, and were digitally recorded. All of the interview participants were provided with a copy of their transcript and given the opportunity to read and amend it, if they felt it would clarify or better represent their answers. Data from parents of the adults with FASD were collected through an online survey consisting mostly of open-ended questions. Sample questions were *What can an instructor do to help your child(ren) learn the material?* and *What can colleges or governments do to help people with FASD get into postsecondary programs and graduate?*

#### *Data Analysis*

The interview transcripts of the adults with FASD were read repeatedly, text was underlined, and notes were made in the margins (Miles & Huberman, 1994). Then the data were grouped into the following categories: diagnosis, elementary school, secondary school, and postsecondary education. Data for each participant were summarized on a table and arranged according to the above categories. The data were compared across each category and similarities and differences were noted (Strauss & Corbin, 1998). The data related to elementary and secondary school experiences were further examined for patterns in background characteristics, then the postsecondary data were analysed for themes in the areas of academic and social integration. The analysis was done by hand (Charmaz, 2000) to increase engagement with the data and interpretations were made using inductive reasoning (Patton, 2002). The qualitative data from the parent surveys were analysed similarly to the process described above.

#### *Trustworthiness*

The researcher must establish indicators that provide evidence that the data collected in the study are authentic and believable (Freeman, de Marrais, Preissle, Roulston, & St. Pierre, 2007). The two main indicators used in this study were credibility and confirmability. Credibility refers to the correspondence between the researcher's portrayal of the participant's viewpoints and the way those individuals actually perceive the phenomena (Mertens, 2005). Conducting member checks and negative case analyses enhanced the credibility of the findings. First level member checks were conducted by having the participants review and confirm the accuracy of the transcripts (Brantlinger, Jimenez, Klingner, Pugach, & Richardson, 2005). A negative case analysis was also done by looking for data that was inconsistent with categories that had been identified (Brantlinger, et al., 2005). A confirmability audit was conducted by the first author to ensure that the summaries of the data could be traced back to the original sources (Mertens, 2005). Finally, the two investigators analysed the data independently to ensure agreement on the findings.

### Findings

#### Diagnosis

Four adults with FASD (Johnny, Ted, Alan, and Sonja) and their parents participated in this research (see Table 1). All of them were adopted at a young age and were raised by their adoptive parents. Only Johnny was from the US and the other three participants were born and raised in British Columbia, Alberta, and Newfoundland. Johnny is 26 years and his mother explained that she and her husband became foster parents when their son was 15 months. She was told he had FAS, and she did some research on it, but added that they had *no clue what we were in store for*. Johnny stated that he knew at age seven years that he had FAS and stoically commented, *I'm stuck with this thing for the rest of my life*. Ted is 39 and was diagnosed when he was 29 years. He explained that he was initially diagnosed as *bipolar*, but when it was determined that he lacked *the serious manic episodes* associated with bipolar disorder, the diagnosis was changed to clinical depression. The mental health diagnosis was later seen as a secondary disability stemming from ARND. Ted expressed that this diagnosis helped him understand *why things have been so damned difficult*. However, Ted harbours negative feelings about it: *I think it has taken me a long time to try to figure out exactly what it all means. I felt ashamed of myself. I felt like less of a person*. Alan is now 31 years and was adopted by his parents at the age of one. Like Ted, Alan was first diagnosed with a mental health problem and through a referral from a family physician the second diagnosis of ARND was made at age 19 years. Also like Ted, the second diagnosis provided an explanation for some of the difficulties he had experienced throughout his life. Alan seemed to accept this assessment and he claimed not to think much about it afterwards. Sonja, aged 43 years, had been diagnosed with dyslexia in her early teens but realized four years ago that she also has FASD. Unlike the others, she read an article in a magazine about FASD and became aware that the symptoms were consistent with her own experience. The self-diagnosis was later confirmed by a family physician working in her home province. Like the other participants diagnosed later in life, she felt relieved to know the source of her problems and commented that it *answered a lot of questions about why I was not in the same place as other people my age*.

**Table 1. Participant Characteristics**

Name	Age	Province/State of Residence	Diagnosis	High School Graduation	Post-Secondary Program	Post-Secondary Graduation
Johnny	26 yr.	Texas	FAS, 7 yr.	Yes	Welding	No
Ted	39 yr.	British Columbia	ARND, 29 yr.	No	GED	No
Alan	31 yr.	Alberta	ARND, 19 yr.	Yes	Culinary Arts	No
Sonja	43 yr.	Ontario	ARND, 39 yr.	Yes	Dental Assistant, Legal Assistant, Ready for Work	Yes

#### Elementary and Secondary Schooling

As Johnny had a diagnosis as a child, he was able to obtain placements in special classes throughout his schooling. The other three individuals were in regular classes during their elementary school years. Alan commented that at that point he *was like everyone else*.

In high school, Alan was enrolled in a private school by his parents because there had been some drinking and trouble with the law. He was the only one of the four participants with FASD who took regular education classes in high school. His mother described him as articulate and a good reader, but recognized that he had difficulties with written expression and socializing with peers. Alan said, *We thought it was a phase and I'd grow out of it. Apparently, I didn't though*. During high school Ted and Sonja both began in regular classrooms and were later placed in special classes with reduced academic demands. Sonja explained that she was assigned to this class for *difficult and slow students* during her second year of grade 9, but was removed after *a week or two ... [when] they knew I didn't belong there*. However, Ted remained in special classes until grade 12. Johnny continued to be placed in special segregated classes, which included some vocational preparation courses. Johnny, Ted, and Sonja all exhibited behavioural problems in school. Ted and Johnny commented that they were angry and *not able*



to concentrate. Sonja explained that due to her FASD, she would *lose focus easily* and *get bored*, and to provide some stimulation, she became the class clown.

The three older participants enjoyed English and art classes. All of them experienced problems with math, and Alan commented that having difficulties in this subject area *is one of the hallmarks of FAS*. Sonja explained that math word problems were particularly difficult as the words and numbers were *jumbled in my brain and I would get things backwards*. Johnny's program included work experience at Target and Walmart, neither of which he claimed to enjoy. None of the others had any work experience or coop in high school, although Alan did receive some instruction on career and life management, which he did not find helpful.

Sonja and Alan participated in sports in elementary and high school, and their parents also enrolled them in extracurricular arts programs (e.g., music and art lessons). In high school Johnny and Ted were both involved in military organizations (Naval Junior Reserve Officer Training Course and Air Cadets, respectively). For both of them, it was a positive experience. Ted enjoyed it because the program was structured and the instructional strategies were appropriate for someone with FASD. He explained, *They do things for the lowest common denominator so they dumb things down as much as possible to try and get everybody on track [and] there is a lot of repetition*.

Although there were positive aspects to their school experiences and their parents provided academic assistance at home, only Johnny and Alan graduated with their peers. Alan stated that he had considered quitting many *times*; however, he perceived that this would be his only opportunity to obtain free schooling and therefore persisted. His mother added that she advocated for him to take his grade 12 English exam using a computer, otherwise she stated that he would not have attempted it.

Ted and Sonja both became involved with the *wrong* friends and eventually dropped out. At the end of grade 10 and with only four credits, Sonja quit school and left home. By that time Sonja's parents had her assessed and she was diagnosed as having a learning disability. Ted left school at the end of grade 12 because he was failing some courses and decided to take a job on a *cruise ship that took people fishing*. Ted was considered an underachiever and felt misunderstood. He explained, *Back then, nobody understood what the problem was. Everyone was getting frustrated. It was to the breaking point. They figured I was being a twit for the sake of being a twit*.

#### *Postsecondary Education*

Ted enrolled in a GED program offered by the local school board and took courses in English and math. He enjoyed the creative aspects of his English classes, had a positive relationship with the instructor, and received a mark that was *just short of honours*. However, he had a *really hard time* in the math class. The math teacher *figured [he] was goofing off all the time* and in the end, he just *squeaked through*. Those were the only courses Ted took after leaving high school and he did not complete his GED.

Johnny, Alan, and Sonja attended college programs. Johnny enrolled in a welding course at his local junior community college because *I thought it would be something neat. You get to melt metal together and make stuff*. Alan went into culinary arts as he always enjoyed cooking and thought that this might be an area in which he could succeed. Although both men entered their programs with high hopes, neither completed them. Johnny quit after one year because he *wasn't focusing on welding. I was focusing on other stuff*. Alan left his program after a few weeks because it became overwhelming. He explained that he had difficulty remembering the cooking terms in his classes and his poor spelling inhibited his performance on written assignments. He also described the practical aspects as being very stressful, *... doing all of those different things at once. I'm pretty good in the kitchen, but if I get frustrated, everything stops working*. When Alan began the program, he was being assessed for FASD and had just started new medication for depression. He described his emotional state as *up and down all the time*. Moreover, the instructor was not informed about his FASD or his medications, and with the stress of the program, Alan felt he could not cope with all of these elements at the same time. He stated that he experienced a *psychotic breakdown*, causing him to quit the program, and *crash* for a few months.

Like Ted, Sonja wanted to obtain her high school diploma and went back to adult high school. She said, *I had a purpose, you know, a goal; that is I wanted to finish high school. So I wasn't a so-called 'loser dropout'. So that's what I did*. Sonja graduated from grade 12 and returned to take English and math at the advanced level so that she could earn her grade 13 diploma. She then enrolled in a dental assistant program because she felt that it was best suited for her. Unfortunately, after completing her studies,

Sonja was unable to find a job as *they all wanted someone with experience*. Years later, she entered a program to be a legal assistant because she always had an interest in law; however, she did not realize that it would be so stressful. She explained, *It's just overwhelming and it's too much for someone with FASD. You really have to be on the ball to do that type of job. You can't forget things*. She felt that if she had done more research into the actual duties of a legal assistant and had known her diagnosis, she would never have gone into the program. Nevertheless, Sonja did complete it and she acknowledged that her parents' support of her academic work over the years had been critical to her success. Most recently Sonja was enrolled in a 10 week work preparation program that lead to certificates in workplace and food safety.

*Accommodations and instructional strategies.* While at college, only Johnny received accommodations because his mother contacted the instructors and asked if he could work at his own pace. Johnny described how he learned the skills, *You just had to practice over and over and over...It took time and patience*. However, his mother added that her son became distracted easily and often did not do the work. She later found out that when assigned to watch instructional welding videos on the computer, Johnny would view inappropriate material during class time. Additionally, he succumbed to peer pressure and left class to drink. Alan, Ted, and Sonja had no accommodations while enrolled in their courses. Sonja did not feel she needed them and the two male participants did not request them.

When asked about accommodations, Alan felt that smaller class sizes and assistance with the assignments would have helped him in his culinary arts program. His mother added that breaking the modules down into smaller chunks would reduce the amount of information to be memorized at one time and the feeling of being overwhelmed. She added that students with FASD should be allowed frequent breaks and the option of completing assignments using a computer. Johnny's mother perceived that her son needed more supervision, particularly when using the computers. She commented, *I don't think he is capable of this type of experience without close supervision. Most people do not know about FAS here*. Ted's mother believed that her son required a quiet, non-judgmental setting where he could work at his own pace and get one-to-one explanations from a patient instructor whenever he needed. She cautioned that distractions and pressure should be minimized.

Sonja stated that she did not require any accommodations: *I didn't need any help. Well, obviously, I'm high functioning – that's the word they like to use*. Nevertheless, she did recommend the use of the following instructional strategies with students with a FASD diagnosis who are registered in postsecondary classes:

- One-on-one instruction to decrease distraction and feeling *stupid in front of others*.
- Present one thing at a time because students with FASD become overwhelmed.
- Speak slowly and provide clear explanations.
- Avoid placing too many things (e.g., posters) on the wall because it is too distracting.
- Use a variety of instructional methods that involve different senses: auditory, visual, and tactile.
- Limit the homework because *people with FASD need their down time*.
- Be aware of the lighting, temperature, and noise levels in the classroom as many people with FASD are more sensitive to them than other students.

*Future plans.* The three males thought about returning to school, but have not done so. Johnny would not resume the welding program but stated that he enjoys physical activity and has looked at courses that would help him become a personal trainer. However, he has not gone beyond investigating this possibility. Both Ted and Alan think about going back to school, but don't think they can bear to experience another failure. Alan explained, *I can't deal with another big crash. It just takes too much time to recover now*. The physical and emotional outcomes of trying something new and failing are just too much of a risk.

## Discussion

### *Background Characteristics of the Participants*

The participants with FASD had varying degrees of primary and secondary disabilities associated with FASD (Connor & Streissguth, 1996; Streissguth, Barr, Kogan, & Bookstein, 1996). Johnny had been diagnosed with FAS as a child and not surprisingly as an adult he had trouble learning and required close supervision by the instructor (Connor & Streissguth, 1996). His mother also wrote that he was easily influenced by peers and had developed a secondary disability: substance abuse problems (Streissguth, Barr, Kogan, & Bookstein, 1996). Sonja also had a diagnosis (learning disabilities) that had been made when she was in her early teens. After earning her grade 12 high diploma, she knew her learning

strengths and weaknesses and along with her personal interests likely selected the dental assistant and later the legal assistant programs with them in mind.

When Ted and Alan began their postsecondary studies, neither of them knew they had FASD. Alan had been diagnosed with mental illness, but Ted's depression had not been formally identified. However, both of them were first diagnosed with mental illness, which were later found to be caused by FASD (Chudley, Kilgour, Cranston, & Edwards, 2007). While in their respective programs, Ted had difficulty with math and Alan had problems with written expression and responding to more than one instruction at a time. Ted's difficulty with math and Alan's problem with written language were likely linked to FASD (Connor & Streissguth, 1996) that continued into adulthood (Hartness, 1998; Streissguth et al., 1994). Moreover, Alan's difficulty in responding to multiple instructions simultaneously might have been exacerbated by his mental health problems (Manalo, Ede, & Wang-Toi, 2010) and his new medication.

In terms of academic preparation for college, three of the four adults with FASD had achieved a high school diploma. It is possible that the curricula included in Johnny's special education program did not adequately prepare him for the academic requirements of postsecondary courses. With the accommodation of being able to take his grade 12 English exam using a computer, Alan entered college with a high school diploma. Unfortunately, at the time he began his program in culinary arts, Alan was depressed, did not know he had FASD and had not yet grasped the full extent of his illness. Like Alan, Sonja had completed high school and had taken academic courses which likely prepared her for success in her postsecondary studies. However, unlike the others, she did not have any secondary disabilities, specifically mental illness or substance abuse that might jeopardize the achievement of her goal – graduation.

Transition and career planning are recommended for individuals with FASD (Shepard and Hudson Breen, 2007) and might have been helpful for these participants. However, none of the participants described the preparation of Individual Transition Plan documents, visits to various colleges, or meetings with special services personnel in colleges. The three older participants likely did not have a formal transition plan because they were in high school before legislation mandating these documents was passed. Additionally, they began their postsecondary studies after taking a break from school and when they resumed their studies, it did not occur to them to ask for any academic assistance. Only Johnny entered college directly from high school and he did not appear to have any accommodations in place until his mother spoke to one of his instructors.

While better transitional planning might have affected the outcomes, it is clear that any career and postsecondary education plans for a person with FASD must be based on accurate diagnoses of primary and secondary disabilities and an understanding of the learning strengths and needs of the individual. At the time when the three older participants began their postsecondary studies, they did not know they had FASD and were therefore unaware of the pervasive and negative effects it could have on their ability to learn and adapt to the demands of their programs.

#### *Academic Integration*

Of the four individuals, Sonja likely had the highest degree of academic integration because she passed all of her college courses and successfully completed the programs in which she was registered. She had taken the advanced-level high school courses that prepared her to do postsecondary work, did not require any academic accommodations to be successful, and was able to follow through on her goals. During the one year that Johnny was in his program, he was able to do the hands-on welding with a lot of practice and at a slower pace. However, he admitted to being easily distracted from his studies, which limited his academic success. Alan appeared to have the least academic integration, as he left his postsecondary studies after one month. Despite the help from his mother, he was overwhelmed by the memorization required in the course work and was stressed by the pace and demands of working in a kitchen. These two participants would have benefited from accommodations such as closer supervision, a slower pace of instruction, and reduced memorization.

In this study, the degree of academic integration in college-level programs appeared to be linked to the students' learning problems that were symptoms of FASD, such as deficiencies in memory and attention, inability to work independently, and the need for slower paced instruction. These problems could also be compounded by the symptoms of a secondary disability, such as anxiety and depression that may have been triggered by the demands of academic studies (Manalo, Ede, & Wong-Toi, 2010; Stevenson, 2010).

A second factor related to academic integration was the goodness of fit between the demands of the program and the cognitive levels and learning strengths and needs of the student. With more careful investigation, Alan might have understood that cooking at home is not the same as cooking in a restaurant kitchen. Similarly, Sonja stated that if she had understood the day to day requirements of working in a legal office (e.g., multi-tasking and remembering things), she would not have registered in a program to be a legal assistant. In these two instances, knowledge of the nature of the jobs for which they were being trained should have been a consideration when selecting a postsecondary program. Although the hands-on welding program, appeared to be a good fit for Johnny, he did not have the academic skills to do the course work and had difficulty sustaining a focus on school. This mismatch between mental and personal capabilities and vocational skill requirements was also noted by Spohr and his colleagues (2007) in their longitudinal study of German patients with FASD.

#### *Social Integration*

Only Johnny spoke of engaging in social activities with friends from college. His mother described him as being easily influenced and that he had problems with alcohol abuse. Although Johnny met some *friends* at school, they were unfortunately a negative influence, which eventually contributed to his withdrawal from the welding program. Alan had experienced difficulties socializing with peers since he was a child, and within the one month that he was in school, he did not likely have time to make friends. Ted and Sonja did not speak of having friends in their programs. It is possible that because they both had the *wrong* friends in high school, they were cautious about making new ones in their respective academic settings.

Hence, in this study only Johnny was socially integrated, but not in the positive way described by Tinto (1975, 1997). Being vulnerable to manipulation and having the *wrong* friends who influenced him to participate in negative activities (e.g., drinking) was linked to his dropping out of school. Therefore, positive social integration was not achieved by the participants, and unlike DaDeppo's (2009) students with LD, social integration did not contribute to persistence among these adults with FASD.

In summary, unlike the previous studies on postsecondary studies using the SIM, it was shown that the background characteristic of having the primary disability of FASD could have serious negative effects on learning and the ability to make *positive* friendships, which was an important factor related to persistence in college. Additionally, secondary disabilities also had a negative effect on persistence. For these participants, academic integration appeared to be more important than social integration (Duquette, 2000; Napoli & Wortman, 1998; Nora, Attinasi, & Matonak, 1990; Pascarella & Chapman, 1983; Sagy, 2000). Similar to the results of Duquette (2000) and Sagy (2000), most of the participants in this study were not socially integrated into the postsecondary institution. Moreover, due to the symptoms of FASD (background characteristic), one of the participants was socially integrated in a *negative* way which compromised his academic integration and persistence. Tinto (1975, 1997) stated that the background characteristic of goal-directedness could strengthen academic and social integration and in turn, persistence. In this research, it was found that another background characteristic – a developmental disability – could weaken academic and social integration, thereby increasing the possibility of withdrawal.

#### *Facilitators and Barriers to Persistence in Postsecondary Education*

One facilitator for Johnny and Alan was the assistance they received from their parents in understanding the course material and memorizing it. A second facilitator was parental advocacy. For example, Johnny's mother informed his instructor that her son has FAS and was able to negotiate work at a slower pace for him. Although Johnny and

Alan both dropped out of their respective college programs; parent tutoring and advocacy were helpful. In Sonja's case, her academic abilities and preparation, goal-directedness, and the absence of mental illness were beneficial. Despite having FASD, these background characteristics enabled Sonja to experience academic integration.

Although the factor of background characteristics was a relative facilitator for Sonja, it proved to be a barrier to persistence for the three other participants. The primary and secondary problems associated with FASD were ultimately at the root of their inability to achieve academic integration and in Johnny's case, positive social integration. A second barrier to completion of postsecondary programs was a poor match between the participants' background characteristics and the demands of the chosen program. For

all but one of the participants with FASD, it appears that the barriers were too much to overcome as three of the four individuals did not complete their postsecondary programs.

#### *Considerations before Registering in Postsecondary Programs*

The data suggest that for people with FASD there are three factors that should be considered when making the decision to enrol in postsecondary courses: the individual, the institution, and family support. At the individual level the symptoms of the primary disability that are manifested in the person and his or her academic preparation in high school should be examined. The presence or absence of secondary disabilities (e.g., mental illness) and goal directness also need to be considered. There are two elements to think about at the institutional level: potential academic integration and potential positive social integration. Potential academic integration refers to the fit between the program demands and the individual's abilities, academic preparation, and mental health. Additionally, if accommodations are required, they must be known to the course instructors and how they will be provided must be determined. Potential positive social integration refers to the ability to resist selecting the *wrong* friends who might engage in negative activities. The third level is family support, which includes advocacy efforts to obtain accommodations and the ability to provide academic support for the individual.

**Table 2. Factors to Consider When Deciding to Enroll in a Postsecondary Program**

Individual	Symptoms of the primary disability Academic preparation in high school Symptoms of secondary disability Goal directedness
Institution	Potential academic integration (e.g., fit between programs and individual characteristics, need for and availability of accommodations, grades) Potential social integration (e.g., ability to select the <i>wrong</i> friends, engage in negative activities)
Family Support	Advocacy or assistance with self-advocacy to obtain accommodations Academic support for the individual

#### *Limitations*

One limitation of this study is that only one interview was conducted with each of the adults with FASD. It was difficult to contact these participants and arrange the interviews with them, and consequently we chose to schedule a single interview so that all of the data could be collected in one session. A second limitation is that this research is a retrospective study and the accuracy of the memories of the adults with FASD might be in question. However, the information provided by the parents helped to confirm their recollections.

#### *Conclusions and Future Research*

In this study, Tinto's (1975, 1997) three factors related to persistence as described in the SIM were used to examine the postsecondary experiences of four individuals with FASD. It was found that the background characteristic of having a disability could affect academic and social integration, and ultimately persistence in a community college. Therefore, one of the important findings of this research is the need to include the presence or absence of disabilities in the background characteristics of the SIM. Depending on the nature of the disability, there may be little or no effect on persistence as shown by Sonja and also found by DaDeppo (2009) and Duquette (2000). However, as illustrated in this research, persistence was negatively affected by the presence of primary and secondary disabilities.

On a practical level, the findings of this study provide tips for college instructors on how to work with students who have FASD and three factors to consider when selecting a postsecondary program for an individual with this disability. These findings have not been previously reported in the literature. Additionally, this study adds to the body of work that calls for the medical profession to become better informed about the symptoms of FASD, including the secondary disability of mental illness that may be associated with it. Early and accurate detection may help individuals with FASD and their families make informed and realistic plans for postsecondary education, if it is appropriate.

One implication for colleges is to provide information about program requirements, working conditions, and non-academic abilities associated with various careers. This type of information could be put online and would be helpful for prospective students who do not have experience in the specific career for which they are seeking training. It would assist them to gauge the degree of fit between their strengths and needs and the demands of the program and the potential jobs. Moreover, access to this information could possibly lead to better choices made by students, parents, and high school personnel. Additionally, part-time and full-time instructors at colleges should have opportunities to obtain training (e.g., in-person sessions or online) about various disabilities and accommodations to develop an understanding of potential student needs.

Future research should include studies in which the SIM is used to guide investigations on postsecondary educational experiences of students with other disabilities. The dimension of the nature of the students' disabilities and their effects on academic and social integration should be examined in particular. Research should also be conducted on the transition plans and the planning process for high school students with FASD. Studies of this nature could also include the three factors to consider described previously (individual, institution, and family support). The findings of this research add to our understanding of how FASD can affect development across the life-span and they support the growing body of literature that attests to the ability of individuals with FASD to discuss their experiences and bring insightful observations to light.

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**Appendix A**  
**POSTSECONDARY EXPERIENCES OF ADULTS WITH FASD**  
**INDIVIDUAL INTERVIEW QUESTIONS**

**Demographic**

1. What is your age?
2. Are you married or single?
3. Have you ever been married?
4. When were you diagnosed as having FASD?
5. How did you feel about having FASD then?
6. Were you raised by your birth parents? Foster parents? Adoptive parents?
7. Do you live at home? If not, where/ with whom?

**Elementary and Secondary Schooling Experiences**

8. Tell me about your elementary school experiences.
9. Tell me about your secondary school experiences.
10. Which subjects did you enjoy? Which subjects did you not like?
11. Did you participate in extracurricular activities or sports? If so, what were they?
12. What type of academic assistance did you receive in school? (For example going to the resource teacher or being in a special class.)
13. Did you participate in a coop program at high school? If so, tell me about it.
14. Did you graduate from high school?
15. If yes, did you ever think of quitting? If so, why? What kept you in high school?
16. If no, why did you leave school? What did you do afterwards?
17. Did your parents help you when you were in high school? If so how (e.g., help with homework)? Did anyone else help you? If not, who did help you and how?

**Postsecondary Experiences**

18. Are you enrolled in a postsecondary program now?
19. What type of postsecondary education program are/were you in? Tell me about it. Why did you choose this program?
20. What accommodations do/did you need to pass your courses? (Prompt: extra time for exams)
21. How did you get the accommodations? Did they help you?
22. What parts of the program are easy? What parts are hard? Why?
23. What can an instructor do to help you learn the material?
24. What do you do to learn the material?
25. Are/were you involved in any school activities? If so, tell me about them.
26. Is/was there a coop in your program? If so, tell me about it.
27. Have you thought of dropping out? If yes, why? What keeps you in school? Or Why did you leave the program? What did you do afterwards? Have you thought of going back to school? Why or why not? If yes, in what type of program and why?
28. How do/did your parents, other relatives, or friends help you?
29. What things can the college or government do to help people with FASD get into programs and graduate?
30. When do you expect to graduate/did you graduate? Will/did the training lead to a job?

**Reflections**

31. What are your future goals? (Career, personal)
32. How can you reach them? What help will you need to reach them? Who can help you?
33. How do you feel about having FASD now? How do you think it will affect your future goals?
34. Is there anything else you would like to add?

**PRE-SERVICE PHYSICAL EDUCATION TEACHERS AND INCLUSIVE EDUCATION:  
ATTITUDES, CONCERNS AND PERCEIVED SKILL NEEDS**

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*The purpose of this study is to ascertain Botswana physical education (PE) student teachers' attitudes toward the inclusion of children with disabilities in the general education classrooms and also to identify their concerns and perceived skill needs with regards to inclusion. A two-part questionnaire consisting of background variables and attitudes using the ATIES Scale was completed by 96 PE student teachers from the University of Botswana. Data on the concerns, and perceived skill needs were collected through interviews and analysed descriptively. Statistic descriptive, t-tests and ANOVA were employed to analyse the quantitative data. The results of the study have shown that PE pre-service student teachers have moderately positive attitudes towards inclusion. Participants were also more concerned about the lack of knowledge and skills required for inclusion and that resources and pedagogical knowledge on inclusion were perceived as the required skills for the success of inclusion in Botswana.*

Attitude research in education and physical education has grown increasingly popular over the past twenty years (Folsom-Meek & Rizzo, 2002). This increase has been driven by the belief that the attitude of the teacher can have a direct influence on the successful inclusion of children with disabilities into regular classes (Avramidis, & Norwitch, 2002; Dart, 2007; Mastropieri & Scruggs, 2004). Within the contemporary inclusive classrooms, general education teachers face increased pressure as their roles change, compared to the traditional ones (Avramidis, Bayliss, & Burden, 2000). In the midst of this, a considerable amount of research is being conducted and policies amended worldwide including Botswana in order to appropriately address the views and philosophies of how children with disabilities can be best educated. Currently students with various types of disabilities are generally placed into general physical education classes without an accompanying teacher aide in Botswana. The inclusion of students with disabilities into general physical education classes has provided a tremendous challenge to physical educators who have strived to meet the needs of the included children without neglecting the needs of the other children. It is therefore important to prepare future physical education (PE) teachers for inclusion of students with disabilities in general physical education (GPE) settings and in order to prepare these students we must be able to measure and to understand their attitudes towards inclusion.

Inclusion focuses on the need for schools to adapt in order to meet the needs of all children, and not children having to change to meet the requirements of the school. This reform in the school system requires a new and different school culture, a culture whereby teachers have to change their beliefs, attitudes and behaviour towards students with diverse needs. Researchers have attempted to investigate the beliefs and attitudes of the individuals who are responsible for implementing inclusive policies. The role of teachers' attitudes has been studied and identified as being one of the central elements to the success or failure of inclusive education practice (Avramidis & Norwitch, 2002). The role of teachers' attitudes in the success or failure of inclusive schools is evident in Dart, (2007) and Kuyini and Mangope, (2011) Mittler, (2003), who noted negative attitudes of teachers as the major obstacle to the progress of inclusive education globally. The majority of these studies in physical education have also assumed that a positive attitude towards inclusion was necessary for the successful inclusion of children

with disabilities into physical education (Loreman, Forlin, & Sharma, 2007). These studies have examined the relationship between different types of attitudes and variables such as teacher age (Mdikana, Ntshagangase, & Mayekiso, 2007), gender (Sharma & Desai, 2002), teaching experience (Marston & Leslie, 1983), educational preparation (Mangope, Koyabe, & Mukhopadhyay, 2012), perceived teaching competence (Mukhopadhyay, Molosiwa, & Moswela, 2009), and type and severity of student disability (Rizzo & Vispoel, 1991).

#### *Variables linked with teacher attitudes*

Several student and teacher related variables have been significantly and consistently linked with specific teacher attitudes toward inclusion (Avramidis, Bayliss, & Burden, 2000). Student grade level and severity of disability have been found to influence teachers' attitudes toward inclusion. Specifically, students with disabilities were viewed more favourably in lower grade levels than in higher grade levels (Mittler, 2003), and children with less severe disabilities were viewed more favourably than those with more severe disabilities (Avramidi & Norwitch, 2002; Nthitu, Kathard, & Sayed, 2011; Mukhopadhyay, 2009). Research on teacher variables has revealed that attitudes were related to self-perceptions of competence, educational preparation, and experience in teaching students with disabilities (Kuyini & Mangope, 2011). Specifically, teachers' attitudes toward inclusion were more likely to be favourable if they perceived themselves as better teachers (Dart, 2007; Mangope, 2002) had greater education preparation (Kuyini & Mangope, 2011), and had more years of experience in teaching children with disabilities (Mukhopadhyay, 2009; Kuyini & Dessai, 2005).

Preparing teachers for inclusion has been a major pedagogical shift in the field of education. This then means that institutions responsible for training teachers ought to ensure that student teachers are adequately prepared to meet the diverse needs of learners in the general classrooms. In this process, crucial factors like teacher attitudes, beliefs, expectations and acceptance of learners with various special needs should be seriously addressed. According to Mukhopadhyay and Molosiwa (2010) positive teacher attitudes can and need to be fostered through training. As observed by Mukhopadhyay, Molosiwa, and Moswela (2009), if teachers leave the training institutions with negative attitudes then such attitudes tend to be difficult to change. This therefore, means that, if Botswana is to achieve its goal of a Well-Educated and Informed Nation by 2016, then teacher training programs need to be strengthened by including programs such as special/ inclusive education, so as to be able to produce teachers who will be able to meet the demanding challenges of inclusion.

#### *Inclusive education in Botswana*

The government of Botswana has long focused on responding to the needs of students with disabilities. Although education of such students started in segregated settings of special schools, currently Botswana has adopted an inclusive education approach as a strategy to address the needs of its children with disabilities whose education has been ignored. Inclusive education comes with challenging demands to all general education teachers as they will now be expected to accept and teach students with diverse needs who traditionally were not under their responsibility. As a result, inclusive education calls for a thorough preparation of teachers on issues of special inclusive education so as to develop some positive attitudes which would enhance the inclusion of such learners by teachers. In this regard, teacher training institutions are being compelled to reform their training structures and include some introductory courses in their programs for their student teachers to cater for the increasing diverse range of learners with disabilities. In Botswana, such practices are in place, for example the University of Botswana offers various programs for student teachers in various subject areas, and physical education is one of the many areas that are being addressed.

Even though training of student teachers on issues of special/ inclusive education is an important area that needs to be addressed, few if not none, studies in Botswana have directly examined the relationship between physical education student teachers' expectations or attitudes towards the inclusion of students with disabilities in their physical education classes in Botswana. The increasingly diverse characteristics of students with disabilities to be educated in Botswana are causing government officials, educators and other important stakeholders to examine the benefits of educating all children in heterogeneous classrooms. Regardless of gender, ethnicity, culture social status and disabilities, it has become clear to many that the needs of all students must be met, and their differences welcomed, celebrated and nurtured in an inclusive classroom. The attitude of Botswana student teachers' attitudes towards the inclusion of students with disabilities into their classrooms is vital in determining the success of the government's efforts in implementing inclusive education policy. Similarly it is also vital in determining the effectiveness of the inclusive education program offered by the University of Botswana to all prospective

teachers (Mukhopadhyay & Molosiwa, 2010). It is therefore necessary to investigate the attitudes of PE student teachers as such research may shed light on attitude factors in the context of Botswana and may help identify the gaps in the special /inclusive education programs offered that may warrant improvement.

#### *Purpose of the study*

The purpose of this study is to identify the attitudes of the University of Botswana's PE student teachers toward the inclusion of students with varying types of disabilities into their general education classrooms. The study also intends to identify the concerns and perceived skill needs of pre-service PE student teachers with regards to inclusion. The research questions guiding the study were:

1. Do PE student teachers hold varying attitudes towards inclusion of students with different disabilities?
2. What are the influences of PE student teachers' background variables on their attitudes towards inclusive education?
3. What concerns do they have about inclusive education?
4. What knowledge and skills do they think they require to successfully include students with disabilities?

### **Method**

#### *Participants*

One hundred and twenty-six students (71 females and 55 males) of an average age of 22 years were enrolled in physical education teacher preparation program at the University of Botswana. A total of eighty-six (86) prospective PE teachers (51 females and 35 males) participated in the study by completing a two-part survey questionnaire. The sampling design was purposive, meaning all students were surveyed who met the criteria of the enrollment in the above explained teacher preparation program. The sampling goal was to obtain as many participants as possible. However, due to late registration processes of the students, the researchers were not able to cover all of the anticipated students.

#### *Instruments*

Attitude toward the inclusion of individuals with disabilities scale (ATIES) (Wilczenski, 1992, 1995) was used to assess the attitudes and to use the results to personalize teacher preparation so that University students develop positive attitudes and strong intentions toward inclusion. The ATIES was developed by Wilczenski (1992) and was further validated in 1995. It is a 16-item scale that measures participants' attitudes towards inclusive education, where each item is rated on a 6 point-Likert type classification from 1 (strongly disagree) to 6 (strongly agree). Example statements from the ATIES are; students who are frequently absent from schools should be in regular classes, Students who cannot control their behaviour and disrupt activities should be in regular classes, students who are shy and withdrawn should be in regular classes. Each subject's overall attitude rating is evaluated relative to the possible score range of 16 to 96, with higher scores indicating more favorable attitudes. This scale has been used in Botswana (Mangope, 2002); in Ghana (Kuyini, 2004), in India (Sharma, 2001) and in a cross-country study (Loreman, et al., 2007) and has been found to be a reliable measure of attitudes towards inclusive education.

#### *Data collection and Analysis*

The questionnaires were distributed to participants who signed consent forms and collected personally by the researchers on the day of the distribution. Of the 116 questionnaires sent out 96 questionnaires were returned and correspond to a response rate of (87%). Ten of the 96 had missing information in many areas and could not be included in the data set for analysis. The total number of questionnaires analysed was therefore 86.

Reliability and factor analysis were undertaken for the ATIES scale, and the reliability analyses showed an alpha coefficient of 0.77, which is similar to the value of 0.71 obtained with student teachers in a study by Kuyini & Mangope (2011) in Ghana and Botswana. The factor analyses generated five factors, which is a complete departure from the four factors underpinning the original scale (Wilczenski, 1992). The first of the five factors in this study, Factor 1 (Behavioural) was comprised of three items relating to physical aggression, Verbal Aggression and Shy and Withdrawn. Factor two (Sensory) was comprised

of three items relating to use of Braille, students with speech difficulties and students with hearing impairment. Factor three (Need Help) was comprised of four items relating to not following school rules, Need help with daily living skills, Difficulty expressing thoughts, and need help to move. Factor four (mixed support) was comprised of three items relating to students needing functional academic programming, those who cannot control their behaviour and those who cannot hear conversational speech. Factor five (Academic) was comprised of three items relating to students whose academic performance is 1 year below and 2 years below and those who absent themselves from school.

These factors did not reflect factor loading in previous studies in Botswana and elsewhere (Ghana, India and the USA) where the ATIES has been used. Perhaps this may have to do with the sample size and the uniqueness of this population (P.E. Teacher trainees), who may not necessarily engage students with special needs at all in the level of sensory and intellectual activity in their teaching.

**Table 1. Factor Analysis Rotated Component Matrix<sup>a</sup>**  
**Principal Component Analysis: Varimax with Kaiser Normalization**

	Component				
	1	2	3	4	5
Verbally aggressive	<b>.798</b>				
Students with physical aggression	<b>.723</b>				
Shy and withdrawn students	<b>.618</b>				
Cannot read standard print & need to use braille		<b>.822</b>			
Speech difficult to understand		<b>.722</b>			
Students using sign language/ comm. Boards		<b>.685</b>			
Do not follow school rules of conduct			<b>.699</b>		
Need training in self-help & daily living skills			<b>.596</b>		
Difficulty expressing thoughts verbally			<b>.530</b>		
Students needing help to move			<b>.504</b>		
Need functional academic program in reading & maths				<b>.635</b>	
Cannot control their behaviour & disrupt activities				<b>.618</b>	
Cannot hear conversational speech				<b>.568</b>	
Students with academic achievement 2years /more below					<b>.856</b>
Students with academic achievement 1 year below peers					<b>.597</b>
Frequently absent themselves from school					<b>.486</b>

## Results

The results of this study are presented in line with the research questions. For research questions 1: *Do PE student teachers hold varying attitudes towards inclusion of students with different disabilities?* The descriptive statistics results showed that the total sample mean score was 57.2 of a maximum score of 96. This means that overall the teachers held moderately positive attitude towards inclusive education. However, the means scores for the individual items showed that only students who are shy and withdrawn attracted positive attitudes ( $M= 4.91$ ) which is the near the upper limit of the 6-point Likert scale classification. On the other hand, students with more obvious disabilities such as visual ( $M=2.39$ ) hearing ( $M=2.84$ ), speech & language ( $M=2.67$  &  $2.51$ ) impairment attracted less positive attitudes. These scores were within the lower levels of the 6-point scale (See Tables 2 and 3).

**Table 2. Total score of ATIES Measure for all participants.**  
**Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
Totals	85	22	87	57.24	12.233
Valid N (listwise)	85				

### *Relationship between background variables and ATIES*

The results of t-tests and ANOVA analysis for research question 2: What are the influences of PE student teachers' background variables on their attitudes towards inclusive education? showed that teachers' background variables such as Gender, education, class level taught, class-size, training in special

/inclusive education, experiences, accounted for differences in attitude scores. However, these differences were not statistically significant (See Table 4 below)

**Table 3. Mean scores for individual items of ATIES**

	N	Mean	SD
Shy and withdrawn students	85	4.91	1.453
Do not follow school rules of conduct	85	4.22	1.538
Difficulty expressing thoughts verbally	85	4.19	1.729
Frequently absent themselves from school	85	4.11	1.753
Students with academic achievement 1 year below peers	85	4.02	1.558
Need training in self-help & daily living skills	85	4.00	1.697
Verbally aggressive	85	3.89	1.448
Students needing help to move	85	3.69	1.832
Students with academic achievement 2years or more below	85	3.61	1.726
Cannot control their behaviour & disrupt activities	85	3.44	1.651
Need functional academic program in reading & maths	85	3.41	1.706
Students with physical aggression	85	3.34	1.570
Students using sign language/ comm. Boards	85	2.84	1.696
Speech difficult to understand	85	2.67	1.467
Cannot hear conversational speech	85	2.51	1.461
Cannot read standard print & need to use braille	85	2.39	1.655
Valid N (listwise)			

**Table 4. Background variables and ATIES Mean scores**

Variable	N	Mean scores	SD
Gender:	Male = 36	55.2	12.41
	Female = 49	58.8	12.00
Age	20-25 Years= 62	58.2	12.23
	26-30 Years= 3	57.0	13.00
	Above 30 Years = 20	54.2	12.27
Education	1= 65	57.7	11.86
	2=20	55.8	13.60
Training	1=19	56.5	11.82
	2=66	57.5	12.43
Pre/Insert	1=66	57.9	12.18
	2=19	54.7	12.41
Class-size	Up to 20 students=43	57.2	11.83
	21-30 students =28	57.3	12.34
	31-40 students =9	59.7	9.98
	Above 40 students=5	53.2	20.35
Rel-Dis	1=15	55.67	18.21
	2=70	57.57	10.69

The variables that stood out clear for mention are age and class size. Younger teachers appeared to have higher mean scores compared to those above 30 years, but this is not statistically significant. Although class-size showed differences among groups, these were not significant. However, the mean score of 57.2 showed that teachers in classes of more than 40 students held less positive attitudes.

*Concerns about Inclusive Education*

To answer the research question *What concerns do they have about inclusive education?* The participants were asked an open-ended question: *What are your concerns about including learners with disabilities in your PE regular classrooms?*

The qualitative responses were grouped into themes and the key themes emerged were: Concerns about teacher skills, Concerns about time pressures, Concerns about resources to support inclusive education, and Concerns about the negative impact on students without disabilities. We present details of these key themes and discuss the findings in relations to findings from the attitude data.

*Concerns about teacher knowledge and skills*

The respondents expressed the view that while inclusion of students with disabilities in physical education classes was laudable, many teachers did not have skills to support such students because the University courses were not broad and detailed enough. One respondent said the following about the inadequacy of the University program:

At the moment we as P.E teachers are not receiving enough training on adapted P.E. In the last semester we were only 12 who were doing Adapted P.E in which we were taught the practical part. We as P.E teachers are not usually equipped with enough skills. I think Adapted P.E should not be an option if we are working towards an inclusive system of education.

Another respondent expressed concern about limited teacher knowledge and skills in the following way: My other concern is about lack of training of teachers and yet they are expected to take part in teaching exceptional children with their exceptional needs. Majority of the teachers do not have the prerequisite skills and knowledge on how to handle students with these types of disabilities. One participant also felt that: *...the problem is that (PE) teachers are not taught or provided with enough information in order for them to operate well in this style of inclusion.*

Similar complaints were recorded from a number of the participants who were interviewed. Some believed that the reason why they are seen as incompetent as compared to teachers from Colleges of education is that even though they have content to teach, they fail to deliver it properly to the learners due to the minimal amount of experience culled in the PE program.

*Lack of appropriate pedagogical skills by PE teachers*

Most student teachers interviewed agreed that they lack pedagogical content knowledge on how to handle students with disabilities. As described by one respondent *...my concern is that teachers have not been fully equipped with the appropriate skills to handle students with difficulties. Even the curriculum is designed to cater for the able bodied.*

Another participant raised a similar concern saying: *....right now I do not know any adaptive equipment used by a child of any disability whilst inclusion dictates that I should be able to adapt the class for an exceptional learner, but right after this I will be going to teach, how am I expected to teach?*

*Concerns about time pressures*

It is clear in the literature that many teachers are concerned about lack of time to implement inclusive activities. And in this study Physical Education student teachers expressed similar concerns. Student teachers view the inclusion of students with disabilities into mainstream settings as being difficult and stressful, other concerns include the availability of support services, which include overcrowded classrooms, lack of prepared teaching materials, inflexible time table, inadequate time for planning and meeting, and inadequate specialist support to meet the needs of this students.

One participant expresses a sense of frustration due to insufficient time by indicating that such students need to be in their own special classes thus *...my concern is where we get the time, why can't these children have their specialised equipment in their special classes to make everything easier.*

Similarly another student teacher expressed the view that *....teaching does not mean waking up and delivering everything that comes to your mind to the student. One has to research fully, plan and organize their presentation and be familiar with tools needed. You also have to assess student progress in class and give feedback, so having to do it for different groups*

will not bear perfect results let alone exhaustive. The best thing for everyone is for them to have their special place with their special attention where that technology won't be put to waste.

Other similar comments were raised. Two participants put it as below:

I don't think that it's a good idea for children with inclusion because it might take time in class to teach them as they have to be separated and the teacher has to compromise or sacrifice to teach them separately and this might take time. And it's also not a good idea in a way that it brings the self-esteem down of those with inclusion as they see others excelling than them.

The other one said:

My concerns about inclusion therefore are that, the disabled may not get appropriate, specialised attention and care from the teacher because he/she is forced to look after both the normal and exceptional, this may disrupt the normal children's education often, teachers are also forced to direct more attention and time to these exceptional children thereby leaving the normal children behind or vice versa, to be honest, it is a mammoth task to cater for these two groups in the same class, believe you me that it requires more time and patience of which many of us lack, therefore our teaching would be very much inadequate

#### *Concerns about resources to support inclusive education*

Resources are critical to inclusive education implementation and the lack of it is usually a problem. In this study majority of student teachers expressed a concern about the need to have the necessary support services for inclusion to thrive. One participant said:

Students with disabilities need special equipments that can help them execute some skills. So, I don't think they can feel free using some things that their normal classmates are not using, for example using a wheel chair playing basketball, while others are running around. The team mates might not even pass the ball to their friend in a wheel chair and it can lead to low self-esteem and inability to acquire skills.

Other concerns include, the availability of support services, overcrowded classrooms, lack of prepared teaching materials, inflexible time table, inadequate time for planning and meeting, and inadequate specialist support to meet the needs of these students.

One participant said:

There should be resources like well paved playing grounds not the dusty grounds which are in our government schools. They should re-think about constructing better grounds because wheel chairs and other materials to be used perform better in well constructed grounds.

#### *Concerns about the negative impact on students without disabilities*

One of the key arguments about inclusive education has been about the impact of those with disabilities on those without disabilities in terms of academic and social achievement. In this study the teachers expressed these concerns. One participant said:

Honestly I believe that inclusion is not a good thing....children with disabilities are more different from children without disabilities in terms of learning because they somehow tend to be slow learners so taking them to regular classes will disadvantage learning especially for normal children as they would have to work at the same pace with them therefore delaying progress!!

Another expressed such concern in relation to teacher engagement time as follows:

I think the inclusive system will in a way disadvantage both individuals with disabilities and those without disabilities. For instance the teachers may tend to give too much attention to the children with disabilities and the other children will not get the attention they deserve. The fact that the number of pupils in the regular classroom is too much, will lead to all the children not getting the attention they deserve. Every child needs the teacher's attention and I feel the inclusive system is not suitable for all children with disabilities.... disabled kids would hinder also the quality of content and material being delivered in lessons to accommodate everyone. It would slow everyone down and the abled students may not get the right attention required because the main focus will be on the disabled ones which will lead to them not performing to their full potential.

#### *Perceived knowledge and skills required by P.E teachers to include students with disabilities.*



To answer the research question *What knowledge and skills do they think they require to successfully include students with disabilities?* the participants were asked the question: What kind of Knowledge and skills would you recommend for PE teachers to prepare them for inclusion?

Student teachers had various ideas on the skills needed to assist them in their efforts to include learners with disabilities. One said:

The skills that I will recommend for teachers to prepare them to for the inclusion of learners with disabilities are acceptance, tolerance, respect and patience. It is not that easy to just accept the situation, firstly teachers are not well equipped with methodology of teaching children with various disabilities, let take for example a child with cerebral palsy, for a P.E teacher to be able to help such a child they must have done adapted physical education, but at the U.B for instance Adapted P.E is still an option and not every one knows how to deal with a child with C.P.

Others felt that it is important for them to have adequate specialist knowledge regarding handling learners with disabilities, so having more knowledge in sport medicine, sport psychology, sport sociology, kinesiology, biomechanics and exercise physiology can maybe help a great deal. One participant said:

My main concern is that some PE teachers might not have adequate specialist knowledge regarding handling learners with disabilities, hence they need knowledge. Teachers should have vast knowledge on the types of students, e.g. slow learners and fast learners as well as students with disabilities and they should have knowledge on how to deal with these different students. Teachers should know best teaching methods that they can employ in which students with disabilities will also be incorporated...

Another participant agreeing with the above said:

At the moment we as P.E teachers are not receiving enough training on adapted P.E. In the last semester we were only 12 who were doing Adapted P.E in which we were taught the practical part, which is important. We as P.E teachers are not usually equipped with enough skills. I think Adapted P.E should not be an option if we are working towards an inclusive system of education...teachers will have to be equipped with ways of assisting students with disabilities...how do you modify? Knowledge of special education is required ...because the teacher has to teach from all angles that is from modified instructions to clear instructions that applies across.

## Discussion

This study aimed to explore the attitudes of P.E. teachers towards inclusive education, their concerns about inclusive education and the knowledge and skills they perceived they required to be able to include students with disabilities in their classrooms. The overall findings for the attitude measure showed that generally PE student teachers hold moderately positive attitudes toward the inclusion of students with disabilities into their general education classrooms. The mean scores for individual items showed that teachers held more positive attitude towards students who are shy and withdrawn. On the other hand, students with more obvious disabilities such as visual, hearing, speech and language impairment attracted less positive attitudes. Teacher background variables such as age and class size showed some influence on attitudes even though this was not statistically significant.

Although they had positive attitudes as student teachers in other Botswana studies (Kuyini & Mangope, 2011; Mangope, Koyabe, & Mukhopadhyay, 2012), no significant differences were found between teachers' background variables such as gender, age, training in special education and their scores on the attitude measure. The finding in relation to training was rather surprising, given that training in special education, the literature has shown, is linked to more positive attitudes towards inclusion of learners with disabilities. However, such results may have been due to the rather modest sample of 85 teachers.

The concerns data showed that teachers had concerns about inclusive education and were related to limited knowledge and skills, time pressures and difficulty dealing with students with disabilities, lack of resources and potential negative impact the inclusion of students with disabilities have on students without disabilities.

These findings mirror other studies in Botswana and Ghana (Kuyini & Mangope 2011; Chhabra, et al., 2010), and in other countries (Johnstone & Chapman, 2009; Sharma, et al., 2007), which revealed that these factors were some of the key concerns of both student teachers and regular teachers. Specifically, Kuyini, and Mangope (2011) found that student teachers in Botswana expressed higher concerns about

issues of inclusion that loaded on what they called Welfare and Workload (Factor 2) and Resources (Factor1). The participants' lowest concerns were about Academic and Acceptance needs of students. This previous finding is mirrored in this study because the analysis of individual items showed that the participants were also worried about not having enough time, and resources (Instructional materials, inadequate para-professionals).

It is interesting to note that many were less concerned about the factors that are internal to the students like type and severity of the disability but rather concentrated more on external factors like instructional materials, para-professionals, and other infrastructure. As captured in comments by one of the participants such as *My main concerns is that some PE teachers might not have adequate specialist knowledge regarding handling learners with disabilities, hence they need knowledge.*

Chhabra, et al., (2010), also found that teachers in Botswana showed concern about inadequate equipment and availability of paraprofessionals, additionally they raised concerns about provision of resources and funding to support the students with disabilities in regular classrooms. Some of the concerns raised by participants were:

students with disabilities need special equipments that can help them execute some skills and that there should be resources like well paved playing grounds not teh dusty grounds which are in our government schools.they should re think about constructing better grounds because wheel chairs and other materials to be used perform better in well constructed grounds

These findings in addition to those of Johnstone and Chapman, (2009) and Sharma, Forlin, and Loreman, (2007) indicate that resources are always a concern for teachers when they think about inclusive education. It is therefore imperative that the Ministry of Education, and Skills Development of Botswana, expands the scope of resource allocation and strengthens resource delivery mechanisms in schools to enhance receptivity to inclusive education. In this case P.E. student teachers were worried about lack of equipment and the Ministry should be looking to identify the equipment required for P.E. classes as a way to allay the fears of teachers.

The participants' responses to knowledge and skills showed that they lack some skills which they also perceive as very useful if they are to successfully include students with disabilities. The literature shows that general and adaptive instructional skills are necessary to make for a meaningful inclusion of students with special learning needs. Indeed researchers such as Mastropieri and Scruggs (2000) and Mitchell (2006) and Kuyini and Desai (2008) have highlighted the fundamental role of adaptive instruction to the success of inclusive education.

However different groups of teachers have need for different types of skills peculiar to their learning area. This unique need may apply to Physical Education teachers.

The student teachers' responses showed that they required skills in the pedagogical content delivery which is lacking from their training. Student teachers may have the subject matter (content) to teach but knowing how to teach students with disabilities is also valuable in making learning more meaningful and enjoyable to the learners. The student teachers expressed the need to have knowledge and skills about how to adapt the P.E. environment to the needs of those with disabilities. Given that they do not feel adequately trained for making instructional adaptations, which require teachers to implement alternative teaching strategies such as modifying instructional materials and presentation styles (Jolivet, Wehby, Canale, & Massey, 2001), this finding is one that should attract the attention of teacher education institutions and policy makers in Botswana.

A more important issue that can be gleaned from their responses is that their expressed knowledge and skills needs are stated in more generic terms without being very specific to the instructional competencies or strategies that have been shown in the literature to support inclusive education. Such a finding has two main implications:

1. Lack of understanding of what modifying instruction in a P.E. class entails to meet the needs of a range of students with disabilities. This implies that their current training has given them a general understanding of inclusive schooling but more specific content around teaching strategies is important if they are to be useful to students with special needs in the classrooms they will be teaching in future.
2. Lack of knowledge or understanding of the specific skills or competencies they may be able to use, which is different from what they have used for students without disability. This lack of knowledge

of the required adaptive instruction skills meant that they could not articulate their needs more clearly. However, the limitation of the interview comes out here in that not enough follow-up questions were used to dig deeper for more specific responses about the knowledge and skills. On the other hand these general responses make it easy for teacher training institutions to adopt a training strategy focusing on the broad fields which means that other related skills can be covered which will be more specific to individual teacher skill needs.

### Conclusion

This study set out to investigate the attitudes of P.E. teachers towards inclusive education, their concerns about inclusive education and the knowledge and skills they perceived they required to be able to include students with disabilities in their classrooms. Although the results showed that teachers held moderately positive attitudes towards the inclusion of students with disabilities in their classrooms, teachers did not differ in their attitudes as a function of background factors. Students with visual, hearing and speech and language impairments attracted less positive attitudes, a finding which betrays the links between these more obvious disabilities and less positive attitudes in traditional societies. Participants also expressed concerns about inclusion on the basis of limited knowledge and skills, lack of resources, and the impact of disability on academic engagement and outcomes of those without disability. While the participants acknowledged that they did not have adequate training, they felt that training to acquire knowledge and skills for inclusive education will be very useful. The implications of these findings are that in spite of the government's pronouncements and efforts to support inclusion, teachers would require more resources and other supports in the future to allay their concerns, build positive attitudes and enable them to contribute effectively to Botswana's inclusive agenda.

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## SAUDI SPECIAL EDUCATION STUDENT TEACHERS' KNOWLEDGE OF AUGMENTATIVE AND ALTERNATIVE COMMUNICATION (AAC)

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*Speech-language pathologists (SLPs), special education teachers (SETs), and occupational therapists (OTs) are all expected to encounter individuals with complex communication needs, who need for Augmentative and alternative communication (AAC) (Costigan & Light, 2010). This study aimed at investigating special education student teachers' knowledge of AAC, and its relation to their academic levels and unique- specializations. To achieve this objective, the researcher administered a ten questions test on 30 participants all of whom met the study including criteria. The means and standard deviations relevant to their responses to the test were counted and then analyzed by means of Analysis of Covariance ANCOVA. Results of ANCOVA haven't shown any statistically significant difference in the participants' knowledge of AAC attributed to their academic levels and unique-specializations. The percentage of fully accurate responses of all participants to the ten tests' questions was 2.66%. This result suggests an inadequacy of participants' knowledge of AAC and a dire need for relevant education and training. Results and implications for future research and practices are discussed.*

Individual with Disabilities Education Act (IDEA) of [1997 P. L. 105-17] requires that assistive technology (AT) should be considered in preparing individualized education program (IEP) [29 U.S.C 2201, §3 (1)] .For the time being there are about 26,000 assistive technology tools which can be included in individualized education program IEP. AAC tools and systems are one of the most important assistive technology categories. AAC is defined as an *integrated group of components, including the symbols, aids, strategies and techniques used by individuals to enhance communication* (American Speech-Language Hearing Association, 1991, p. 10). In the previous decade and particularly since the latest amendment of the IDEA and the mandated items therein concerning assistive technology, AAC has become an important and pressing issue in educating professionals who provide services to children with disabilities and their families (Foley, 2001). SETs and SLPs are highly important members among the multidisciplinary team which takes the responsibility for AAC planning, administration, and making relevant decisions (Parette, Huer, & Brotherson, 2001; Prelock, 2000). AAC also includes other specialists who are responsible for doing suitable modifications required for AAC systems and tools, a thing that enables students with disabilities to access public education curricula by means of their own AAC systems and to use them in the classroom (ASHA, 1997-2004; Parette & Marr, 1997).

While the most acceptable estimations point out that the numbers of individuals who need for AAC services are likely to be in the tens of millions worldwide (Segafoos, Schlosser, & Sutherland, 2010), and such numbers totaled around 3.5 million in the USA alone (Beukelman & Mirenda ,2005), however, there is similar data that confirms, despite the wide acceptance of AAC as a supportive means for children with complex communication needs, the education and training related to the AAC as well as the number of well trained professional are not parallel to the amount of the required services (Lebel, Olshtain & Welss, 2005). In this context, many researchers have suggested that the lack of specially trained professionals on AAC would in turn lead to a lack of AAC services provided to a large portion of

individuals with complex communication needs (ASHA, 1981; Merrill, Yilon-Hamivitz, Weiss, Iebelm, & Seligman-Wine, 2000).

Despite increased attention which the AAC enjoys recently among SLPs (Marvin, Monato, Fusco, & Gould, 2003); however, the studies conducted in the most advanced countries reveal divergent results. For example, Marvin et al., (2003) conducted a survey included seventy-one SLPs in order to explore issues related to their experience with and education in the use of AAC. Results indicated that more than half of those surveyed believed that they received a limited or poor training in AAC, and over 80% declared that they hadn't received adequate education during their post graduates study. Although about one third of respondents referred to their work with the users of AAC, but the majority of them (63%) expressed their inconvenience in using it, and (72%) expressed inadequacy in using it. On the other hand, Balandin and Iacono (1998) found out in their survey conducted on Australian SLPs that the most common reason that SLPs do not recommend the use of AAC, is the limited knowledge and skills of families and teachers related to this kind of communication. After almost ten years of the last study, Iacono and Cameron (2009) reported that SLPs working with young children in early intervention programs in Australia showed broad knowledge of AAC and its various advantages. Also their reported intervention and assessment approaches reflected the best documented practices in the literature. However, the only exception of AAC implementation was for family-centered intervention programs. Participants expressed their displeasure of family's negative attitudes towards the use of AAC. In the USA, Ratcliff, Koul, and Lloyd (2008) conducted a survey in an attempt to collect data about current status of academic and clinical education in AAC, and comparing its results with earlier surveys to determine any changes being made as programs in the US adopt new standards of the American Speech-Language Hearing association in the field of speech - language pathology. The Survey results showed that 73% of the respondents said they received an independent syllabus of AAC, and 80% said the content of AAC was infused in other courses. The study concluded that academic preparation of AAC has increased in the last decade; however, there is still need for further clinical preparation in this regard.

AAC services in developing countries are limited in general (Alant & Lloyd, 2005), and the reason behind that is the lack of financial, clinical and educational resources (Sutherland et al., 2010). The same reasons apply to many Arab countries; where there are many different obstacles hinder AAC. In this context, Hock and Lafi (2011) pointed out that AAC applications in most Arab countries witnesses' big problems which negatively affect the use of communication technology in general. Such problems are associated with interwoven cultural, economic, educational, and political issues as well as other problems related to current AAC systems. In Egypt for instance, Wormnaes and Abdel Malek (2004) conducted a survey included 30 participants of SLPs which aimed to discover their experiences and attitudes relevant to AAC. The survey results showed that only 10 out of 23 participants (44%) who worked with children with limited and/or nonfunctional speech abilities felt they were sufficiently qualified to work in the field of AAC, while 22 respondents (74%) believed that it is very important for SLPs to learn more about AAC. AAC programs in Israel seem no better than that, as in a study conducted there, Merrill et al (2000), pointed out that all AAC training programs have been concentrated in Jerusalem which makes SLPs and other professionals in rural areas isolated from AAC resources and from different educational opportunities.

There is vast range of individual and contextual factors affecting communication through AAC alternatives (Light, 1997). As a result of that ACC services are delivered by a collaborative team of professionals of different experiences and specialties including SLPs, SETs, and OTs (Suto, Muller, Hunt & Goetz, 2001). It is expected that such specialists would come across individuals with complex communication needs during their field clinical and educational practices (Costigan & Light, 2010). According to a survey included a number of professionals, 45% of SLPs and 80% of SETs said they have delivered services to individuals with complex communication needs, (Locke & Mirenda, 1992; ASHA, 2002). And because it is likely that SLPs, SETs, and OTs would meet individuals who are in need for ACC services, they are required to have at least the basic competences related to ACC services as part of their professional knowledge and skills (Hammel & Angelo, 1996).

The Kingdom of Saudi Arabia is a leading Arab country in providing different services for individuals with disabilities, either in preparation of trained staff, or launching of specialized educational and inclusive programs. However, there is very limited information on the status of AAC whether in terms of pre-service or in-service preparation programs, or in terms of the competences of practicing professionals. In their programs dedicated to SETs preparation, most Saudi universities tend to be category-oriented. King Abdul Aziz University is one of the leading universities in SETs preparation.

When a student joins the Bachelor program in special education, he/she receives introductory courses on the subjects of special education over two terms (semesters) and then joins one of the unique majors available in the university including speech- language disorders, autism disorder, intellectual disability, learning disabilities, and others. The researcher conducted the current study in an attempt to explore the knowledge of special education student teachers majoring speech language disorders, autism disorder, and intellectual disability of AAC, as they are supposed to have basic knowledge about AAC because it is likely to come across individuals that their training would require AAC services. More precisely, the researcher conducted the present study to explore the participants' knowledge of AAC and demonstrate to what extent this knowledge is influenced by their academic levels and unique specializations.

## Method

### *Participants and setting*

In this study, the researcher selected the participant students according to the following criteria:

1. Participants should be in the two academic levels of third and fourth years.
2. Participants' unique-specializations should be among one of the following study pathways: (speech-language disorders, mental disability, autism disorder).
3. They should not have previous field experience.
4. They should agree to participate in the study and to abide by its procedures till the end.

In light of the above criteria, 30 special education students at the faculty of education belonged to King Abdul Aziz university in Jeddah, participated in the study (N=30). Participants were divided into 16 participants in third year academic level ( $n=16$ ), and 14 participants in fourth year academic level ( $n=14$ ). As well as, Participants were distributed according to the unique-specializations into 12 students in speech and language disorders pathway ( $n=12$ ) and 9 students in intellectual disability pathway ( $n=9$ ) and 9 again in autism disorder pathway ( $n=9$ ). For more details about participants (see table1). Participants responded to the ten questions test at the micro instruction hall pertaining to the section of curriculum and teaching methods at the Faculty of Education, it is spacious and quiet hall, and appropriate for applying the study tool.

### *Procedures*

#### *Design and statistics*

The study was done according to Quantitative descriptive research design, and the researcher used a survey tool (the ten questions test) to explore the participants' knowledge of AAC. Descriptive statistics was used for counting means and standard deviations of the participants' responses as well as ANCOVA was used to find out to what extent they were affected by academic levels and unique-specialization variables or the interaction between them.

#### *Data collection and test administration*

The researcher prepared ten questions test similar in its construction and coding schemes to the questionnaire of Patel and Khamis-Dakwar, 2005. Even the researcher quoted seven questions with their typical responses from it. Those questions are written in italics in table (3). The test was made up of two parts: the first part contains primary data of the respondent such as academic level, unique-specialization as well as response instructions, whereas, the second part was made up of ten questions, eight of which measure basic knowledge of AAC. The test didn't include any question that measures practice or attitudes domain, because all respondents were still students and have not begun their field experience yet. To check test validation and the appropriateness of the translated questions, the researcher presented the test to three raters holding Masters Degree in speech language disorders and Ph.D. in special education at the Faculty of Education in King Abdul Aziz University. They rated the test in terms of: (a) relation of questions to AAC and how far they represent it, (b) checking that all questions measure knowledge domain related to AAC, and (c) appropriateness of language phrasing (wording). Researcher took their comments into account, and made the necessary changes. Also the researcher counted test reliability through test – retest method, as the researcher administered it twice on eight-students pilot sample, equal to the study's participants in terms of academic levels and unique -specializations and with seven-days time interval. Test- retest reliability coefficient reached 0.89. The final copy of the ten questions test was applied on the participants. They were asked to answer all questions in the test – each participant separately- seriously and objectively without resorting to any information source. The

researcher explained to them the answer to the test requires approximately half an hour, without obliging them to do so.

#### *Responses/Answers coding schemes and correction process*

The researcher prepared a form to encode participants' responses to the ten questions based on examples of typical answers mentioned in Patel and Khamis-Dakwr, in addition to the review of related literature (e.g., Sigafos et al., 2010; Light & Drager, 2007; Beukelman, Fager, Ball & Dietz, 2007; Balandni & Morgan, 2001; Subihi, 2012; Chress & Marvin, 2003; Mirenda, 2003). The form included three proposed levels to respond to the first question until the eighth ranging from (inaccurate answer) given 0 score, and (partially accurate answer) and was given 1 score, and (fully accurate answer), and was given 2 scores. The ninth and tenth questions were coded within two response levels: Yes; and was given 2 scores, No; and was given a 0 score. In order to correct participants' responses and to encode them within the previously mentioned levels, two independent faculty members separately reviewed the participants' responses and encoded them based on the responses encoding form prepared for this purpose, then the agreement coefficient between them was counted. The agreement coefficient reached (0.85).

### **Results**

The study was mainly conducted to explore the participants' knowledge of AAC and to show whether that knowledge would differ according to the difference of their academic levels and unique-specializations. Table (1) shows results of means and standard deviations of the participants' responses according to the academic level and unique-specialization, accordingly, there is a seemingly difference in means and standard deviations of the participants' responses related to the academic level and unique-specialization variables.

ANCOVA results show no statistically significant difference in the means of the participants' responses attributed to the academic year  $F(0.737) = 0.309$ ,  $P \geq 0.05$ , or unique-specialization  $F(0.600) = 0.282$   $P \geq 0.05$ , or the interaction between them  $F(0.921) = 0.082$   $P \geq 0.05$ .

Table (3) shows the participants' responses to the ten questions of the test according to typical response coding. Hence, the percentage of inaccurate responses was 53.64% while fully accurate responses were 2.66% and the partially accurate responses were 43.67%.

### **Discussion**

The study aimed at investigating special education student teachers' knowledge related to AAC, and its relation to their academic level and unique-specializations. The total means of the participants' responses based on their different academic levels and unique-specializations was ( $M=4.90$ ). ANCOVA results of their responses based on the variables of academic level, and unique-specialization, and the interaction between them, showed no statistically significant differences attributed to these two variables, or the interaction between them, which means that the academic level of the participating students (the level of third, and fourth years), and their unique-specializations in (speech-language disorders, autism or intellectual disability) were not influential variables in their knowledge of AAC. This result implicitly assumes the participants' equal knowledge of AAC despite different specialties and academic levels. If we take the proportion of participants' responses to the ten questions as an objective criterion to describe their knowledge of AAC, we find as much as 53.64% of the total responses were absolutely inaccurate versus only 2.66% fully accurate and 43.67% partially accurate. So, it can be said that the participants' knowledge of the AAC was very limited.

In fact this result involves different meanings with negative predictive significances. It means that these student teachers would engage later in field work with only a minimum theoretical knowledge and without any essential practical relevant skills, bearing in mind that the efficiencies of AAC are part and parcel of the professional competence of SLPs, SETs and other specialists (Hammel & Angelo, 1996). Even some countries such as the United States will not grant students majoring speech and language, for instance, certificates and career practice license until they prove that they have knowledge and skills related to AAC (ASHA, 2002). It also means that until the date of this study the participants haven't received any specialist course, or a chapter of a course, or any training concerning AAC during their study period and this was clear from their responses to the ninth, and tenth questions. This is consistent in part with what is referred to in the literature concerning the lack of educational and training programs available for AAC (Lebel, Olshtain & Welss, 2005), and the consequent parallel lack of AAC services that are supposed to be available to a large portion of individuals with complex communication needs



(ASHA, 1981; Merrill et al, 2000). Also; this result Partially correspond to what was referred to by Costigan and Light (2010) that a significant proportion of pre-service preparing programs for SLPs, OTs and SETs have failed to provide AAC specialist course; which means that a large proportion of students learning these disciplines may graduate with minimal knowledge or without exposure to AAC at all.

**Table 1. Means and Standard Deviations of the Participants' Responses to the Pre- Post Tests According to Variables of Academic Level and Unique Specialization.**

Academic level	Unique specialization	<i>M</i>	<i>SD</i>	Number of participants
Third year	Speech and language disorder	4.43	.787	7
	Intellectual disability	4.75	.500	4
	Autism	5.2	2.168	5
	Total	4.75	5.291	16
Fourth year	Speech and language disorders	5.00	1.414	5
	Intellectual disability	5.00	1.871	5
	Autism	5.25	1.500	4
	Total	5.07	1.492	14
Total	Speech and language disorders	4.67	1.075	12
	Intellectual disability	4.89	1.364	9

	Autism	4.90	1.373	9
	Total	4.90	1.373	30

**Table 2. ANCOVA Results of the Impact of Academic Level and Unique -Specialization and the Interaction Between Them on the Participants' Response to the Test.**

Variation source	Sum of squares	df	Mean squares	F value	Sig
unique-specialization	1.338	2	.669	.309	.737
Academic level	.611	1	.611	.282	.600
Unique –specialization × Academic level	.357	2	.179	.082	.921
Error	52.014	24	2.167		
Total	54.700	29			

Significant at  $P \geq 0.05$

The following lines contain in more detail the connotations of results listed in Table 3. It is clear from this table that some of the participants have had limited knowledge or logical expectation to answer the first question, as the responses of ten participants (33.3%) lie within partially accurate coding level, and may be such an answer was a result of a personal experience irrelevant to framed academic course or study course requirements; because all the participants, without exception, were not subjected to a

specialized course, or specialized chapter in AAC, and that was clear from their responses to the ninth question. The same thing applies to the second question, as the answers of five participants (16.6%) lie within the coding level (2); they mentioned three categories of disability suffer from weakness in expressive language and communication. In answering the fourth question, 21 participants (70%) were rated within the coding level (1); seventeen of them answered (sign language), while four of them answered (Picture Exchange Communication System. PECS). For question 6, responses of all participants lie within the coding level of (0), it means that the participants either answered no, or they did not answer this question, and no doubt that this question was more precise than the preceding ones, as it reflects a more advanced level of knowledge, and it would be difficult for those who haven't studied a specialized course to answer it. For the seventh and eighth questions, the researcher will assume there were random answers to them, because by reviewing the two questions, the researcher found out that all the participants answered Yes or No without providing justifications for their answers. In general; the study results provide additional support for the literature, as the previous studies conducted on specialists' knowledge of AAC, and the assessment of their skills have expressed the need of these specialists for more knowledge and training (Marvin et al, 2003; Blandin & Iacono, 1999; Ratcliff, Koul, Lloyd, 2008; Worman & Abdel Malek, 2004).

**Table 3. Coding schemes of participants' responses to pre-post tests' questions**

<b>Question</b>	<b>Response Category</b>	<b>Response Code</b>	<b>Examples of Typical responses</b>	<b>Number and percent of responses</b>	
<b>Can you define the AAC?</b>	Inaccurate	0	No response, or any inconsistency response with 1 or 2	20	66.6
	Partially Accurate	1	Tools, strategies, or systems that support verbal communication	10	33.3
	Fully Accurate	2	Wide concept that points to any means that supports verbal communication or temporally or permanently compensates it, and it includes aided and non-aided communication through low and high technology.	0	0
<b>What are disabilities that need to AAC?</b>	Inaccurate	0	No response at all, or mentioning a category that doesn't need AAC, such as non-exceptional children, or children with learning disabilities.	2	6.6
	Partially Accurate	1	Individuals with speech impairments	23	76.6
	Fully Accurate	2	Individuals with expressive and communication impairments	5	16.6
<b>Who are those specialists responsible for AAC training and monitoring?</b>	Inaccurate	0	No response at all, or mentioning a member in 2 or someone contrary to that	0	0
	Partially Accurate	1	Speech-language pathologist and/or special education teacher	30	100
	Fully Accurate	2	SLPs, OTs, SETs	0	0
<b>What examples of AAC that you know?</b>	Inaccurate	0	No answer at all, or answering computer and stickers	9	30
	Partially Accurate	1	Mentioning one example only, such as (PECS) or sign language	21	70
	Fully Accurate	2	Mentioning at least four examples such as PECS, PCS, VOCAs, Signs, Communication board, writing	0	0

<b>What are the functions that AAC serves?</b>	Inaccurate	0	No answer at all	7	23.3
	Partially Accurate	1	Mentioning one function only such as communication or speech intelligibility .	23	76.6
	Fully Accurate	2	Mentioning all functions: speech intelligibility, communication, and social adaptaion	0	0
<b>Is there any difference between alternative and augmentative communication? What is it?</b>	Inaccurate	0	Answering No, or no answer at all.	30	100
	Partially Accurate	1	Answering Yes, without any explanation	0	0
	Fully Accurate	2	Answering yes: communication system performs the same function and what determines its role as alternative or augmentative is the existence or non-existence of language with the individual subjected to training.	0	0
<b>Is there any age limit for AAC use?</b>	Inaccurate	0	Yes. Or no answer at all.	16	53.3
	Partially Accurate	1	No. without any explanation	14	46.6
	Fully Accurate	2	No. AAC can be used for different age levels (children, adults, and old people)	0	0
<b>Does the use of AAC negatively affect the ability of producing speech?</b>	Inaccurate	0	Answering yes, or no answer	20	66.6
	Partially Accurate	1	Answering no without sufficient explanation	10	33.3
	Fully Accurate	2	No, the AAC supports language development and speech production if it is perfectly used.	0	0
<b>Have you recently read anything about AAC? What was it?</b>	Yes	2		3	10
	No	0		27	90
<b>Have you ever had any training or supervision on AAC?</b>	Yes	2		0	0
	No	0		30	100
<b>Total percent of fully accurate responses</b>					2.66
<b>Total percent of partially accurate responses</b>					43.67
<b>Total percent of inaccurate responses</b>					53.64

#### *Implications for Future Research and Practices*

Future studies should focus on several research areas, some of which are directly related to the results of the current study and some respond to what is referred to by the educational literature as impediments of the AAC technology activation in the Arab countries. As most of the Arab countries including Saudi Arabia lack clear and precise statistics about the prevalence rates of disability therein (Al-Thani, 2006), and they are absolutely lacking data and statistics related to the numbers and proportions of individuals with communication disorders, so, there is urgent need to conduct studies supported by governmental and non-governmental bodies based-on clear categorization basis to reach accurate statistics on the prevalence rates of disability, types of disabilities, especially communicative ones, and the different needs resulting from them which will help in determining the size and sort of the required services. Therefore, any initiative to activate the AAC services in the Kingdom of Saudi Arabia and other Arab countries must be based on accurate statistics of the prevalence rates of communication disorders, and the number of candidates entitled for these services.

As cultural, educational and economic factors have emerged as crucial and influential factors in activating the AAC in the Arab countries in general (Hock & Lafi, 2011), such countries, as well as higher education institutions, educational institutes, and local and regional organizations should direct their research efforts towards the studies that endeavor to understand the community culture, its prevailing intellectual stereotypes and the attitudes of its members towards the use of the AAC. They are also required to direct similar research efforts for developing outreach programs that are capable of changing the attitudes of the community members, as well as the attitude of individuals with complex communication needs towards the use of the AAC.

Another important implication for future research on the one hand, and for governments, legislators and policy makers in the Arab countries on the other, is the necessity of discussing economic challenges faced by many AAC users and their families and their repercussions on them. The high cost of some AAC tools and devices constitute another challenge that hinders the activation of the AAC technology in the Arab countries and other countries in the world (Hock & Lafi, 2011; Alant & Lloyd, 2005; DeRuyter, McNaughton, Caves, Bryan, & Williams, 2007) especially the high technology aided communication (Glennanm, 1997). The Arab countries have to deal seriously with the results of these studies and take their recommendations into account to confront such problems.

Wormanen and Abdel Malek (2004) expressed their concerns about the inability of many individuals with complex communication needs and their families, particularly in rural and disadvantage areas to use the high-tech AAC systems as many of them know the local language only and do not have technical skills to deal with tools and devices of the AAC, whereas the English language in particular and other European languages dominate such tools and devices. This problem constitutes a rich research area that calls for the attention of researchers in the Arab countries in general to identify the technical problems associated with AAC technology and the literacy ability required, for reaching practical solutions thereon, which will eventually be adopted by influential persons and decision makers.

Also the universities and higher education institutes concerned with SETs and SLPs preparation in the kingdom of Saudi Arabia and other Arab countries should direct their research potentials to evaluate and update their existing programs to conform to international standards for SETs and SLPs preparation, namely the standards of the Council for Exceptional Children. CEC (2008) and ASHA (2012). As such they can graduate qualified professionals that are capable to apply the AAC on individuals with complex communication needs. In addition they have to direct similar research efforts to assess AAC training needs related to veteran SETs, SLPs and other professionals, as well as to prepare appropriate training programs to update the knowledge and skills of teachers and professionals of different specialties to improve their performance and enable them to be more competent in using the AAC technology.

There is still need for conducting other studies to assess how disability acts and regulations in the Arab countries and their amendments are compatible to the international acts and conventions concerning the communication rights of persons with disabilities (e.g., IDEA, 1997, 2004; the United Nation Convention on the Rights of Persons with Disabilities, 2006; the National Joint Committee for the Communication Needs of Persons with Severe Disabilities, 1992) and to what extent have the Arab countries succeeded in raising the awareness about such acts and regulations as being an abiding force which guarantees the different rights of the persons with disabilities, particularly their right to communicate.

#### *Limitations to the study*

While the study sought to achieve its objectives, it's advisable to deal cautiously with its results, as they are unlikely to be generalized, because the study was confined to assess the AAC knowledge on limited number of the student teachers within only one program out of the preparation programs of SETs and of other supportive services in Saudi universities, in addition to the characteristic nature of the test's questions. As these questions, while they require a great part of the response to be by the respondent, they remain subject to corrector subjectivity.

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## SOCIAL COMPETENCE INTERVENTION IN AUTISTIC SPECTRUM DISORDERS (ASDs) - A CASE STUDY

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*The purpose of this case study was to determine the effectiveness of a combined intervention in remediating the social skills in a first-grader with a disorder from the autism spectrum disorders (ASDs). The researcher also aimed to identify the changes observed during the intervention period. The combined intervention consisted of reading personalized Social Stories that targeted specific social skills and peer mediated intervention. The intervention took place for a period of eight weeks. In order to determine the effectiveness of the intervention, the researcher compared the teachers' ratings on the Social Behaviour Assessment Inventory (SBAI) (Stephens, 1992), data gathered from the Conditional Probability Record (Steege, & Watson, 2009), and informal interviews conducted with the teachers and mother before and after intervention. The results showed that the combined intervention did improve the targeted social skills; there was an increase in target behaviours post intervention and a minimal improvement in the rating scales. Based on the results, implications and recommendations for future research were drawn.*

In a typical school setting, it is customary to see mainstream and special needs children interacting with each other, they may be sitting next to each other in class, sharing their supplies, and whispering or giggling at times. During recess, they would sit together on a bench sharing their meals, or even playing tag. However, not all students with special needs are able to socialize with their peers, especially those with deficits in social skills. They tend to sit alone during lunch breaks, are likely to observe others play, or may simply sit on the lawn and browse quietly through a book. These common behaviors are usually manifested in children diagnosed on the Autistic Spectrum Disorders (ASDs).

Autism spectrum disorder (ASD) is viewed as a term that includes Rett disorder, childhood disintegrative disorder (CDD), autistic disorder, pervasive developmental disorder not otherwise specified (PDD-NOS), and Asperger syndrome (Ben-Arieh & Miller, 2009; Sicile-Kira, 2004). The common characteristics between people on this spectrum are that they have difficulties in social interaction, communication, and imaginative thinking (Pittman, 2007). Additionally, AS is currently understood as *a developmental disorder characterized by significant difficulties in social interaction and emotional relatedness and by unusual patterns of narrow interests and unique stereotyped behavior* (Church, Alisanski, & Amanullah, 2000, p. 12). Children with deficits in social competence demonstrate a restricted range of social communication skills such as limited ability to (a) initiate and maintain conversations, (b) request information/materials from teachers and/or peers, (c) listen to and respond to teachers and/or peers, and (d) interact in basic games or other activities (Carter, Klin, Ornstein-Davis, Volkmar 2005; Bray, Hanley-Hochdorfer, Kehle, 2010). People diagnosed with this disorder often suffer from impairments in social interaction and communication; they are unable to sustain friendships and engage in limited social activities (Krauss, Orsmond, Seltzer, 2004). Currently, there is no test to accurately diagnose ASDs. Hence, diagnosticians have to solely rely on observation of behaviors, a person exhibits, a procedure that remains highly subjective in the absence of clear criteria leading to a differential diagnosis (Sicile-Kira, 2004).

As for Asperger's syndrome which has previously been defined as a deficit difficulty with social relationships, including problems with nonverbal behaviors (eye contact, facial expressions, and body gestures), difficulty sustaining peer relationships, and problems with social reciprocity (Clikeman, 2007).



Although formerly it was once considered a rare disorder, today present the prevalence rates of AS is estimated between 30 to -60 in 10,000 cases. Originally, AS was identified diagnosed in males only, but more recent research has confirmed its presence in females, albeit to a lesser extent (Finkelmeyer, Sebrechts, Stewart, Trepangnier, Woodford, 2006).

Although ASDs are generally regarded as a lifelong disability, the variability and severity of the symptoms make it challenging for specialists to determine its prognosis (Ben- Arie & Miller, 2009). However, there is general agreement that IQ, language skills prior to the age of five, degree of impairment, early intervention, and level of available therapy are all indicators of how the individual will fare (Ben- Arie & Miller, 2009).

AS is a disorder that is not well characterized. Previous work has shown no clear-cut distinction between AS, High Functioning Autism (HFA), and Nonverbal Learning Disorder (NLD) (Yalof, 2007; Clikeman, 2007). Children with HFA have problems with social interaction; lacking a close circle of friends doesn't seem to bother them. On the other hand, children with NLD and AS desire social interaction with friends (Clikeman, 2007). NLD overlaps considerably with Asperger's but not as much with HFA (Clikeman, 2007). Table 1 provides a summary of the similarities and differences found in the literature. Still, it is accepted that these children have difficulties in three areas of functioning: social interaction, communication, and imaginative thinking (Pittman, 2007). Children with deficits in social competence demonstrate a restricted range of social communication skills such as limited ability to (a) initiate and maintain conversations, (b) request information/materials from teachers and/or peers, (c) listen to and respond to teachers and/or peers, and (d) interact in basic games or other activities (Carter et al., 2005).

There is no specific test to diagnose ASDs. As such, any diagnosis is based on observable characteristics that a person exhibits. It should be noted that pioneers may be skeptical about the diagnosis since it tends to be based on observations, and observations may be somewhat subjective (Sicile-Kira, 2004). However, there is a general agreement that an eclectic approach is recommended when working with individuals with ASDs; these interventions include: individual and family psychotherapy, psychopharmacology, special education, occupational therapy, and speech and language therapy (Ben-Arie & Miller, 2009; Elder et al., 2006). The research provided in this review focused on the recommended interventions for remediating social skill deficits by special educators.

Interventions that have addressed deficits in acquisition of social skills include social stories which aim at teaching the children explicit unspoken rules through stories and pictures (Ben- Arie & Miller, 2009). Social stories may be applied to a wide range of social situations and can be created depending on the child's needs. These stories usually have descriptive sentences about the setting, characters, and their feelings; they also give direction in regard to the appropriate responses and behaviors (Sicile-Kira, 2004). Sansosti and Powell-Smith (2006) examined the effects of individualized social story interventions on the social behavior of three children with AS. The social stories were read, and a direct observation of the participants' was conducted three times per week during unstructured school activities, such as recess. Data revealed an increase in the social behavior of two of the three participants when the treatment was implemented.

Although several studies have found social stories to be an effective intervention when it comes to greeting people appropriately (Denning, 2007) and reducing levels of inappropriate behavior (Scattone, 2002), many of the previously conducted studies aimed at increasing pro-social behaviors through decreasing problematic behaviors (Sansosti & Powell-Smith, 2006). Additionally, while social stories have benefited many students, there is little empirical evidence related to the use of social stories to increase social and communicative behavior in school settings (Hanley-Hochdorfer et al., 2010). For example, Delano and Snell (2006) used social stories as an intervention to increase social interactions in three elementary students, in a controlled resource room. The results of the study showed that the three participants demonstrated improvement in the resource room; however, two out of three generalized their social behaviors to the mainstream classroom.

Another type of intervention is through increasing fluency of appropriate social behaviors through exposure and practice using "social scripts," where adolescents may carry index cards that include various responses for different situations. In one study, a group of adolescents with AS and HFA were assigned to groups (Fombonne, Meng, Strulovitch, Tagalakakis, & Tse, 2007). They met for two hours a week for a period of 14 weeks where they were taught social skills through role-play. The members practiced the new skill in pairs, one pair at a time, while the rest of the group watched and gave feedback.

In brief, the results of this study indicated that participating in social skills groups can be effective in helping adolescents with ASD develop comfort and confidence in social interactions. Parents' positive feedback suggested generalization to other settings (Tse et al., 2007).

A study conducted by Bock (2007) examined the effect of the social behavior learning strategy SODA (Stop, Observe, Deliberate, and Act) with four elementary school children diagnosed with AS. The students were required to read stories that incorporate the SODA strategy. After the intervention took place, maintenance probes occurred once a month for 5 months. The participants benefited from the SODA intervention; they showed good improvement in time spent learning cooperatively, playing organized sports games, and interacting with others during lunch time when SODA training began.

Another study was conducted to evaluate the efficacy of two social skills intervention programs that were implemented on 6 to 11 year old children with HFA and AS (Owens et al., 2008). The two programs were LEGO and Social Use of Language Program (SULP). SULP used a clear curriculum and a hierarchical learning approach to teach social and communication skills. Teaching started by reading novels about monsters that encounter social difficulties and progressed to adult modeling. The children then practiced and played games within the group setting and then moved on to new situations to encourage generalization (Owens et al., 2008). On the other hand, LEGO therapy was a social skills intervention for school-age children. The program was based on collaborative LEGO play, which used the child's natural interests to motivate learning and behavior change. A typical LEGO therapy project aimed to build a LEGO set, importantly with a social division of tasks. In a group of three people, the individuals had to communicate and follow specified rules to complete the LEGO build. Each collaborative activity required verbal and non-verbal communication, collaboration, joint problem solving, joint creativity and joint attention to the task. Results showed that the children who participated in LEGO therapy improved more than the other group on autism-specific social interaction scores (Owens et al., 2008).

Bearing these studies in mind, research showed that natural teaching strategies used to improve social interaction between children with ASDs and their peers were designed on the basis of incidental teaching, 'social stories', and/or simple peer modeling (Hyun-Jin Choi & Nieminen, 2008). A variety of peer-related strategies have been developed to improve the social functioning of children on the autism spectrum. Peer-mediated strategies typically involve the use of socially competent peers to model and reinforce appropriate social behavior (DiSalvo & Oswald, 2002). An example of peer mediated intervention was provided by Kamps et al. (1994) who examined the peer tutoring approach using a multiple baseline across participants with reversal design. Participants included three 8- and 9-year-old boys with autism who were high functioning in terms of language and intellectual abilities but lacked social competence, and all other children in a third-grade classroom. Tutoring sessions resulted in an increase in interaction from 80 to 120 seconds per 5-minute sample for the three children with autism. Additionally there was an increase in the mean interaction time of peers, and the children with autism displayed improved academic achievement (DiSalvo & Oswald, 2002).

Laushey and Heflin (2000) investigated this approach with two five-year-old children diagnosed with ASD. These children had adequate language skills and could read at the kindergarten level, but suffered from weak social competence. The results indicated that the children with autism increased their social interaction by 36% and 38% respectively during the treatment phase, as compared with the baseline phase, in which children attended regular classes but were not assigned a buddy (DiSalvo & Oswald, 2002).

Various interventions were found to be effective in teaching social skills to children on the spectrum; however, little research combined the use of social stories and peer mediated intervention, especially in Lebanon. Thus, a combined intervention consisting of social stories and peer mediated intervention will be used to remediate social skills in this case study.

#### *Purpose and Rationale*

Recent data suggests that the number of students identified with AS and HFA has increased dramatically over the last few years, especially in general education settings (Myles, 2005; Sansosti & Powell-Smith, 2006; Steyaert & Marche, 2008). Thus, it is imperative for general education teachers and special educators to become acquainted with effective strategies to help these students experience successful inclusion.

The purpose of this case study was to remediate social skills in a first grader who attends a mainstreamed classroom (inclusive setting) in an urban school in Beirut using social stories and peer mediated interventions to increase adaptive behaviors in a child diagnosed with a form of ASDs.

#### *Interventions for Students With AS*

Many researchers have documented the effectiveness of peer mediated intervention programs that improve social skills, such as LEGO (LeGoff 2004; LeGoff and Sherman 2006) and Social Use of Language Programme (SULP) (Baron-Cohen, Granader, Humphery, Owens, 2008). Peer mediated interventions in the form of peer tutoring and cooperative learning, tend to improve social competence and increase participation (Barbetta, Delquadri, Kamps, Leonard, 2002). An increase in the amount of time engaged in social interactions was fairly documented (Constantino, Friesen, Przybeck, & Todd, 2000).

Social stories, on the other hand, are short tales that describe specific social situations and appropriate responses (Gray, 1998). Social stories have proven effective in targeted social skills in children with ASDs, namely greeting people appropriately, improving positive social interaction, asking for help, and increasing the frequency of social communication through eliminating problematic behaviors such as spitting and yelling (Sansosti& Powell-Smith, 2006). Lastly, stories teach the child how to identify social cues that are prerequisites to specific desirable behaviors (Greenway, 2000). Empirical evidence on the effectiveness of social stories in school settings is somewhat limited (Hanley-Hochdorfer, 2010). The following questions were explored:

1. What are the effects of a combined intervention consisting of peer mediated intervention (pairing social and average to high achieving children with a child with impaired social skills on school projects) and reading personalized Social Stories (that target student's class participation) on a child with impaired social skills?
2. What are the observable changes during the intervention period and hypothesized explanations?

#### *Hypothesis*

It was hypothesized that using an intervention composed of peer mediated intervention on academic tasks and reading social stories improves targeted social skills in this particular first grader. It was hypothesized that there will be an improvement in the teachers rating scale after completing the intervention.

Peer mediated intervention involves the use of socially competent peers to model and reinforce appropriate social behaviors in natural settings. In this pairing, socially competent peers are paired with a child with ASD to promote social skills through incidental learning (DiSalvo& Oswald, 2002).

#### **Method**

##### *Participants*

The primary participant was a seven-yearold (first grader) boy with ASD, who is referred to as Adam. The secondary participants included three of his classmates from Grade 1 who were considered typically developing peers (both socially active and average to high achievers academically); his homeroom teachers, special educator, and mother. Peer participation was based on individual voluntary participation on school projects during enquiry lessons. Children who participated did so whenever they wanted to, without constraint, thus reflecting natural school interactions.

Adam is a Lebanese student who lives with his family consisting of his parents and two siblings. Adam is currently attending a regular first grade class (inclusive setting). He also receives help from a special educator twice a week. Adam has been assessed three times; twice by educational psychologists and once by a speech therapist. While there was no definitive diagnosis, the specialists agreed that Adam appears to meet the criteria for ASD.

Adam was selected to participate in this study because he displays weakness in social skills and he demonstrates the basic reading skills necessary to read the social stories.

Consent was given by Adam's parents and staff at the school, in accordance with the usual procedure for ethical guidelines.

### *Research Design*

In this intrinsic case study, A-B-A Single- Subject Design was used to study changes in the behavior of a student with ASDs who was exposed to a social intervention program. A single- subject design was specifically chosen for this study because it is commonly used to study changes in an individual's behavior while being exposed to an intervention or treatment (Fraenkel, & Wallen, 2006). The primary benefit of using the A-B-A design is that the statement of change is strengthened when the behavior is maintained after stopping the intervention (Tillman & Burns, 2009).

An initial baseline phase was designed to gather information about Adam's social behavior. During this phase, Adam's teachers were asked to fill out the Social Behavior Assessment Inventory (SBAI) rating scale, the researchers observed and documented Adam's social interactions using the Conditional Probability Record (CPR), and informal interviews were conducted with the teachers and mother. Following this phase was the intervention phase that took place during eight weeks. During the intervention phase, the researchers read a social story with Adam every Tuesday, and a cooperative group work activity took place every Friday. Finally, a week after discontinuing the intervention, a follow-up phase was allowed to measure the changes in Adam's social interaction. Similar tools to the ones in the baseline phase were used in the follow- up phase, namely the SBAI rating scales filled by the teachers, observations of Adam's behavior and documentation of his social behavior using the CPR.

### *Materials and Instruments*

#### *Social Stories*

Social Stories are individualized short stories that describe specific social situations and provide specific desired responses (Gray, 1998). These short stories are used to help individuals with ASDs interpret and understand situations that may be confusing to the child (Kincaid, Powell-Smith, Sansosti, 2004). The selected social stories were designed or chosen depending on the target skills that need remediation. The target skills were identified after gathering information about the student's behavior from observations conducted by the examiner and interviews with the parents and teachers. Social stories were designed to address the following identified target behaviors that need remediation: raising one's hand to ask a question, sharing items, talking to the teacher, asking questions, asking for help, greeting people and introducing one's self, and joining in on activities. The social stories were individualized booklets. Each booklet is 4 to 5 pages long; these pages include brief sentences and some pictures. The types of sentences used in the stories are the following: (a) descriptive sentences, which identify the contextual variables of the target situation (example: sometimes, recess is on the playground); (b) directive, which assist in describing a desired behavior in response to a social cue or situation (example: I will try to say things like *good job* or *nice drawing*); (c) prescriptive, which describe the reaction and feelings associated with the target situation (example: there are other kids who like to play with me during recess); (d) affirmative, which express shared belief within a given society (for example, this is a good habit) (Sansosti et al., 2004). The content of the stories was based on information collected through indirect measures such as interviews with teachers, observing the child in various settings, and data collected from the child's school records and assessment reports.

#### *Social Story Journal*

The researchers kept a journal; during or after each social story session, the researchers would take notes on the student's behavior. Keeping a journal allows the researchers to monitor Adam's progress, document the child's questions or responses, and record the level of difficulty he is experiencing.

#### *Social Behavior Assessment Inventory (SBAI)*

The SBAI is designed by Thomas M. Stephens, and Kevin D. Arnold, and published by Psychological Assessment Resources, Inc. The SBAI measures the level of social behaviors exhibited by children and adolescents in classroom settings. This assessment is appropriate for children between the ages of 5 and 15. It consists of 136 items that describe social skills commonly observed in the classroom. A teacher, counselor, or parent who has observed a student's behavior rates each item on a 4-point scale describing both the presence and level of the behaviors exhibited by the student; teachers were asked to complete a rating scale immediately before and after intervention period which was the Social Behavior Assessment Inventory (SBAI) (Stephens, 1992).

#### *Functional Behavioral Assessment*

Functional Behavioral Assessment (FBA) was used to identify and evaluate the variables that trigger particular behaviors. Both an indirect and direct FBAs were conducted. The indirect FBA consisted of gathering information through semi-structured interviews and through the SBAI rating scale. The direct

FBA consisted of using the Conditional Probability Record (CPR) to monitor the child's behavior. CPR was used to observe and record the antecedents and consequence of a behavior. This type of observation is usually beneficial when the likelihood of the occurrence of particular behaviors is targeted (Steege & Watson, 2009).

#### *Procedures*

##### *Ethics*

The present study was conducted following the ethical guidelines set forth by the Council for Exceptional Children (CEC) (Rumrill & Cook, 2001). Prior to initiating the study, a formal meeting was conducted with the child's parents, special educator, and homeroom teacher. The purpose of the meeting was to provide the parents and teachers with the purpose of the study, and a description of the procedure. Parents were informed about the benefits of the intervention, and were given the option of withdrawing their son from the study at any time and for any reason. After conducting the meeting, the parents were asked to sign an informed consent. Privacy and confidentiality were assured through the use of a pseudo (Adam).

*Baseline.* The researchers gathered information about the student's behavior through informal and semi-structured interviews with the teachers and school counselor. Additionally, the special educator and two regular teachers were asked to fill out a SBAI rating scale. Finally, the target behaviors or skills that needed remediation were also taken from child's school records.

Additionally, the researchers observed Adam during the course of his usual school activities. The observation took place twice a week for two weeks. The students were observed for 15 minutes, during different times of the day. The observer used a 15 second interval while recording the data. Additionally, the observer was required to mark the occurrence of target behaviors using the Conditional Probability Record (CPR) (Steege & Watson, 2009).

*Intervention.* After the first two weeks of initial observations (the baseline phase), a transition was made to the intervention phase. The researchers used social stories and cooperative group work during this phase. Once a week, a personalized social story was read to the student. The social story targeted the specific skills that need remediation. They were designed in accordance with research based guidelines and recommendations (Gray, 1993; Denning, 2007).

Once a week, the teacher grouped Adam with 3 typically developing peers on a group project. The teacher took 10 minutes to explain what the project was about and assigned roles for each group member. The assigned roles were changed each week. Cooperative learning groups were based on incidental teaching, making use of academic projects using simple peer modeling, with the use of direct instructions and guidance of the special educator. Each project required verbal and non-verbal communication, collaboration, joint problem solving, joint creativity and joint attention to the task. The teacher was the mediator between the children. She also emphasized the importance of certain behaviors while the students were working by taking advantage of this natural setting to positively reinforce Adam's behavior verbally or simply give direct instructions to guide him.

Implementation of the social stories and peer mediated intervention also took place for a period of eight weeks.

*Follow-Up.* A week after completing the intervention, Adam's social behavior was observed both in the classroom and on the playground. The observation took place three times a day; two days per week, for two weeks. The observer was required to mark the occurrence of targeted behaviors using 15 second partial interval recording (similar to that used during the baseline phase).

Additionally, during the post-assessment phase, three teachers were asked to fill out a SBAI rating scale. Also, an informal interview was conducted with the teachers and parent in order to get more details on their feedback.

#### *Data Analysis*

A detailed description of Adam's social behavior during the baseline phase was documented through observations using CPR, notes taken by the researchers, and informal interviews conducted with the mother and teachers. Based on the collected data, the target skills that need remediation were identified. The combined intervention was then implemented for a period of 8 weeks. The researchers used a journal to document Adam's behavior during the intervention phase. Finally, after completing the intervention, a second observation similar to the one conducted in the baseline phase was implemented and the teachers

were asked to fill the rating scales for a second time. The differences in behavior and scores were documented. The changes that were maintained in Adam's behavior during the generalization period were provided. Moreover, visual illustrations were presented in order to compare Adam's target behaviors pre and post intervention. The graphs were plotted based on the frequency of target behaviors. An analysis and synthesis of the documented data, in both the journal and graphs, was discussed. Lastly, a summary of the results collected from the rating scales filled by the teachers, observations conducted, and informal interviews was provided.

## Results

### *Behavioral Changes Observed During Social Stories Sessions*

Adam was very cooperative throughout the story reading sessions. During the first few encounters, he was somewhat coy. However, towards the second week of one-to-one sessions, he became more outgoing. In almost every session, Adam would come to the classroom door and greet the researchers, ask permission to go to the library and read a book several times. Adam was capable of remembering the main investigator's name (Noor) by the second week.

During the story sessions Adam was capable of reading the stories fluently: he could recall the main ideas of previously taught stories, answered comprehension questions related to the text. Adam could answer the examiners' questions most of the time; however, it should be noted that he did not use complete sentences. It was much easier for him to give one word answers or fill in the blanks. For example, the researchers asked him, *After borrowing something what do you do?* Adam looked and did not respond. However, when the question was rephrased to *After borrowing something do you keep it or return it?* He said, *Give it back.*

Adam was also capable of expressing himself using gestures. For instance, when he read the text related to asking questions, he raised his hand to show how he would ask his teacher a question. Also, when he saw a picture of a boy changing his clothes, he covered his mouth and said *impolite* in Arabic. However, he was not able to elaborate why it was impolite. In another session, Adam pointed to a picture of a child smiling and said *happy* while grinning, then pointed at a child frowning and said *sad* while pressing on his teeth.

At times, Adam made statements which didn't seem to make much sense and were out of context. He also tended to mumble words that were not clear to the examiner, and when asked to repeat what he said he would not. When the teachers were asked if they noted similar behaviors in the classroom, they mentioned that they did and they assumed that this was because Adam was very much affected by the weather. His mood changed when it used to rain; he would become inattentive and somewhat restless. Based on the notes in the journal, Adam did become restless and distracted by the rain; however these *random statements* were not only made on rainy days.

During the library sessions, Adam tended to sit next to the researchers. He usually put his head on her shoulder and played with her scarf or sweater while reading the story. Adam was capable of asking if he could go to the restroom during one of the sessions. On one occasion, the main investigator forgot her pen on the table after the session ended; so he walked back to the table and got it for her saying, *Your pen*. The friendly relationship that was documented in the journal contradicted some of the information in one of Adam's assessment reports. For example, according to his report Adam avoided any physical contact and preferred sitting far from others. One possible explanation for his behavior during story reading sessions is that he must have felt comfortable with the reader and enjoyed the story sessions. Perhaps Adam became familiar with the routine that took place every Tuesday, which in turn, made him feel at ease. Another possible explanation is that some kids act differently when they are being observed by strangers in unfamiliar settings.

Towards the last few sessions, some minor changes were noticed in Adam's behavior. Adam became more expressive, and tried to initiate conversation on several occasions. For example, the investigator came to pick him up one day, so he grabbed her hand and walked her towards his desk. He then showed her a picture he drew of a fire with flowers and trees around it. He pointed at the drawing and labeled the items he drew and then said, *Forest*. The researchers also noticed that Adam became friendlier towards others. For example, Adam started to greet the librarian upon entering the library. Also, on several different occasions, he greeted teachers walking in the hallway. However, it should be noted that Adam exhibited minimal eye –contact and used phrases (instead of complete sentences) while talking to others.

In conclusion, the general impression obtained from the documented data in the journals is that Adam progressed from being relatively reserved to increasingly more sociable. A difference in his pro-social behavior towards others was also evident (e.g., greeting the librarian). Although some positive changes were observed in Adam's behavior towards others, we cannot conclude that these changes were secondary to the intervention. Several external factors may have influenced Adam's behavior, such as his increased comfort level with the researchers or even maturation.

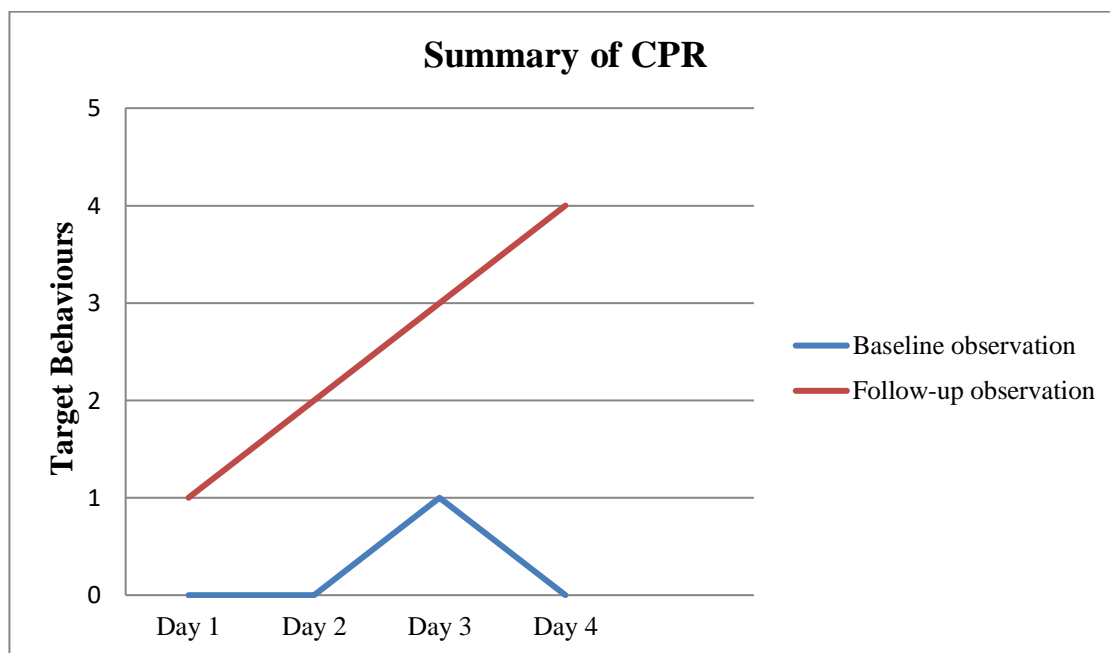
#### *Behavioral Changes in Response to Peer Mediated Intervention*

Although Adam seemed to be very confident and comfortable, he was not able to verbally present his work in a fluent way. When given oral prompts, Adam was able to answer questions. Adam's only verbal initiation was when he asked his friend what he was doing. Perhaps the reason he was able to do this is because he was asked this particular question several times.

Adam was more of a passive group member. It seems as though he benefited from group work because he was able to imitate his peers when he was not sure about what he was supposed to do. It cannot be concluded that Adam was capable of completing the task; however, he wasn't able to take the leading role in any of the group activities.

#### *Adam's Social Communication Progress*

Frequencies of the occurrence of targeted behaviors were gathered, through observations, using the Conditional Probability Record (CPR) which is part of the Functional Behavioral Assessment (FBA) process. So, every 15 seconds the researchers would look at Adam to see if he was engaged in a target behavior. If he was, the researchers noted the antecedent (what took place before the incident or what lead to it) and the consequence (what happened after the incident; for examples, feedback, reinforcement, activity taking place) (see sample of CPR in Appendix II). Figure 1 shows a summary of the CPR.



**Figure 1. Summary of Frequency of Target Behaviors.**

As the data from the above figure shows, Adam had one social encounter during the observation that took place prior to the intervention phase. This incident took place during recess when Adam attempted to join in on a game. He ran towards one of his classmates and nudged his shoulder. During the intervention phase, Adam's social interaction fluctuated; there were minimal attempts at first, then the social interactions increased. In the observation conducted post intervention the examiner noticed several attempts and actual social interactions; however, the amount of interaction differed from day to day.

Perhaps the amount of interaction observed post intervention differed depending on the time of day and the activity that was taking place. According to the researchers' notes in the journal and CPR, there was only one social interaction during the observation conducted on day one; this observation was conducted during the first period while the students had a writing assignment to do. On the other hand, the other

three observations took place during recess, lunch time, and carpet time (where students were free to do as they please). During these observations Adam made several interactions with his peers and teachers; such as sharing snacks, asking his classmate questions, and greeting a teacher. The child received positive feedback during all encounters except for one.

#### *SBAI Results*

The Social Behavior Assessment Inventory was filled out by two homeroom teachers and the special educator who works with Adam on a regular basis. The teachers filled the forms once in February, prior to starting the intervention, and once in April after completing the intervention.

The SBAI consists of four sections that need to be filled by the teachers; these sections include the following: Environmental Behaviors (ER), Interpersonal Behaviors (IP), Self-Related Behaviors (SR), and Task-Related Behaviors (TR). Thus, the results of the inventory were classified in terms of the above mentioned subscales. After adding up the scores, the total numbers were plotted on the SBAI Profile Grid. The total scores either fell in the *within expectations* range which means the behavior is acceptable, or the *elevated* range which means the behavior is lower-than- acceptable level (Stephens, 1992). A decrease in score indicates a change in ratings and improvement of behavior; the lower the score becomes, the closer the behavior exhibited is to the acceptable level (Stephens, 1992).

#### *Environmental Behaviors*

According to the homeroom teachers before intervention, Adam exhibited some problems in his care for the environment (ability to clean after himself, use the classroom materials in appropriate ways, and dispose of trash properly). He was unable to deal with emergencies in an age-appropriate way. Lastly, Adam did not show any disruptive behavior in the school premises. Similar scores were obtained in the post-intervention.

According to the special educator's scores before the intervention took place, Adam did not exhibit any problems in this area. Similar scores were obtained in the post-intervention. Table 2 shows a summary of the scores obtained from the Environmental Behavior (ER) subscale that were completed pre- and post intervention for both the teachers and special educator.

**Table 2. Homeroom Teachers' & Special Educator's Ratings on Environmental Behaviors (ER) Pre and Post Intervention**

Subscale	Pre and Post Intervention											
	T-Pre			RC			T-Post			RC		
Care for the Environment (CE)	4	E	3	E	4	WE	4	WE	4	WE	4	WE
Dealing with Emergencies (DE)	3	E	3	E	2	WE	2	WE	2	WE	2	WE
Lunchroom Behavior (LR)	3	WE	3	WE	2	WE	3	WE	3	WE	3	WE
Movement Around Environment (MO)	4	WE	3	WE	4	WE	4	WE	4	WE	4	WE

Note. T-pre= teachers' scores pre intervention; RC= Rating Category; T-post= Teachers' scores post intervention; S-pre= Special educator's scores pre intervention; S-post= Special educator's scores post intervention; WE= Within Expectations; E= Elevated.

#### *Interpersonal Behavior (IP)*

The results of the inventory scales filled out by both the homeroom teachers and special educator pre-intervention yielded similar results. Adam's overall scores in the Interpersonal Behavior subscale fell within the elevated range. According to the results, Adam was not capable of coping with conflict in appropriate ways; for example he was not able to respond to verbal or physical assault by leaving the situation or calling for help. Adam had difficulties in gaining his teachers' attention by raising his hand or approaching them and asking for help. Adam was capable of stating his name when asked, greeting adults and peers by their names, and responding to greetings by shaking hands and saying, *How do you do?* However, he was not capable of maintaining eye contact, introducing himself, or introducing people to each other. Adam could help his peers and teachers when asked, but he was not able to offer help. Adam exhibited play skills, such as turn taking and following rules, that are lower than the expectable level for his age. Lastly, he was capable of distinguishing between what belongs to him and what belongs to others; however he was not capable of asking permission to use others belongings.

According to the data gathered in the post intervention, the total scores of the homeroom teachers' rating scales remained in the elevated range. However, the results showed a general improvement in some of Adam's interpersonal behaviors. The major improvements (decrease of 3 or more points) were present in the following subscales: Coping with Conflict (CC), Greeting Others (GR), and Making conversation (MC). The scores on Accepting Authority (AA) remained the same; while the remaining six subscales



showed a decrease in one to two points. It should be noted that Adam's scores in Greeting Others and Property: Own & Others were borderline; a decrease in an additional point would lead the score fell into the within expectations range.

Similarly, there was a general improvement in the total post test scores obtained from the special educator's rating scales on IP. The major improvements (decrease of 3 or more points) were present in the following subscales: Coping with Conflict (CC), Greeting Others (GR), and Making conversation (MC). The scores on Accepting Authority (AA) remained the same; while the remaining six subscales showed a decreased one or two points. It should be noted that a decrease in an additional point on the GR subscale would lead the score fell into the within expectations range. Table 3 shows a comparison of the teachers' and special educator's rating scales that were obtained in the pre and post intervention.

**Table 3. Homeroom Teachers' & Special Educator's Ratings on Interpersonal Behaviors (IP) Pre and Post Intervention**

and Post Intervention										
Subscale	T-Pre		RC	T-Post	RC	S-Pre		RC	S-Post	RC
Accepting Authority(AA)	9	E	9			E	11	E	11	E
Coping with Conflict(CC)	16	E	9			E	11	E	8	E
Gaining Attention(GA)	13	E	12			E	14	E	11	E
Greeting Others(GR)	14	E	8			E	12	E	8	E
Helping Others (HP)	14	E	12			E	14	E	14	E
Making Conversation(MC)	19	E	16			E	16	E	13	E
Organized Play(OP)	9	E	8			E	7	E	6	E
Positive Attitude Towards Others(PA)	7	E	6			E	6	E	6	E
Playing Informally (PL)	10	E	9			E	14	E	12	E
Property: Own & Others(PR)	6	E	5			E	6	E	6	E

Note. T-pre= teachers' scores pre intervention; RC= Rating Category; T-post= Teachers' scores post intervention; S-pre= Special educator's scores pre intervention; S-post= Special educator's scores post intervention; WE= Within Expectations; E= Elevated.

#### *Self-Related Behaviors (SR)*

The scores of Adam's self-related behavior subscale on the teachers' ratings before intervention were all in the elevated range; except for his ability to take care of himself. His score on exhibiting responsible behavior fell in the *elevated* range; however a decrease in one point would lead the total score to be part of the *within expectation* range. Similarly, the special educator's ratings during pre-intervention were in the elevated ranges except for self-care and accepting consequence subscales.

The results of the teachers' rating scale post intervention showed a decrease in the total scores of the following subscales: Accepting Consequence (AC), Positive Attitude Toward Self (PA), and Responsible Behavior (RB). Adam's total score on Accepting Consequence became in the *within expectations* range after intervention.

The results of the special educator's rating scale post intervention also showed a decrease in the total scores of the following subscales: Accepting Consequence (AC), Expressing Feelings (EF), and Positive Attitude Toward Self (PA). Adam's scores on AC and EF became in the *within expectations* range post intervention. The total scores in the remaining subscales did not change. Table 4 shows a comparison of the teachers' and special educator's scores obtained before and after intervention.

#### *Task Related Behaviors (TR)*

In general, according to the teachers' and special educator's rating scales before intervention, Adam's scores on task related behaviors were in the elevated range. There was a conflict in scoring between the homeroom teachers' and special educator's scores in *Attending Behavior (AT)* subscale, which includes looking at teacher when instructed, quietly watching presentations, and listening to a class speaker. The homeroom teacher rated him as being in the acceptable range (score 3), while the special educator rated him in the elevated range (score 5). One explanation for the discrepancy in scores could be that Adam behaves differently depending on the setting he is in.

After the intervention was discontinued, Adam's scores on some of the subscales decreased. He showed improvement in the following subscales: Classroom Discussion (CD), Following Directions (FD), Group Activities (GP), Performing Before Others (PF), and Quality of Work (QW). The scores of the remaining six subscales did not change. Although there was a general improvement in the total scores of some of

the subscales, the scores still remained in the elevated range. The only subscale that became in the *within expectations* range is Performing Before Others (PF).

**Table 4. Homeroom Teachers' & Special Educator's Ratings on Self-Related Behaviors Pre and Post Intervention**

Subscale	T-Pre		RC	T-Post	RC	S-Pre	RC	S-Post	RC
Accepting Consequence(AC)	5	E	3			WE	5	E	3
Ethical Behavior (EB)	10	E	10			E	7	E	7
Expressing Feelings (EF)	4	E	4			E	4	E	2
Positive Attitude Towards Self (PA)	11	E	9			E	6	E	5
Responsible Behavior (RB)	9	E	8			E	8	E	8
Self-Care (SC)	3	WE	3			WE	3	WE	3

Note. T-pre= teachers' scores pre intervention; RC= Rating Category; T-post= Teachers' scores post intervention; S-pre= Special educator's scores pre intervention; S-post= Special educator's scores post intervention; WE= Within Expectations; E= Elevated.

The total scores on the special educator's rating scale post intervention also showed a general improvement. There was a decrease in the following subscales: Asking and Answering Questions (AQ), Classroom Discussion (CD), Following Directions (FD), and Independent Work (IW). The decrease in total scores was between one and two points. The scores of the remaining six subscales did not change. A comparison of the teachers' and special educator's rating scales pre- and post intervention are presented in Table 5.

**Table 5. Homeroom Teachers' & Special Educator's Ratings on Task-Related Behaviors (TR) Pre and Post Intervention**

Subscale	T-Pre		RC	T-Post	RC	S-Pre	RC	S-Post	RC
Asking & Answering Questions (AQ)	8	E	8			E	10	E	8
Attending Behavior (AT)	3	WE	3			WE	5	E	5
Classroom Discussions(CD)	12	E	10			E	17	E	16
Completing Tasks(CT)	6	E	6			E	6	E	6
Following Directions(FD)	6	E	5			E	6	E	4
Group Activities(GP)	12	E	8			E	7	E	7
Independent Work (IW)	8	E	8			E	7	E	6
On-Task Behavior (OT)	9	E	9			E	11	E	11
Performing Before Others(PF)	10	E	5			WE	6	E	6
Quality of Work(QW)	8	E	7			E	8	E	8

Note. T-pre= teachers' scores pre intervention; RC= Rating Category; T-post= Teachers' scores post intervention; S-pre= Special educator's scores pre intervention; S-post= Special educator's scores post intervention; WE= Within Expectations; E= Elevated.

In an attempt to gauge which subscales changed or stayed the same from the pre- to post intervention phase, a summary of the total scores are presented in Table 6 and Table 7; Table 6 lists the target subscales and Table 7 lists the non-target subscales. The subscales were divided into target and non-target depending on the behaviors that they represent. The selected target subscales are the following: in the Interpersonal Behaviors category, the important subscales were: Coping with Conflict, Gaining Attention (examples: raising hand, using please and thank you, or asking peers for help), Greeting Others, Helping Others, Making Conversation, Positive Attitude Towards Others, and Playing Informally (example: joining in on play or sharing games); in the Self-Related Behaviors category, the following were selected: Expressing Feelings (example: describing own or others feelings or moods verbally) and Positive Attitude Toward Self (example: saying thank you and making positive statements about self); in the Task Related Behaviors category, the following were selected: Asking and Answering Questions, Classroom Discussion, Group Activities, and Performing Before Others.

According to the data presented in Tables 6 and Table 7, Adam's target behaviors improved in all of the subscales; this was documented in either the teachers' rating scales, the special educator's ratings, or by both. Yet, his scores remained in the elevated range except for the special educator's score on expressing feelings. Adam also showed improvement in some of the non-target behaviors which is not

commensurate with the increase in the target behaviors. All scores that did improve remained in the elevated range.

**Table 6. Summary of Changes in Target Behaviors**

Subscales	Change in teachers' score	Change in total (teacher's score)	Change in special educator's score	Change in total (special educator's Score)
Coping with conflict	< 7	-	< 3	-
Gaining attention	< 1	-	< 3	-
Greeting others	< 4	-	< 4	-
Helping others	< 2	-	-	-
Making conversation	< 3	-	< 3	-
Organized play	< 1	-	< 1	-
Positive attitude towards others	< 1	-	-	-
Playing informally	< 1	-	< 2	-
Expressing feelings	-	-	< 2	WE
Positive attitude toward self	< 2	-	< 1	-
Asking & answering questions	-	-	< 2	-
Classroom discussion	< 2	-	< 1	-
Group activities	< 4	-	-	-
Performing before others	< 5	-	-	-

Note. < = decrease in score; WE = changed to within expectations; - = no change.

**Table 7. Summary of Changes in Non-Target Behaviors**

Subscales	Change in teachers' score	Change in total (teacher's score)	Change in special educator's score	Change in total (special educator's Score)
Care for the environment	< 1	-	-	-
Dealing with emergencies	-	-	-	-
Lunchroom behavior	-	-	< 1	-
Movement around environment	< 1	-	-	-
Accepting Authority	-	-	-	-
Property: own & others	< 1	-	-	-
Accepting consequences	< 2	WE	< 2	WE
Ethical behaviors	-	-	-	-
Responsible behavior	-	-	-	-
Self-care	-	-	-	-
Attending behavior	-	-	-	-
Completing task	-	-	-	-
Following directions	< 1	-	< 2	-
Independent work	-	-	< 1	-
On-task behavior	-	-	-	-
Quality of work	< 1	-	-	-

Note. < = decrease in score; WE = changed to within expectations; - = no change.

#### *Teacher' & Parent's Feedback*

Towards the end of the intervention, an informal meeting was conducted with the teachers, special educator, and counselor to inquire about Adam's behavior in and out of class. His teachers reported great improvement in peer interaction during recess and group activities, but minimal verbal communication with others. Adam's special educator indicated that Adam had grown more comfortable with his peers

and teachers by the end of the year, thereby justifying his increased interaction with others. The school counselor noted that Adam had shown progress in her sessions; he had stopped her in the hallway to say *hi* on several occasions.

An informal phone interview was conducted with Adam's mother to ask for her feedback. She noted that Adam's behavior towards his family is inconsistent. He exhibited friendlier behavior towards his siblings at times, while he tended to ignore them or play alone at other times. At all rates, he had become more comfortable interacting with their new cleaning lady, and greeted the doorman and their neighbors in the building on several occasions.

### *Discussion of Results*

#### *SBAI Results*

The data gathered from the homeroom teachers' and counselor's SBAI rating scale that were completed pre and post intervention showed mixed results. One possible explanation for the difference in ratings is that the Adam would act differently depending on the setting. For example, he would act in a particular if he is in his regular classroom with his peers as opposed to when having a one-on-one session with the special educator. Perhaps Adam feels more comfortable expressing himself when fewer people are around, or he might simply feel more comfortable talking to his special educator than his homeroom teachers, consistent with Delano and Snell (2006) who noted a difference in behavior from one setting to another. In their study, they attempted to use social stories to increase verbal initiations in three children with autism. The results indicated that the children showed improvement in the controlled setting; however, only two out of three were able to generalize their social behavior in the regular classroom.

Moreover, according to Bellini, Benner, Hope, & Peters's (2007) meta-analysis of 55 single-subject design studies maintenance and generalization effects of school-based social skills interventions for children and adolescents with ASD were significantly lower for interventions that took place in the resource room. Conversely, interventions that were implemented in the regular classroom produced higher maintenance effects and higher generalization effects across participants and settings.

In sum, results from the rating scales presented in tables one through six confirmed the first assumption; there was improvement in scores on the post intervention ratings. However, it should be noted that although there was an improvement in the total scores of many of the subcategories on the SBAI rating scale, most scores still remained in the elevated range. One possible explanation may be that the duration between the time the first and second rating scales were completed was too short. Two months may not have been long enough for there to be a big difference in behavior.

#### *Conditional Probability Record (CPR) Results*

The data gathered using the Conditional Probability Record (CPR) which is part of the Functional Behavioral Assessment (FBA) process confirmed the second assumption made by the researchers. The CPR record showed an increase in social engagement following the initiation of the social stories and peer mediated intervention.

Although Adam exhibited an increase in social interactions with others, his conversational skills and oral expression did not improve. He was able to interact with others by sharing his snacks, raising his hand, and playing in a friendly manner with his peers. However, Adam exhibited minimal verbal contact with others; he attempted to speak a few times, albeit in unintelligible mumbling. Also, when Adam shared his snacks, he simply handed the cookie to his classmate without saying anything. When the classmate said thank you, Adam just smiled.

Berry, Bodin, Gilmore, Klinger, Lee, Palardy (2003) documented similar results to those found in this study. They used social stories to teach the following social skills: greeting, conversation, and play to four children with HFA. The children were between the ages of 6 and 9. The intervention took place once a week for 8 weeks. Following each story session, the children were paired with other typically developing peers to do fun activities. These researchers used observation of the play sessions and rating scales as their assessment tools; the children were asked to complete the Social Support Scale for Children and the Loneliness Scale. The results of the study showed that these children improved; initiating and responding to greetings and play skills but not for conversational skills (Berry et al. 2003). The children also noted an increase in perceived social support from their peers post-intervention.

*Behavioral Changes Observed During Intervention*

The results of this study showed that reading social stories was beneficial. Adam was capable of reading the social stories on his own, and was able to answer the comprehension questions related to the text. Adam also showed an increase in social interactions such as greeting the researchers and other teachers such as the librarian. He was also capable of asking questions and sharing items; all of the above mentioned behaviors were discussed in the stories read during the story sessions, similar to Denning (2007) and Thiemann and Goldstein (2001)'s findings. However, the latter study showed limited generalization and maintenance of social behavior, presumably due to the length of the intervention period. Adams, Gouvousis, Waldron, & VanLue (2004) conducted an intervention with a 7-year-old participant with a disorder from the ASD which consisted of reading social stories. Although the intervention conducted by Adams et al. (2004) differed from the present study in that they had the parents read social stories to their child at home, the study yielded similar results. Adams et al. (2004) noted that reading social stories to the child helped him understand how to ask for help, thus increased his social interactions with the adults around him.

According to the data noted in the journal, Adam was capable of working cooperatively with his peers. He was able to perform the delegated tasks. During two of the sessions, Adam was required to stand and present what he has done in front of his classmates. He was capable of labeling the items he drew and acting out a given role. However, it should be noted that he was not capable of expressing himself in a fluent way. The teachers usually gave him probes or asked him specific questions in order for him to express himself orally. When comparing Adam to the peers in his group, it was noticeable that he still has not reached their level of oral expression. The researchers also noted that, apparently, the other students in class knew that Adam is somewhat *different*. They attempted to assist him by asking if he needed help or by guiding him in what he should do on occasions. For example, the teacher called Adam while he was working on a given task, so one of his group members came up to him and told him that the teacher was calling him; his peer then told him he should see what she wants.

A group of researchers attempted to examine the effectiveness of cooperative learning (CL) in increasing the level of social behaviors and task engagement in two high-functioning autistic students (Bruton, Daly, Grey, Hanan, & McGuinness, 2007). Both children were placed in groups which included three typically developing peers, one male and two females. The first child attended the CL session in the resource room, while the second in the regular classroom. According to the results of their study, the group work substantially increased the level of social engagement for both children. CL seemed to facilitate task engagement; additionally there was a decrease in passive task engagement.

Kamps et al. (1994) found peer mediated interventions to be effective in increasing social competence in children with disorders from the ASD. Their study included two HFA participants and all other children in a third-grade classroom. The two children with autism were 8- and 9-year-old boys; they were high functioning in terms of language and intellectual abilities but lacked social competence. The group sessions resulted in an increase in interaction from 80 to 120 seconds per 5-minute sample for the children with autism. Additionally there was an increase in the mean interaction time of peers, and the children with autism displayed improved academic achievement (DiSalvo & Oswald, 2002).

Additionally, Laushey and Heflin (2000) investigated the effects of a similar approach with two five-year-old children diagnosed with ASD. These children had adequate language skills and could read at the kindergarten level, but suffered from weak social competence. The results indicated that the children with autism increased their social interaction by 36% and 38% respectively during the treatment phase, as compared with the baseline phase, in which children attended regular classes but were not assigned a buddy (DiSalvo & Oswald, 2002). Moreover, many researchers have documented the effectiveness of peer mediated intervention programs that improve social skills, such as LEGO (LeGoff, 2004; LeGoff and Sherman, 2006) and Social Use of Language Programme (SULP) (Owens et al., 2008).

The results of the present study allow several conclusions. First, Adam showed an increase in social interaction, from pre to post intervention phase, which was documented using CPR. Although Adam exhibited an increase in social interactions, most of Adam's attempts to interact with others were not through verbal communication or through using complete sentences. Secondly, positive change was documented in the scores of the teachers and special educator on the rating scales; these changes were related to the skills targeted through the social stories. However, it should be noted that, although change was evident, most of his scores remained in the elevated range. It seems as though Adam enjoyed the social story session since he asked to go to the library on several different occasions. Additionally, Adam

showed an increase in friendly behavior towards others during the intervention period. Peer mediated intervention, through cooperative group work also seemed to be an enjoyable activity for Adam and his peers. Adam was capable of working cooperatively; he also received positive feedback on various occasions which reinforces Adam's behavior. Peer mediated intervention also appeared to be beneficial in this particular case because it gave Adam the opportunity to practice what he was taught natural settings (versus un-natural settings such as the library). Lastly, the effectiveness of this intervention was confirmed by the feedback obtained from Adam's teachers and mother.

#### *Limitations*

Although the study was found to be effective and Adam's social interactions with others increased, there are several drawbacks to the study. First, the study was implemented on one student, thus limited generalization can be made. Secondly, because it was a combined intervention, we cannot say which intervention caused the changes in Adam's behavior. Thirdly, the observation was conducted by the researchers, which might have created internal bias. Moreover, we cannot say with certainty that Adam will maintain his pro-social behavior since additional post-testing after longer periods was not conducted. Lastly, one limitation may be the age of the participant. This combined intervention was found to be enjoyable and effective with a first grader, however it might not be as effective for older students and adolescents.

#### *Implications*

Although various studies have found social stories to be effective in decreasing inappropriate behavior (Scattone, 2002; Sansosti & Powell-Smith, 2006; Scattone, Wilczynski, Edwards, and Rabian, 2002), the present study adds evidence to the effectiveness of social stories in increasing pro-social behaviors in children with ASD. Additionally, the mother's positive feedback implies that there may be a generalization of pro-social behavior to other settings.

This combined intervention is easy to implement in inclusive settings. It is not only beneficial, but also simple and enjoyable to the student. Additionally, the cooperative group work not only encourages the integration of children with special needs with their regular peers, it also reinforces desirable behavior and provides the student with several opportunities to apply what was taught in the social stories.

According to the findings of this study, several components can aid teachers and special educators in remediating social skills in children with ASD. Some of these components are the following: (a) use social stories that describe specific situations and expected responses (refer to Gray, (1994)); (b) provide the reader with insight on how others would feel when they he/she acts in an appropriate way; (c) model the appropriate behavior expected of the child; (d) provide the child with ample opportunities to practice what was taught in the story. This can be done by involving peers through cooperative group work or involving the parents; (e) use positive reinforcement to encourage the reoccurrence of desired behaviors.

#### *Recommendations for Future Research*

Since social skills deficits create lifelong difficulties for children with ASD, it is essential for researchers to find ways to remediate these skills. Future studies should try to identify which elements in the combined intervention lead to the greatest change in behavior; they should also identify the appropriate time needed for the intervention to be effective. Perhaps future studies can extend the length of treatment or intensify the intervention by giving the child additional afterschool sessions. As mentioned earlier, although, the interventions need to be tailored to the child's specific needs, researchers should try to identify which individuals will benefit the most from such an intervention. Additionally, more research should be conducted in order to address the issue of maintenance and generalization of social skills. Perhaps future studies can conduct post tests after longer periods of time from discontinuing the intervention in order to see the long term effect of the combined intervention.

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## THE EFFECTS OF VIDEO SELF-MODELING ON CHILDREN WITH AUTISM SPECTRUM DISORDER

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*Video self-modeling (VSM) is a type of intervention that has been developed to assist students in viewing themselves successfully in a wide variety of domains. The present study was designed to analyze the effects of VSM on children with autism spectrum disorder in an academic setting, with specific focus on improving on-task behavior and appropriate transitions. Participants were two children who were enrolled within the functional interrelated classroom and diagnosed with autism spectrum disorder. Using an alternating treatment design over a 20 day time period, participants received 10 days of VSM and 10 control days in a random order. Results indicated that for the first child on-task behavior significantly increased on VSM days compared to control days and maintenance was established by the increasing of on-task behavior during the weeks of implementation. For the second child, appropriate transitions significantly increased on VSM days compared to control days but maintenance was not established. Additionally, teachers' ratings of participants' behavior improved from a pre-test given before the intervention to the post-test conducted at the conclusion. Practical suggestions for implementing VSM are provided, in addition to suggestions for future research.*

Autism is a type of disorder included in the autism spectrum disorder (ASD) category. Other disorders in the category include Asperger's syndrome and pervasive developmental disorder-not otherwise specified. Individuals with autism have a triad of impairments. These impairments include verbal and non-verbal communication, social interactions, resistance to environmental change (Delano, 2007) and restricted behaviors and interests (Braithwaite & Richdale, 2000; Delano, 2007). Examples of restricted behaviors and interests include unusual behaviors and habits or obsessions, such as repetitive ticks or motor routines. In addition, children with autism have deficits in attention behavior, eye contact, and processing of social stimuli. One of the most prominent deficits in children with autism is communication, as 30% of children with autism never develop a language to native-like proficiency.

Volkmar, Cohen, and Paul (1985) found that parents of 50 children diagnosed with autism reported a variety of stereotyped movement including rocking (65%); toe walking (57%); arm, hand, or finger flapping (52%); and whirling (50%). The pervasive influence of autism spectrum disorder on diverse domains can have an adverse impact on a child's educational performance (Delano, 2007) and can cause these children to lag behind peers. Consequently, educational programs for children with ASD must be multi-faceted and address communication and language development, social and affective development, life skills, and academics.

For many years parents, teachers, and therapists have actively and aggressively pursued a wide range of approaches to treating students with ASD (Buggey, 2005). There have been many attempts to intervene with children who have ASD, some with reasonable success. This literature review will examine such attempts, focusing on a new technique known as video self-modeling and the practical significance its benefits has for children with autism.

The concept of modeling, or observational learning, as an intervention technique was first introduced 40 years ago by Albert Bandura, as part of his seminal work on social learning theory (Bellini & Akullian, 2007). Modeling or observational learning is defined as a result of observing the behavior of a model

(Shipley-Benamou, Lutzker, & Taubman, 2002). This concept is known as *others as model*. Among the countless responses acquired observationally, those behaviors that seem to be effective for others are favored over behaviors that are seen to have negative consequences and the evaluative reactions that people generate toward their own behavior also regulate which observationally learned responses will be performed (Bandura, 1977). Over the course of his career, Bandura (1977, 1997) demonstrated that modeling has a profound impact on the development of children. Bandura (1977) showed that children will imitate behaviors with or without the presence of reinforcement, and will perform the behavior in surroundings other than the settings where it was originally observed. Bandura also stated that children are most likely to attend to a model that they perceive as competent, and who is similar to themselves in some way.

Technological advances in the past two decades have allowed researchers to extend the concept of modeling to include the use of video to teach a wide variety of skills (Sherer, Pierce, Parades, Kisacky, Ingersoll, & Schreibman, 2001). Models presented in televised form are so effective in capturing attention that viewers learn much of what they see without requiring any special incentives to do so (Bandura, 1977). Only a few studies have investigated the effectiveness of video interventions for children with autism, the majority of which have focused on teaching social behaviors and increasing language skills (Shipley-Benamou et al., 2002). In a typical study, children with autism view a video of a target behavior prior to entering the setting in which the target behavior was measured (Delano, 2007). D'Ateno, Mangiapanello, and Taylor (2003) created videotapes for children with autism using adults as models for appropriate play. Children with autism viewed the videotapes, waited one hour, and were observed afterwards in a similar play scenario as the one depicted by the adult in the video. It was noted that the modeling intervention was related to positive gains in appropriate play in children with autism.

As illustrated from the research studies above, the use of video modeling to improve behaviors in a child with autism has been fairly successful. The success could, in part, be explained by four primary features. First, video modeling includes many of the features that Bandura found to be important, such as the use of a competent and similar model. Second, video modeling minimizes attention and language requirements. This is because the child only needs to view a small spatial area (i.e., television monitor) and to listen to a minimum amount of language. Video modeling avoids reliance on social interactions or the presence of a therapist to promote learning. This reduction in the importance of social interactions may be particularly significant for children who struggle in social settings. Finally, motivation for watching television in general might increase interest in watching the video (Sherer et al., 2001).

Among all the advantages of other as model, there are some disadvantages. One disadvantage is the child acting as the model may not remain anonymous during the video recording process. This might reduce the number of parents who give permission for their child to serve as a model (Shipley-Benamou et al., 2002.). Filming the desired behavior requires time and follow-up sessions may be needed. Locating a child that is age and gender appropriate as well may serve as additional constraints.

These disadvantages might be solved through another idea from Bandura. Specifically Bandura (1997) noted that the advantage of seeing oneself perform successfully provides clear information on how best to perform skills and strengthens beliefs in one's capability. The phrase *self-as-model* refers to a method of having the child with autism spectrum disorder serve as their own model, typically using videotapes. Video Self-Modeling (VSM) has been evaluated as a second type of video modeling in which the children with autism serve as their own models (Delano, 2007). The process involves recording the target child maximizing a specific skill. The videos are edited, removing unwanted behaviors or errors and other distracting footage, and should be around three to five minutes in length all together. The result should be footage of the target child performing desired behaviors. Repeated viewing of the video occurs, showing only desirable behaviors. Moderate to strong outcomes of the reviewed studies suggest that VSM can be used successfully to support students' communication, behavior, and academic performance in educational settings (Hitchcock, Dowrick, & Prater, 2003).

Buggey (2005) applied VSM to autism spectrum disorders to help with such behaviors as social interactions, tantrums, and language productions. In his study, Buggey collected baseline data, and then implemented VSM intervention. After noticeable improvement of behaviors, VSM was withdrawn and conclusions were made. It appeared that all participants made substantial gains as a result of VSM. Shipley-Benamou et al. (2002) found that using VSM was effective in teaching daily living skills to children with autism. An increase in play-related statements in children with autism toward their siblings was found using VSM according to Taylor, Levin, and Jaspers (1999). VSM has proved efficient with

help in academic areas such as math (Schunk & Hanson, 1989) and life skills (Miklich, Chida, & Danker-Brown, 1997). Shunk and Hanson (1989) concluded that children who struggled with arithmetic made noticeable improvements after viewing themselves perform correct fraction problems on videotape. Thus, VSM has been incorporated into the classroom as an effective tool to assist students academically.

The success of the tool could be due to a variety of factors. First, VSM offers a way for individuals to confront their own behaviors (Buggey, 2005). VSM usually has immediate results, making it time and cost efficient (Hitchcock et al., 2003). Videos are also portable and can be used to maintain target behaviors during school breaks, such as winter or summer break. By minimizing attentional requirements, requiring the child only to look at a small spatial area (a television monitor), and to hear only the minimum necessary language, children are more able to direct their focus to relevant stimuli (Shipely-Benamou et al., 2002). Children might enjoy watching themselves more than watching an age-matched model and, thus, may be more motivated to attend to the videotape, as well as the familiarity of the self-model might make visual processing, and thus learning, easier (Sherer et al., 2001). It also allows individuals to see themselves as they could be rather than as they currently are. In addition, television offers a relatively nonthreatening medium of teaching when compared to direct human interaction (Zihini & Zihini, 1998).

Further, watching predominately positive and/or successful behaviors of self, as opposed to negative and/or unsuccessful behaviors, is essential to effective modeling as it increases both attention and motivation to attend to the modeled behaviors (Bellini & Akullian, 2007). Research has supported the notion that skills learned via video modeling and VSM generalize across different settings and conditions and that the positive gains made during the video modeling intervention are maintained for months following the conclusion of the intervention (Bellini & Akullian, 2007). Schreibman, Whalen, and Stahmer (2000) used a video priming technique to reduce or eliminate disruptive behaviors associated with transition situations for children with autism, and in all instances the video priming intervention resulted in decreases in the disruptive behavior and generalized across new transition situations.

There has been limited research in general on VSM, the number only in the single digits. A meta-analysis conducted by Bellini and Akullian (2007), included 23 studies that were published between 1998 and 2005. Of those 23, 15 examined video modeling interventions and only 7 examined VSM, with one study examining both video modeling and VSM. In addition, to date, most of the research on the use of video modeling with children with autism spectrum disorder has focused on improving social-communicative skills (Delano, 2007). There has been limited attention and research conducted regarding children with autism spectrum disorders who exhibit severe attention (Courchesne et al., 1994), social (Pierce & Schreibman, 1995), and motivational deficits (Shipley-Benamou et al., 2002). A majority of research has been conducted to increase social skills in the community, conversational skills, and functional skills such as brushing teeth or washing face, and play behavior. Research on VSM within the last three years has continued to explore its benefits in the areas of social engaged time (Victor, Little, & Akin-Little, 2011), social initiatives during playground time (Buggey, Homes, Sherberger, & Williams, 2011), social skills, functional skills (Gelbar, Anderson, McCarthy, & Buggey, 2012) and extension to pre-school aged children (Buggey & Hoomes, 2011). Consequently, more research needs to be conducted on VSM procedures to improve academic functioning, increase on-task behavior in certain academic fields, or allow parents or teachers to pick the task to increase the social relevance. Hitchcock et al. (2003) noted that more research is needed on VSM and they encouraged teachers and researchers to implement VSM and investigate this type of intervention, since there is little research available to date.

The purpose of the present study was to implement VSM in the classroom to improve academic performance, such as on task behavior and appropriate transitions with two students with ASD. Specifically, this study utilized the image of future success (Dowrick, 1999) or video feedforward. Video feedforward is a category of VSM interventions. In feedforward interventions, individuals observe themselves successfully demonstrating skills that are slightly above their current capability (Bellini & Akullian, 2007) or that have not been previously attained (Hitchcock et al., 2003). In a study conducted by Dowrick, Kim-Rupnow, and Power (2006), it was found that video feedforward had significantly increased students' rate of improvement in reading fluency.

Research indicates the utility of self-modeling is evident in that it has been used to address successfully a myriad of conditions, including daily living skills (Shipley-Benamou et al., 2002); language production (Buggy, 2005); preteaching reading skills (Beck, Burns, & Lau, 2009); responding behaviors (Buggy, Toombs, Garndener, & Cervettie, 1999); attention-deficit/hyperactivity disorder (Walker & Clement,

1992); transitions (McCoy, Mathur, & Czoka, 2010); and learning/behavior disabilities (Clare, Jenson, Kehle, & Bray, 2000). With regards to increasing children's on-task behavior, previous investigations employing self-modeling have revealed mixed results (Clare et al., 2000). Clare et al. (2000) reported a substantial increase in their participants' on-task behaviors. In contrast, however, Possell, Kehle, McLoughlin, and Bray (1999) found idiosyncratic and limited effects of self-modeling with similar students used in previous studies. Thus, the present research explored the implementation of VSM within a functional interrelated classroom to explore the effects it had on children with autism spectrum disorder and on-task behavior. Therefore, it was hypothesized that *the implementation of VSM would significantly increase the percentage of on-task behavior compared to control conditions*. With regards to Clare et al. (2000), students' on-task behaviors were maintained at six and eight weeks after termination of treatment. Lonnecker, Brady, McPherson, and Hawkins (1994) also observed maintenance during the fading phase of research conducted. Consequently, it was also hypothesized that *the implementation of video self-modeling (VSM) within the functional interrelated classroom would demonstrate maintenance or the general increase in on-task behaviors over the seven weeks of implementation*.

Making successful transitions from one activity to another is difficult for many children, especially children with autism spectrum disorder; increasing the length of the transition is directly relevant to the amount of time available for student engagement in an expected task (McGrath & Rust, 2002). Visual supports may improve learning for children who have limitations in processing or attending to transient information or who are challenged to recall information presented verbally (McCoy et al., 2010). It was hypothesized that *the implementation of VSM would increase the percentage of appropriate transitions as compared to control conditions*. With regards to this hypothesis, it was also predicted that *the implementation of VSM would demonstrate maintenance, or the general increase in appropriate transitions over the weeks of implementation*.

Finally, the present study investigated the functional interrelated classroom teachers' responses before the implementation of VSM and after the completion of VSM. It was hypothesized that *teacher's ratings of on-task behaviors and appropriate transitions would significantly increase after the introductions of VSM as compared to baseline ratings*. This hypothesis was intended to provide a clearer understanding of how the functional interrelated classroom teachers perceived the implementation of VSM and whether they found it effective with their chosen students and areas of improvement.

## Method

### Participants

Two middle school students were chosen to participate in this study. Both students attended one middle school in Western Kansas and participated in a special education functional interrelated classroom on a daily basis. They were selected for participation in this study because they were previously diagnosed with ASD as documented on the individual education plan (IEP), showed struggles or difficulties in specific academic areas, and were thought to benefit from VSM when teacher input was taken into consideration.

The first student was a 13-year-old Caucasian girl in the 8<sup>th</sup> grade. VSM was implemented to assist her in increasing her time on-task during reading class (30 minutes), suggested by the two functional interrelated classroom teachers. Beck et al. (2009) described time on-task as attending to the assigned reading material (e.g., appearing to silently read material, writing, raising hand to ask for assistance, and listening to a teacher explain directions). Clare et al. (2000) defined on-task behavior as having eye contact with the teacher, or the assigned task, and performing the requested assignment. In the current study, these definitions were used in addition to time on-task including the student being engaged in academic learning time. Academic learning time consisted of listening to a story, cut and paste activities, coloring or drawing, handwriting practice, or flashcards. Time on-task also included increasing her positive interaction with peers and classroom staff, which encompassed keeping her hands to herself (no pinching, hitting, pulling hair), and replacing automatic refusal to do academic activities with willingness to attempt activities. Off-task behaviors were as defined by previous research and included not having eyes orientated toward the assigned material. Examples of off-task behavior included talking to a peer about something other than the assigned task, staring out the classroom window, being out of seat, and showing any physical aggression (Beck et al., 2009). These definitions of off-task behavior were utilized in the current study.

The second student was a 14-year-old Caucasian girl in the 8<sup>th</sup> grade. VSM was also implemented to assist her with transition difficulties. In particular, she struggled with transitions during specific class periods when she was asked to switch activities or when she was asked to leave for related services. According to the functional interrelated classroom teachers, her struggles included: very vocal responses and exaggerated questions as to what is going on, tears or crying, hand or finger flapping, and/or exaggerated sobbing. For the purpose of this study, the research focused on transitions during academic periods, which included switching activities in the same academic period. This study focused specifically on math class, because both teachers reported math as being the academic class period where a majority of her difficulties were observed.

Appropriate transitions for this student encompassed attending to the assigned task, which included eyes focusing on the assignment, remaining in her seat, and little to no loud vocalizations or interruptions. Appropriate transitions also included putting away specific materials as directed and retrieving materials for the next activity in math class. Inappropriate transitions consisted of loud vocalizations by the student when asked to begin a new activity in the math class, such as exaggerated sobbing, crying, and dramatic questions. Inappropriate transitions also encompassed refusal to put away class materials or refusal to get out new class materials for the new activity

#### *Experimental Design*

This study utilized a single subject repeated measures design. Single subject designs are designs that can be applied when the sample size is one or when a number of individuals are considered one group; these designs are typically used to study the behavioral change an individual exhibits as a result of some treatment (Bonds-Raacke & Raacke, 2012; Wasson, 2010) and are frequently used in VSM research (Bellini & Akullian, 2007; Beck et al., 2009; Hines & Simonsen, 2008). For the current study, a pre-assessment evaluation completed by the teachers before implementation of VSM of each student's academic behavior occurred. Next, the independent variable was introduced and impacts measured. Finally, a posttest assessment, again completed by the teachers, evaluated the effectiveness of VSM on targeted skills.

An alternating-treatment design with comparison and withdrawal conditions was used to compare the effects of VSM on the performance of on-task behaviors and transitions by the two respective students. An alternating-treatment design is one in which two or more treatment options are alternated in quick succession to evaluate differential effects. Each time a condition is introduced it is maintained only for a brief period before being alternated with a different condition. This design was selected for the current study because of its numerous benefits such as the elimination of baseline data. In addition, previous research utilizing the alternating-treatment design has found that conditions are quickly discriminated by the participants and the influence of conditions can be easily observed (White, 2010). However, there are also some limitations to this design when the population of interest is children with ASD. For example, many children with autism spectrum disorders are preoccupied with *sameness* in their home environments and with school routines. It is not uncommon for changes in the routine to lead to a tantrum or other emotional disturbances (Filipek et al., 1999). However, the advantages outweighed the possible limitation and consequently, the alternating-treatment design consisted of 20 days of implementation, occurring three days a week for seven weeks. Of the 20 days, 10 days utilized VSM treatment and 10 days served as a control. The order of the implementation was determined using a random procedure.

#### *Materials and Procedure*

After obtaining consent from the school district to conduct the study, permission was granted by both the functional interrelated classroom teachers. Consent was then obtained from each of the student's parents and, child assent was also obtained from each of the participants in the present study. Once consent was granted, the teachers completed the pre-assessment baseline surveys. For Student 1, the survey measured on-task behaviors (such as making eye contact, performing required assignments, engaging in academic learning time) and off-task behaviors (such as talking to peers at inappropriate times, staring out the classroom window, getting out of the seat). For student 2, the survey measured teachers' perceptions of appropriate transitions like putting away materials when directed and inappropriate transitions like refusal to begin a new activity.

Next, video recording began on each individual child to record the specific target behaviors for VSM footage used in implementation of the research. Video recording took approximately one week to obtain enough footage to create a master video for the two students to view on their randomly assigned VSM

days. Editing the videos occurred as well to ensure that only positive behaviors were viewed. Once the videos were edited, a voice over was provided with encouraging prompts for the first student to increase self-efficacy. Such auditory prompts included *Great work, nice job working quietly, or look how good you are working!* The master video for the second student made use of visual prompts she could read. These visual prompts included *Nice job working quietly, good job, and great work!* Videos were played to the child before the specified academic class on the randomly assigned VSM day. To document any change in behaviors, each student was recorded using the Flip video camera each day of the research, which included VSM days and control days for comparison to measure change.

#### *Dependent Variables*

Classroom data was collected by employing momentary-time sampling, with behavior of each student rated every 10 seconds during 30 minute observation sessions with Student 1 and 10 minute observation sessions with Student 2. Momentary time sampling has been shown to effectively measure on-task behavior for typically developing students as well as students with BDs (Beck et al., 2009; Gunter, Venn, Patrick, Miller, & Kelly, 2003). The two dependent variables included on-task/off-task behaviors for the Student 1 and appropriate/inappropriate transitions for the Student 2. To gather the dependent variables the present study made use of three research assistants to assist with coding the data obtained.

There were a total of three observers who viewed the video tapes, two current school psychology graduate students and one undergraduate student with a minimum of one year of experience in a research setting. The observers received a one hour training session. During the training session, the operational definitions for on-task and off-task behaviors and appropriate and inappropriate transitions were provided. In addition, example video clips were provided to illustrate on-task and off-task behaviors for the first student, as well as appropriate and inappropriate transitions for the second student. The examples provided did not contain actual footage to be analyzed during the experimental procedure. The observers watched the sample videos, and practiced classifying on-task and off-task behavior and appropriate and inappropriate transitions, and discussed the results. When a 90% consensus was reached, the experimental procedure was ready to begin. The observers were blind to the conditions of the study as recommended by Clare et al. (2000).

#### **Results**

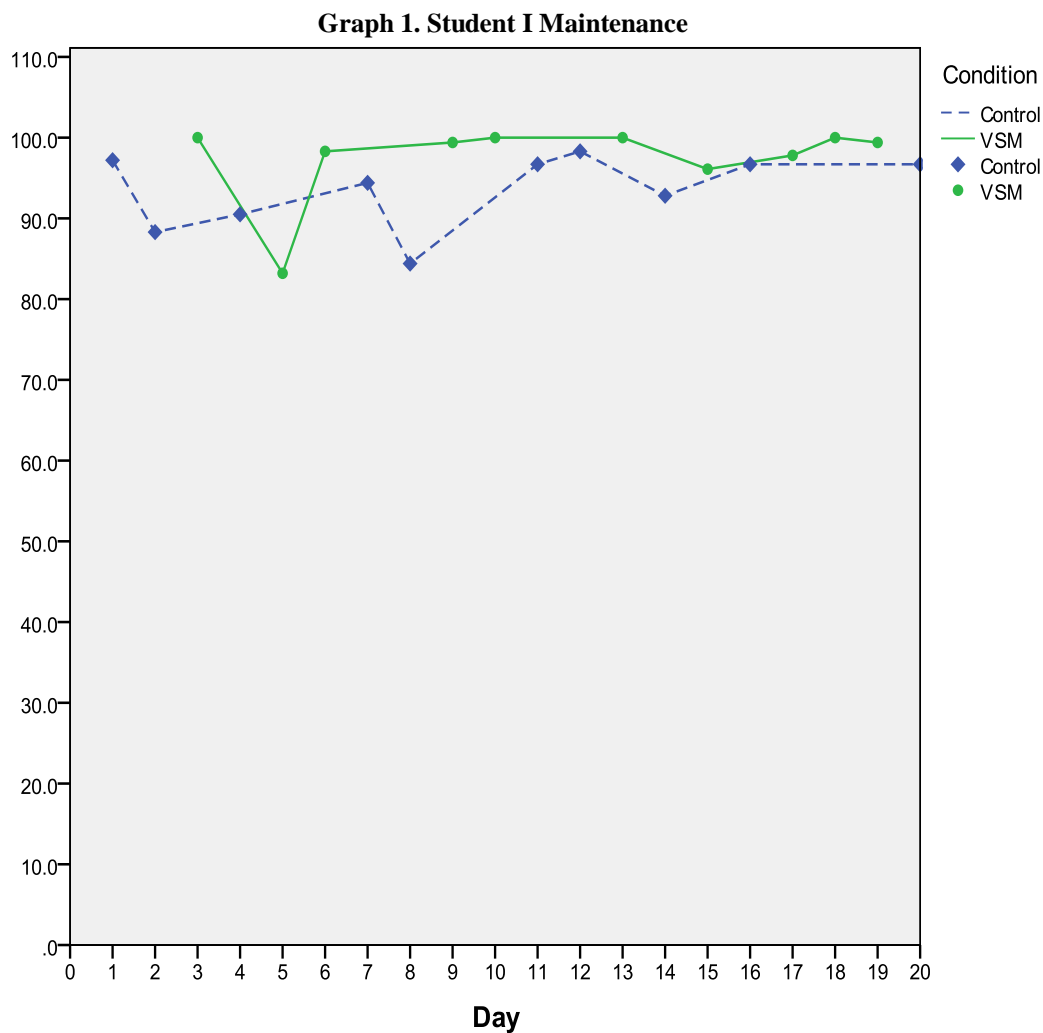
A Pearson correlation coefficient was calculated to assess the relationship between each of the three observers' scores to find the highest correlations between each when looking at Student 1 data. There were strong positive correlations found with Researcher one when compared to Researchers two ( $r(20) = .873, p < .05$ ) and Researcher three ( $r(20) = .854, p < .05$ ). Researcher one was determined the primary observer regarding Student 1; due to having the highest correlations (J. M. Naylor, personal communication, April 11, 2012)). A Pearson correlation coefficient was also calculated to assess for the relationship between each of the three observer's scores to find the highest correlations between each when looking at Student 2 data. There were strong positive correlations found with Researcher one when compared to Researcher two ( $r(20) = .957, p < .05$ ) and Researcher three ( $r(20) = .955, p < .05$ ). Again, Researcher one was determined the primary observer regarding Student 2, due to having the highest correlations.

#### *Hypothesis (a)*

A paired-samples  $t$  test was calculated with Student 1 data to determine if on-task behavior varied between control days and video self-modeling (VSM) days. Results indicated that the average percent of on-task behavior on the VSM days ( $M = 97.42; SD = 5.16$ ) was significantly higher than the average percent of on-task behavior on the control days ( $M = 93.6; SD = 4.56$ ),  $t(9) = 2.18, p < .05$ . A paired-sample  $t$  test was also calculated using Student 1 data to determine if off-task behavior varied between control days and VSM days. The average percent of off-task behavior on the control days was 6.12 ( $SD = 4.83$ ), and the average percent of off-task behavior on the VSM days was 2.58 ( $SD = 5.16$ ). Thus, significantly higher mean scores were found for off-task behavior on the control days than on the VSM days,  $t(9) = 1.98, p < .05$ .

#### *Hypothesis (b)*

A Pearson correlation coefficient was calculated to assess the maintenance effects of VSM on Student 1 over the course of implementation. A moderate positive correlation was found ( $r(20) = .402, p < .05$ ), indicating a significant linear relationship between the day of treatment and on-task behavior. Maintenance was achieved over the course of implementation of the research for Student 1 (See graph1).



#### *Hypothesis (c)*

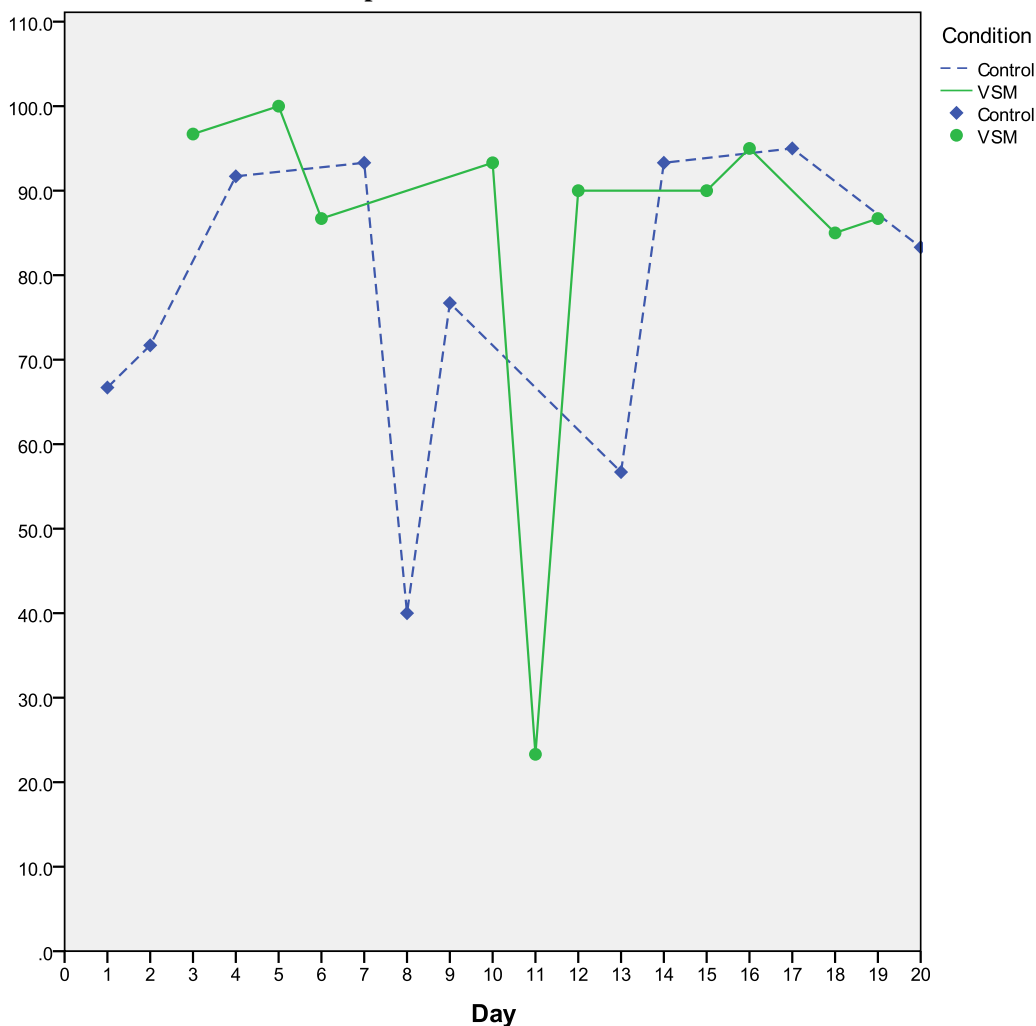
A paired-samples  $t$  test was calculated with Student 2 data to determine if appropriate transitions varied between control days and video self-modeling (VSM) days. The average percent of appropriate transitions on the control days was 76.84 ( $SD = 18.34$ ), and the average percent of appropriate transitions on the VSM days was 84.67 ( $SD = 22.09$ ),  $t(9) = -1.41$ ,  $p > .05$ . A review of the days in which the video was applied to Student 2 revealed an anomaly. This anomaly may be due to the fact Student 2 had a different para-educator than she usually has on this specific day, resulting in a change in the student's schedule. Student 2 had a consistent para-educator to work with during math class each day, but on this day the para was absent. Many students with ASD display resistance to environmental change, which may have led to the anomaly. Thus, the paired-samples  $t$  test was re-run with the exclusion of the anomaly. The average percent of appropriate transitions on the control days was 80.93 ( $SD = 13.78$ ), and the average percent of appropriate transitions on the VSM days was 91.45 ( $SD = 5.09$ ). With the removal of the anomaly, there was a significant difference between the control days and the VSM days ( $t(8) = -1.94$ ,  $p < .05$ ). A paired-samples  $t$  test was calculated with Student 2 data to determine if inappropriate transitions varied between controls days and VSM days. The average percent of inappropriate transitions on the control days was 23.16 ( $SD = 18.34$ ), and the average percent of inappropriate transitions on the VSM days was 15.33 ( $SD = 22.09$ ),  $t(9) = 1.41$ ,  $p > .05$ . Again the analysis was re-run excluding the anomaly. The average percent of inappropriate transitions on the control days was 19.07 ( $SD = 13.78$ ), and the average percent of inappropriate transitions on the VSM days was 8.51 ( $SD = 5.09$ ). With the removal of the anomaly, there was a significant difference between the control days and the VSM days ( $t(8) = 1.94$ ,  $p < .05$ ).

#### *Hypothesis (d)*

A Pearson correlation coefficient was calculated to assess the maintenance effects of VSM on Student 2 over the course of implementation. A weak positive correlation was found ( $r(20) = .103$ ,  $p > .05$ ), indicating a lack of a significant linear relationship between the day of implementation and appropriate

transitions. Maintenance was not easily achieved over the course of implementation of the research for Student 2 (See graph 2).

**Graph 2. Student 2 Maintenance**



#### *Hypothesis (e)*

A 5-point likert-scale was administered to the two classroom teachers before implementation of VSM and upon completion of the VSM research. The likert-scale had each of the teachers rate on-task behavior as well as off-task behavior for Student 1 and appropriate and inappropriate transitions for Student 2. A paired-samples  $t$  test was calculated to compare the teachers' perceptions of on-task behavior for Student 1 before implementation of VSM, to the teachers' perceptions of behaviors after implementation of VSM, with higher scores indicating greater frequency of behavior. The average mean rating of the teachers' perceptions before VSM implementation was 2.79 ( $SD = .49$ ), and the average mean rating of the teachers' perceptions after implementation of VSM was 4.12 ( $SD = .24$ ). According to the two teachers' responses, there was a significant increase of on-task behavior in Student 1 upon completion of the VSM research ( $t(6) = -5.20, p < .05$ ). A paired-samples  $t$  test was also calculated to determine the teachers' perceptions before and after VSM implementation of off-task behavior, with higher scores on the post-test indicating improvement or a decrease in behaviors. The average mean rating of the teachers' perceptions before implementation was 2.90 ( $SD = 1.93$ ), and the average mean rating of the teachers' perceptions after implementation was 4.40 ( $SD = .42$ ). Again, according to the two teachers' responses, there was a significant decrease of off-task behavior in Student 1 upon completion of the VSM research ( $t(4) = -3.00, p < .05$ ).

A paired-samples  $t$  test was calculated to compare the teachers' perceptions before implementation of VSM, to the teachers' perceptions after implementation of VSM of appropriate transitions for Student 2, with higher scores indicating greater frequency of behavior. The average mean rating of the teachers'



perceptions before VSM implementation was 2.80 ( $SD = .67$ ), and the average mean rating of the teachers' perceptions after implementation of VSM was 4.20 ( $SD = .57$ ). According to the two teachers' responses, there was a significant increase in appropriate transitions in Student 2 upon completion of the VSM research ( $t(4) = -14.00, p < .05$ ). A paired-samples  $t$  test was calculated to compare the teachers' perceptions before implementation of VSM, to the teachers' perceptions after implementation of VSM of inappropriate transitions for Student 2, with higher scores on the post-test indicating improvement or a decrease in behaviors. The average mean rating of the teachers' perceptions before VSM implementation was 3.20 ( $SD = 1.35$ ), and the average mean rating of the teachers' perceptions after implementation of VSM was 4.40 ( $SD = .55$ ). Thus, there was no significant difference found between before and after implementation of the VSM research with regards to inappropriate transitions ( $t(4) = -1.47, p > .05$ ).

### Discussion

The purpose of the present study was to examine the effects of video self-modeling on children with autism spectrum disorder when implemented in an academic setting and the maintenance of desired behaviors over time. This study was developed in response to previous research (Buggey, 2005; Clare et al., 2000; Sherer et al., 2001; Shipley-Benamou, 2002; Schunk & Hanson, 1989) suggesting the positive gains made by video self-modeling on children in various settings. However, this study was implemented in the classroom to improve academic performance, including on-task behavior and appropriate transitions with students with ASD. The present study added to the literature by allowing teachers to choose the specific students with concerns, the academic behavior to target, and the class period to implement VSM, thus increasing social relevance.

In an effort to examine the effects of video self-modeling on children with autism spectrum disorder; five hypotheses were developed. The first hypothesis developed stated the implementation of VSM would significantly increase the percentage of on-task behavior compared to control conditions. Consistent with prior research, the data suggests that video is a useful medium for accomplishing positive behavior change in this population (Charlop & Milstein, 1989; Lonnecker et al., 1994; Pierce, Clad, & Schreibman, 1997; Schreibman et al., 2000; Shipley-Benamou et al., 2002) and the first hypothesis was supported. There was a clear demonstration that for Student 1 on-task behavior greatly improved as a result of the VSM implementation in her reading class. Consistent with the second hypothesis developed, the implementation of VSM demonstrated maintenance over the seven weeks of implementation. In other words, at the completion of the study, on-task behavior for Student 1 had increased overtime regardless of the condition.

The third hypothesis developed stated that the implementation of VSM would increase the percentage of appropriate transitions as compared to control conditions. Student 2 was approaching significance overall, but showed evidence of an anomaly within the 20 days of implementation. With the removal of this anomaly, Student 2 showed a significant difference in overall appropriate transition behavior. The anomaly occurred on day 11 when the student's para-educator was absent unexpectedly. As mentioned earlier, children with ASD show resistance to environmental change (Delano, 2007). It was apparent that the removal of her consistent para-educator led her to struggle during her math class and removing this day provides a clearer picture of the actual impact of VSM.

The fourth hypothesis developed stated that the implementation of VSM would demonstrate maintenance. Maintenance for Student 2 was difficult to establish, and it is thought with more time dedicated to the implementation of VSM, maintenance may be found.

The fifth, and final, hypothesis developed stated the teachers' ratings of on-task behaviors and appropriate transitions would significantly increase after the introductions of VSM as compared to baseline ratings. Consistent with this hypothesis, teachers rated on-task behavior and appropriate transitions low on the administered likert-scale before implementation. Upon completion of the present study, another likert-scale was administered for the teachers to rate the strength of improvement in on-task behavior and appropriate transitions. Each teacher gave high ratings for improvement and an increase in on-task behavior and appropriate transitions.

Skills are not perfected through observation alone, nor are they developed solely by trial-and-error fumbling (Bandura, 1977). It is important to stress that some progress is significant when working with children with ASD. Their triad of impairments, consisting of verbal and non-verbal communication, restricted behaviors (Delano, 2007; Braithewaite & Richdale, 2000) and resistance to environmental

change (Delano, 2007) can drastically affect their performance academically in the classroom. With VSM implementation, an increase in desired behaviors in the specific VSM days when compared to the control days was achieved. Children with ASD do present a resistance to small changes in their schedule, and the progress that was observed and noted can be considered a success in their academic classes.

It is important to note the clear benefits of VSM. First, the implementation of VSM was relatively nonintrusive, only taking a few minutes at the beginning of their chosen class period to view the edited video clip of positive and appropriate behaviors. Another benefit of VSM is that it tends to produce almost immediate results upon viewing the video clip. No researchers have found instances of delayed effect or even slow, gradual effects; thus if immediate results are not exhibited, it is unlikely that continued viewing will be effective unless it is adapted (Buggey, 2005). These reasons make VSM a viable option for teachers to select.

#### *Limitations and Future Research*

A possible limitation due to the single-subject design is the small sample size (Buggey, 2005). In this specific study, that threat was confounded by only having two participants with ASD. In addition, the implementation of VSM was conducted in a natural environment, where there were many extraneous variables that could not be controlled for such as fire drills and school wide activities. Another possible threat to validity was the presence of the video-camera throughout the implementation of the research. Known as the Hawthorne Effect, students may have tended to increase their on-task and appropriate behavior having known there was a camera recording their behavior. A final limitation of the present study is the lack of a follow-up phase. Maintenance as well as replication of skills across settings and contexts within the student's natural environment remains uncertain (Shipley-Benamou et al., 2002). This study was performed within 20 days of control and VSM implementation; the two participants may have benefited and maintained appropriate behaviors given more time.

Future research is needed to verify the current studies results and to continue exploring the effects of video self-modeling on children with autism spectrum disorder. The future research should also extend the amount of time between the intervention and the follow-up phase to determine maintenance of video self-modeling. Generalization across different settings and skills should also be explored. The application of video self-modeling should also be extended to being used in other academic and behavior areas and throughout each day, as opposed to once a day a few times a week. Future research can also include training sessions to assist the teachers and staff in developing and implementing specific video clips for chosen students. Finally, future research is needed to determine if the intervention is equally effective in culturally diverse populations, which would be predicted given promising preliminary findings using VSM with English language learners (Ortiz, Burlingame, Onuegbulem, Yoshikawa, & Rojas, 2012).

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## THE IMPACT OF VISION LOSS ON PERSONALITY TRAITS

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*The aim of this study is to explore the differences in personality traits amongst adults with blindness, adults with low vision and sighted adults. Moreover, the relationship between the four scales of Eysenck's personality questionnaire and the demographic characteristics of participants with visual impairments was examined. There are no statistically significant differences amongst the three groups in scales P, N and E. However, the sighted adults have a lower score on the L scale. The older individuals with visual impairment reveal less extraversion and greater neuroticism. Moreover, the women with visual impairments show greater neuroticism than the men with visual impairments.*

One of the most influential models in the field of personality is founded on three factors, namely Psychoticism (P), Extraversion (E), and Neuroticism (N) (Eysenck & Eysenck, 1975, 1985). The Eysenck Personality Questionnaire (EPQ) contained questions in each of the 4 scales which measure introversion/extraversion (E), neuroticism (N), psychoticism (P) and lie (L).

According to the Eysenck Personality Profiler (Eysenck, Barrett, Wilson & Jackson, 1992), the seven personality traits comprising extraversion were defined as activity, sociability, expressiveness, assertiveness, achievement orientation, dogmatism, and aggressiveness. The seven personality traits comprising neuroticism were defined as low self-esteem, unhappiness, anxiety, dependency, hypochondriasis, guilt, and obsessiveness. The seven personality traits comprising psychoticism were defined as risk-taking, impulsiveness, irresponsibility, manipulation, sensation-seeking, masculinity, and unreflectiveness (Francis & Jackson, 2004). Genetic factors may contribute to the variance of these three personality traits in proportion of about 50% or more, while within-family environmental factors seem to be influential as well (Eysenck, 1990). Moreover, many other researchers have argue for the genetic base of the E (Eaves & Eysenck, 1975), P, N (Birley et al., 2006) scales of EPQ and the influence of shared environmental factors in L (Lie) scale of EPQ, through twin studies (Heath, Eaves, & Martin, 1989; Heath, Jardine, Eaves, & Martin, 1988, 1989).

What needs to be asked in this point is in what degree visual impairments influences Extraversion, Psychoticism and Neuroticism? Adaptation to visual impairment entails adjustment of one's self, values and life goals in order someone to meet the challenges arisen by the impairment. This process may be particularly strenuous especially after being sighted for many years (Boerner, Wang, & Cimarolli, 2006). Visual impairment may have a serious effect on people's daily functioning, social relationships and quality of life (Boerner et al., 2006), and may also challenge their physical capacities as well as their psychological capacities to adjustment (Harrington & McDermott, 1993).

Few studies have been done in order to examine the personality traits of the adults with visual impairments. Thus, there are limited findings available for a comprehensive review. In general, there is an obvious shortage not only in the application of the personality test in the persons with visual impairments, but also in the evaluation of the results since there have been few attempts to standardize the test in order to adapt them to the persons with visual impairments (Haymes, Guest, Heyes, & Johnston, 1996; Warren, 1984). Furthermore, there are no norms for persons with visual impairments (Swallow, 1982). A further criticism regarding the use of personality questionnaires is the claim that

they are open to various forms of misinterpretation of the answers – the participants may proceed to a conscious or random misinterpretation of the answers (Furnham, 1990).

Despite the difficulties in applying and interpreting the personality questionnaires, some researchers have attempted to make a comparison between different groups of people with visual impairments (eg. men/women, blindness/low vision), as well as a comparison amongst the people with visual impairments and the sighted people. No evidence for significant differences in personality traits between individuals with visual impairments and sighted individuals has been detected in research studies (Harrington & McDermott, 1993). Some writers strongly believe *the blind person's personality* to be qualitatively different than that of the sighted individual, while others stand by the belief that there is no essential difference (Warren, 1984).

In regards to extraversion, Warren (1984) reviewed various research projects for which different tests were used with contradictory results in certain cases. According to this review: a) children with blindness generally present lower extraversion scores than sighted children b) adolescents and young adults with blindness do not show any statistically significant differences in comparison with their sighted peers, c) males with visual impairments (blindness or low vision) seems to be more extrovert than females with visual impairments (Warren, 1984). As far as neuroticism is concerned, researchers' findings are in greater agreement. Specifically, findings show that adolescents and young adults with blindness appear to be more neurotic than their sighted counterparts (Warren, 1984). Comparing both sexes, females with blindness (adolescents and young adults) are defined as being more neurotic than males with blindness (Warren, 1984). Moreover, no differences in neuroticism between adolescents with residual vision and adolescents with total blindness have been observed (Warren, 1984).

The results from the study done by Adrian, Miller and De l'Aune (1982) suggested that individuals with visual impairments show psychological pathology on the dimensions of depression, psychasthenia, and schizophrenia. The researchers above used CPI (California Personality Inventory) and MMPI (Minnesota Multiphasic Personality Inventory) as research tools in order to evaluate a sample of 128 adults with congenital visual impairments (both blindness and low vision).

Klinkosz, Sekowski and Brambring (2006) used the Polish version of the NEO-FFI Personality Inventory (a sort version of the NEO PI-R) in order to evaluate Polish university students with visual impairments (blindness and low vision). The purpose of the study was to examine if there is any correlation between academic achievements and personality traits. The analysis showed that the female students with visual impairments had less neuroticism and higher score in the other 4 scales of the NEO-FFI (Extraversion, Openness, Agreeableness, Conscientiousness) compared to female students of the sighted control group. The males with visual impairments – especially the participants with blindness – had, in most cases, higher scores than their sighted peers. In the extraversion scale the students with blindness (males and females) had a significantly higher score in comparison to both the sighted students and the students with low vision. In the scale regarding neuroticism, males (with or without visual impairments) had a noticeably lower score than females, but the latter had a better score in all the other scales than the former. The ability to see or not did not influence the score on the neuroticism scale.

The use of the Eysenck Personality Questionnaire (EPQ) in sighted individuals revealed the influence of age and gender in personality traits. Lynn and Martin (1997) examined gender differences in Neuroticism (N), Extraversion (E), and Psychoticism (P) in 37 countries using EPQ. They found that men were consistently lower than women in N and generally higher on P and E. McCrae and his colleagues (2004) detected a negative correlation between age and extraversion as well as a negative correlation between age and neuroticism, using NEO-PI-R. Furthermore, age is negative correlated with the psychoticism scale of EPQR-A (the Revised and Abbreviated form of EPQ) (Gibson, McKelvie, & DeMan, 2008).

Alexopoulos & Kalaitzidis (2004) conducted a study amongst the Greek population (a sample group of 946 sighted individuals), aged 16-73 (mean = 19.71) for which the EPQ-R (short scale) was used. The majority of the participants were high school and university students. The mean scores in the four scales (Extraversion, Neuroticism, Psychoticism and Lie) were the follows:  $E = 8.85$ ,  $N = 6.75$ ,  $P = 2.75$ , and  $L = 5.33$ . The men have a considerably higher score than the women on the Psychoticism scale (P) as well as on the Introversion/Extraversion scale (E). On the other hand, the women have a higher score on the Neuroticism scale (N) and the Lie scale (L).

### Study

The research presented in this article focuses on: a) investigation of possible differences in the personality traits amongst sighted adults and adults with visual impairments and b) investigation of possible relationships between the personality traits of adults with visual impairments and their vision status (blindness vs. low vision), age, gender, and how recently the visual impairment occurred. Taking the genetic base of the personality traits described through EPQ-R into consideration, we hypothesized that there would not be significant (if any at all) difference between adults with visual impairments and sighted adults. We also hypothesized that males with visual impairments would score lower in N scale and higher in P and E than females with visual impairments and that age would be negative correlated with E, P and N.

### Method

#### Participants

Ninety adults with visual impairments (blindness or low vision) and 70 sighted adults took part in the research. The participants with visual impairments were selected from the members of the Panhellenic Association of the Blind. Initially, we contacted by phone a random selection of 180 individuals with visual impairments (60 individuals with blindness or severe visual impairments and 120 individuals with low vision) in order to invite them to participate in the study. From the total of 180 invited participants, 110 individuals agreed finally to participate. However, the following adjustments had to be made: a) the group of individuals who were blind had to match with the group of individuals with low vision in terms of age, and gender, and b) participants with additional disabilities were excluded. In the end, 30 individuals with blindness and 60 with low vision participated in the present study.

The sighted participants were selected on the basis that they matched with the group of participants with visual impairments in terms of age and gender. The sighted adults, 47 men and 23 women, were between the ages of 19-54 ( $M = 30.81$ ,  $SD = 9.07$ ). The participants with visual impairments, 60 men and 30 women, were aged 19-54 ( $M = 30.66$ ,  $SD = 10.18$ ).

The participants with visual impairments were divided into two categories: a) individuals with blindness or severe visual impairments (braille readers or users of a text-to-speech software or a screen reading software) and b) individuals with low vision (readers of large prints or of typically print texts with the use of low vision aids). Of the 90 participants with visual impairments, 30 were individuals with blindness or severe visual impairments and 60 were individuals with low vision. The participants with blindness or severe visual impairments, 20 men and 10 women, were aged from 19 to 53 years old ( $M = 30.80$ ,  $SD = 9.59$ ). The participants with low vision, 40 men and 20 women, were aged from 19 to 54 years old ( $M = 30.59$ ,  $SD = 10.23$ ).

#### Instruments

The measures used in the present study assessed demographic/personal data, and personality traits.

**Demographic data.** The following demographic data was collected from participants with visual impairments: visual acuity, visual field, and reading media (braille, large prints, lens, screen magnifier, screen reader, CCTV), gender, age, and age at loss of sight. Sighted respondents provided demographic data on gender, age and educational level. Moreover, a new variable was created named *how recently the visual impairment occurred*. The results were formed by subtracting the age at which loss of sight occurred from the participant's age.

**Personality traits.** The Eysenck Personality Questionnaire-Revised Short Scale (EPQ-R short scale) (Eysenck & Eysenck, 1991) were used. This questionnaire has been translated into the Greek language by Alexopoulos & Kalaitzidis (2004). The EPQ-R sort scale is a sort version of the EPQ-R, which is the most recent scale developed by Eysenck (Alexopoulos & Kalaitzidis, 2004). The questionnaire contained 48 questions, 12 questions in each of the 4 scales which measure introversion/extraversion (E), neuroticism (N), psychoticism (P) and lie (L).

**Reliability.** With reference to typical population, the reliability and validity of the questionnaire were previously examined in Alexopoulos and Kalaitzidis's study (2004). The internal consistency reliabilities (Cronbach's alpha) regarding P, E, N, and L, respectively, were as follows:  $\alpha = .47$ ,  $\alpha = .78$ ,  $\alpha = .73$ , and  $\alpha = .69$ . Test-retest correlations were 0.44 for P, 0.92 for E, 0.91 for N, and 0.87 for L, respectively.

In the present study, the internal consistency reliabilities (Cronbach's alpha), for the sample of adults with visual impairments were 0.42 for P, 0.83 for E, 0.71 for N, and 0.73 for L, respectively. Moreover, test-retest correlations were computed for part of the sample of adults with visual impairments. Test-retest correlations were 0.50 for P, 0.89 for E, 0.88 for N, and 0.81 for L, respectively.

### Procedure

In the present study, the ethical principles of Declaration of Helsinki (World Medical Association, 2010) were followed. Additionally, consent was obtained from the individuals, using the appropriate forms and according to the procedure suggested by the World Medical Association (2010).

The researcher was experienced in conducting reviews to individuals with visual impairments. The researcher read out the questions to each participant (sighted or participant with visual impairments) separately and then he wrote down the answers given by the participant. Each participant was alone with the reviewer in a quiet room during the procedure.

## Results

### Differences between the groups

The means and the standard deviations of the 4 scales (P, N, E, and L) of the EPQ-R Short Scale were calculated for each group of participants separately (see Table 1) based on the condition of their eyesight (sighted, individuals with blindness, individuals with low vision).

**Table 1 Means and Standard Deviations in Relation to Vision Status**

Group	P		N		E		L	
	M	SD	M	SD	M	SD	M	SD
Blindness	3.40	1.63	5.23	3.13	7.80	3.55	<b>6.20*</b>	2.93
Low vision	3.07	1.44	4.88	2.32	8.08	3.02	<b>6.33**</b>	2.56
Vision	3.69	1.81	5.39	2.63	9.06	3.02	5.01	2.41

\* $p < 0.05$ , \*\* $p < 0.01$

The implementation of ANOVA showed that there are statistically significant differences amongst the three groups only in the L scale ( $F = 4.869$ ,  $p < .01$ ). The application of the Bonferroni post-hoc test showed that the sighted adults have a lower score on the L scale, both from adults with blindness ( $p < .05$ ) as well as from adults with low vision ( $p < .01$ ).

### Differences within the group of adults with visual impairments

We also explored the factors which might affect the scores of adults with visual impairments in each of the 4 scales. The method of linear multiple regression analysis was implemented, using the variables vision status, gender, age, and how recently the visual impairment occurred, as predictors.

**Introversion/Extraversion.** The analysis yielded an adjusted  $R^2$  of .081 ( $F = 2.958$ ,  $p < .05$ ). A significant individual predictor of extraversion was age ( $\beta = -.411$ ,  $p < .01$ ). According to the results, extraversion declines with the increase in age. Gender, vision status, and how recently the visual impairment occurred were not significant individual predictors of extraversion (see Table 2).

**Table 2. Multiple Regression for Variables as Predictors of Extraversion**

Variable	B	Std. Error	Beta	t	p
Vision status	.338	.690	.050	.491	.625
Gender	-.666	.686	-.099	-.971	.334
Age	-.129	.041	-.411	-3.142	.002
How recently the V.I. occurred	.037	.032	.154	1.168	.246

Note. Adjusted  $R^2 = .081$ ,  $p < .05$ .

**Neuroticism.** The analysis yielded an adjusted  $R^2$  of .061 ( $F = 2.547$ ,  $p < .05$ ). Significant individual predictors of neuroticism were gender ( $\beta = .210$ ,  $p < .05$ ) and age ( $\beta = .292$ ,  $p < .05$ ). According to the results, the women showed a higher score on the neuroticism scale. Furthermore, the scores on the neuroticism scale increase as the age increases. Vision status and how recently the visual impairment occurred were not significant individual predictors of neuroticism (see Table 3).

**Psychoticism.** The analysis yielded an adjusted  $R^2$  of .019 ( $F = 1.424$ ,  $p = .233$ ). No variable was a significant individual predictor of psychoticism.



**Table 3 Multiple Regression for Variables as Predictors of Neuroticism**

Variable	B	Std. Error	Beta	t	p
Vision status	-.373	.570	-.068	-.655	.514
Gender	1.155	.567	.210	2.038	.045
Age	.075	.034	.292	2.208	.030
How recently the V.I. occurred	-.019	.026	-.096	-.718	.475

Note. Adjusted  $R^2 = .061$ ,  $p < .05$ .

*Lie*. The analysis yielded an adjusted  $R^2$  of  $-.030$  ( $F = 0.344$ ,  $p = .848$ ). No variable was a significant predictor of lie.

### Discussion

According to the results of the analysis, there are no statistically significant differences amongst the three groups (individuals with blindness, individuals with low vision and sighted individuals) in scales P, N and E. This result clearly supports our hypothesis about the absence of differences between the groups.

However, the sighted adults have a lower score on the L scale, both from adults with blindness and from adults with low vision. There is a possibility that the presence of the researcher may have influenced the answers from the subjects with visual impairments. If this is true, the results in the other scales may have also been influenced. Another possibility that could interpret the high score of the participants with visual impairments in L scale is that they might have tried to retain or to present a conformist social image of themselves. What could account for such an attitude may be the fact that because persons with visual impairments grow up in a disadvantaged group of society - a minority, they face serious difficulties in having an independent life in a modern society (Reid, 2000). In every case, it would be useful to assess the validity of the participants' self-reports through peer report data (Wolf, Angleitner, Spinath, Riemann, & Strelau, 2004).

The means of the 4 scales (P, N, E, L) that were calculated in this study it is inappropriate to be compared with the respective means of Alexopoulos and Kalaitzidis (2004) study, because the majority of the participants in Alexopoulos and Kalaitzidis's research were high school and university students, aged in average 19.7 years.

In the present study, the older individuals with visual impairments reveal less extraversion and greater neuroticism. Similarly, there is research with sighted participants in which the negative correlation between age and extraversion is obvious (Costa, Herbst, McCrae, & Siegler, 2000; Farmer et al., 2002). On the other hand, the findings of this research are in conflict with the research findings which took place involving sighted adults where neuroticism is negatively correlated to age (Costa et al., 2000; Farmer et al., 2002).

In this research, the women with visual impairments show a higher score on the neuroticism scale than the men. The findings were similar to research done on a population of individuals with visual impairments (Klinkosz et al., 2006), as well as on sighted individuals (Aluja, Garcia, & Garcia, 2002; Budaev, 1999; Costa, Terracciano, & McCrae, 2001; Farmer et al., 2002; Lynn & Martin, 1997; Wilson & Doolabh, 1992). For example, elevated neuroticism scores in female subjects have been reported previously by Katz and McGuffin (1987).

### Limitations

Researchers commonly modify the way in which the tests are administered, which have been designed to test sighted individuals – they administer the test orally and simultaneously record the answers. This specific procedure was followed in the present study as well. This procedure does not allow the participants with visual impairments to do the test in the same manner as the sighted participants (Haymes et al., 1996). It certainly would have been preferable for the answers to the questionnaire to have been able to be completed using alternative methods, in order to avoid the presence of the researcher. For example, the individuals with blindness could have answered the questionnaire by using a computer and screen reading software. Recent attempts have been made to implement these alternative forms of presentation in order to be used by individuals with visual impairments (see Papadopoulos & Goudiras, 2004). Moreover, the method involving a cassette recorder along with a braille answer sheet could be used (Johnson, 1989), which allows the participants with visual impairments to complete his test on his own. More recently (Reid, 2000), alternative test application methods were put forward, such

as incorporating low vision aids, CCTV (closed-circuit television) and OCR (optical character reader), which can improve the credibility of the results.

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## THE RELATIONSHIP BETWEEN LETTER FLUENCY MEASURES AND ARABIC GPA

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*This study investigated two widely-used early literacy skill's indicators in reflecting growth in first-grade language achievement skills. It compared two curriculum-based assessments of letter knowledge: Letter Naming Fluency (LNF) and Letter Sound Fluency (LSF) in the Arabic language. A sample of 125 first-grade students, 100 average readers and 25 with reading difficulties, was recruited from two public primary schools in Jordan. These students were administered both assessments 18 times, one each week, during the second half of the first grade. Students' progress for both measures was followed. Although students' LNF progress was higher than LSF, still LSF had a higher correlation with Arabic language achievement than LNF at the end of the first grade. Furthermore, students who were struggling with reading scored significantly lower on Arabic CBM LNF and LSF probes than their peers without disabilities. Implications for Arabic language learning and assessment are discussed.*

### *The Relationship Between Letter Fluency Measures and Arabic GPA*

Underachievement in reading is a well-documented and persistent problem. For example in the U.S.A, the National Center for Educational Statistics (NCES; National Center for Educational Statistics, 2007) reported that during the 2005–2006 school year, 36% of all fourth grade students scored below the *basic level* in reading. Furthermore, the National Reading Panel (NRP; National Institute of Child Health and Human Development [NICHD], 2000) indicated that at least 20% of children demonstrated reading deficits before the third grade. Early identification and intervention of children who are at risk for reading problems is critical to the prevention of reading problems. For students at risk for later reading problems, high-quality instruction, delivered early, can reduce later reading failure (e.g., Simmons et al., 2008; Torgesen et al., 1999).

Response to Intervention (RTI) has been generally defined as a practice for providing high-quality instruction and intervention matched to student needs, while using student level of performance and rate of growth for making educational decisions (Batsche et al., 2006). In the area of reading, RTI models provide a framework for implementing early, intensive intervention in kindergarten and first grade to prevent reading problems and improve reading outcomes for at risk students (Al Otaiba & Torgesen, 2007; Vellutino, Scanlon, & Zhang, 2007). RTI models typically utilize a process of universal screening, in which all students are assessed to determine those at risk for later failure. In addition, student progress is monitored over time to assess the impact of instruction, determine when instructional changes should be made, and evaluate whether more intensive instruction is needed. Clearly, the measurement tools used for RTI must provide reliable and valid data for making these decisions. The RTI has commonly utilized curriculum-based measurement (CBM) for decision making. The CBM was originally developed to provide special educators with brief, standardized assessments for use in evaluating student progress toward individual academic goals (Deno, 2003). Major work in extending CBM procedures downward to early literacy measurement was accomplished through the Dynamic Indicators of Basic Early Literacy Skills (DIBELS; Good & Kaminski, 2007), a set of fluency-based indicators designed to measure foundational skills of reading.

The first grade represents a critical time period when a child integrates pre- and early literacy skills toward becoming a reader. Screening in early first grade should accurately identify students at risk for failing to develop skills in accurate and fluent word recognition and reading connected text, which are crucial for reading success in later grades. However, reading skills in the fall are still in an embryonic state and reading connected text is generally not expected. Several types of measures have been studied

for first grade reading screening, such as accuracy and fluency in naming letters and letter sounds, identifying sounds in words or phonemic segmenting or blending, and accuracy and fluency in reading words or pseudo-words (for a review see Johnson, Jenkins, Petscher, & Catts, 2009; Perney, Morris, & Carter, 1997). Measures such as Letter Naming Fluency (LNF) and Letter Sound Fluency (LSF) are used widely in first grade through web-based applications such as the Dynamic Indicators of Basic Early Literacy Skills (DIBELS, Good & Kaminski, 2007). LNF assesses skills in letter knowledge and fluency in identifying the letters of the alphabet. LSF is a measure designed to assess skills in knowledge and fluency in identifying the letters sounds of the alphabet. The LNF and LSF measures have demonstrated validity in predicting future reading skills (Catts, Petscher, Schatschneider, Sittner Bridges, & Mendoza, 2009; Goffreda & DiPerna, 2010; Johnson et al., 2009; Nelson, 2008).

The score for the LNF represents the number of letters a child can name correctly within one minute using a random listing of upper- and lowercase forms. The LNF involves recognizing and naming the letters in a short period of time, which shows mastery and rapidity in letter recognition (Foulin, 2005). Knowing letter names accurately and fluently explains significant amounts of variance in later reading ability (Richey, 2004; Richey & Speece, 2006). It should be noted that letter-naming fluency is distinguished from the Rapid Automatized Naming letters task (RAN; Wolf & Denckla, 2005; Wolf & Bowers, 1999) as the RAN letter task uses a few presumably known, frequently occurring letters (i.e., five letters) whereas LNF measures use many exemplars (i.e., all the letters of the alphabet) (Speece, Mills, Ritchey, & Hillman, 2003).

The LSF assesses letter sound knowledge by asking children to identify the sound of an isolated letter. Typically, letters are arranged in random order and students produce letter sounds for one minute. LSF has an evidence of reliability coefficients in the .80 to .90 range for alternate-forms reliability and test—retest in kindergarten and first grade and concurrent and predictive criterion-related validity coefficients in the .50 to .90 range with word reading (Elliott, Lee, & Tollefson, 2001; Fuchs & Fuchs, 2004; Speece & Case, 2001). In addition, a substantial body of research has demonstrated that skills that are related to mapping sounds to letters (i.e., phonological awareness) play critical roles in learning to read and write in languages with alphabetic writing systems (e.g., Adams, 1990; Ehri, 1998). A positive relationship between phonological awareness and literacy skills has been found for kindergartners to third grade students (Carrillo, 1994; Vernon & Ferreiro, 1999).

Some researchers suggested that knowing letter names accurately and fluently explain significant amounts of variance in later reading ability (Richey, 2004; Richey & Speece, 2006). Furthermore, other researchers proposed that knowing letter names is a better predictor of later reading than knowing letter sounds because learning letter names helps children acquire letter sounds since many letter names contain the letter sounds (Share, 2004; Treiman, Tincoff, Rodriguez, Mousaki & Francis 1998). On the other hand, not all researchers agree on the importance of learning the names of the letters in learning to read. The DIBELS research team argued that teaching letter knowledge is not an important instructional goal. It's not that instructing in letter knowledge is harmful, but rather that it may not be an important goal in teaching reading. They stressed that children need to associate the sounds with letters, and may not need to know the letter names, for reading (DIBELS, Good & Kaminski, 2007). However, empirical studies that investigated the specific role of letter-name or sound knowledge in predicting Arabic literacy acquisition are sparse. Because of the importance of letter knowledge in the early phases of reading acquisition, the development of a CBM that assesses performance in this aspect of reading is warranted. Furthermore, English LNF and LSF need to be validated across other languages and cultures to spread the benefit of this type of early assessment across the world. This study was intended to investigate the use of CBM LNF and LSF in Arabic language in Jordan.

#### *Arabic Early Reading in the Jordanian Curriculum*

The Arabic language has an alphabetic writing system; letters in written words represent sounds in spoken words. The awareness that letters represent the sounds in spoken words is called the alphabetic principle. One of the basic steps in learning the alphabetic principle is recognizing and naming the letters of the alphabet. Children will also have to learn the sounds in words (phonemic awareness) and the letters that represent those sounds. Although some of the letter names in Arabic provide cues for letter sounds, most of the letter names differ significantly from its sounds. Arabic is an alphabetic language with 28 letters, written in a joined fashion from right to left (Abu Rabia & Siegel, 2002). All letters are consonants except three long vowels. Another three short vowels (diacritics) do exist in the form of separate diacriticals, but not as independent graphemes. When any of these diacritics appear on certain letters, it gives the letter a completely different sound; for example, the letter *b* could have any one of the

sounds /ba/, /bi/, or /bu/. If the same letter *b* comes in a word where it does not need a vowel, its sound will be *eb*. Therefore, when these diacritics or short vowels appear in the Arabic script they show a high degree of regularity and the students can read by predicting the sound of the letters. However, in most modern and printed Arabic texts (grade four and above) vowel signs are not given, therefore reading relies more on the context rather than spelling. Thus, the Arabic script becomes more irregular (Abu-Rabia, 2002; Abu-Rabia & Siegel, 2002).

The Arabic script is written in a cursive fashion where letters are joined in print and in hand writing. Also, letters change their shapes according to their placement in the word (at the beginning, middle, end or basic). In other words, each individual letter has multiple forms or shapes, according to its position in the word. Many letters, furthermore, have similar graphemes but their phonemes are completely different. The Arabic alphabet consists of letters with twenty one having grapheme similarity with at least one or two letters (Breznitz, 2004). The combination of these graphical features of the Arabic language creates certain difficulties in learning and teaching reading skills.

In the first-grade Jordanian curriculum, the teaching of reading focuses on word recognition techniques. As the letter sounds form the foundation of word recognition in Arabic, the textbook is organized to include several lessons purposefully planned to teach every particular letter. Learning a certain letter includes learning its sound and various shapes then blending it with long vowels and letters in order to make syllables and words, and segmenting syllabus in order to deconstruct these same sounds and letters. By the end of the first grade, it is expected that students would know all of the letters and their sounds, their various shapes and how to read simple words by analyzing them into their smaller components (syllables and letters).

#### *Significance of the Study*

It is important to have a reliable means of identifying students who are at-risk of failure as soon as difficulties arise. As discussed earlier, for students at risk for later reading problems, high-quality instruction, delivered early, can reduce later reading failure (e.g., Simmons et al., 2008; Torgesen et al., 1999). Large-scale reading screening requires measures that are (a) brief and efficient, (b) indicate the skills important for the grade level in which they are used, and (c) predict later achievement. All these psychometric traits exist in English CBM and need to be investigated across other languages, specifically, Arabic language.

The DIBELS LNF and LSF are standardized, individually administered tests that provide a measure of risk. Students are considered at risk for difficulty achieving the early literacy benchmark goals if they perform in the lowest 20% of students in their district. That is, below the 20th percentile using local district norms. Students are considered at some risk if they perform between the 20th and 40th percentile using local norms. Students are considered at low risk if they perform above the 40th percentile using local norms (AIMSweb, 2007).

Although CBM procedures may be more racially and culturally neutral than traditional norm-referenced tests (Galagan, 1985; Shinn, 1989), to date and to the best of the author's knowledge, no studies in the Arab world have been conducted to examine the validity of the CBM procedures when used to assess LNF and LSF in Arabic. Arabic schools are in need of an empirically-based assessment tool to predict reading progress. For example, CBM LNF and LSF are rarely used by teachers or psychologists in Jordan (Al-Natour, AlKhamra, & Al-Smadi, 2008). Teachers in Jordan and Arab world are in need of efficient measures to identify young students who are not making adequate progress in learning to read.

#### *Purposes of the Study*

The purpose of this study is to explore the applicability of the CBM LNF and LSF in the Arabic language. This study investigated the CBM LNF and LSF measures and the degree to which they reflected students' growth towards Arabic language achievement during the second semester of the first grade. It was hypothesized that LSF would predict Arabic language achievement better than LNF because rapid processing of grapheme-phoneme codes would indicate a greater depth of knowledge of the alphabetic principal. This study addressed following questions:

*Study Question 1:* What are the growth trajectories of LNF and LSF for average readers of the first grade students in Jordan?

*Study Question 2:* What are the growth trajectories of LNF and LSF for struggling readers of the first grade students in Jordan?

*Study Question 3:* What is the relationship between the Arabic CBM letter fluency measures (LNF and LSF) and Arabic Language Grade Point Average among average readers?

## **Method**

### *Participants and Setting*

A total sample of 125 first grade students, 100 average readers and 25 with reading difficulties, participated in this study. Students with reading difficulties were identified by resource room teachers based on their performance in the first semester of the first grade. All participants were administered the Arabic CBM LNF and LSF probes. Participants were recruited from two public primary schools in the southern region of Jordan. The age range of the students was 75-86 months with a mean of 82.03 and SD = 3.95, of these students 63 were females and 62 were males. The participants were selected from a larger set of students (419) who were assessed to meet the requirements for inclusion in the study: intelligence within the average range, native speakers of Arabic, no noted emotional or behavioral disorders, no noted attention disorders, and no sensory impairments. Consent for participation was obtained from the participants and their parents or guardians. Two qualified examiners who have a degree in childhood education were trained to administer and score the Arabic CBM LNF and LSF. These teachers worked in two different public primary schools in a college town of Jordan. During the data collection, the author had weekly updates and discussions with the examiners team to address the crucial points in the Arabic CBM LNF and LSF administration and then provide feedback.

### *Measures*

*Arabic CBM LNF and LSF probes.* Twenty four different but equivalent probes that consisted of all Arabic letters were used to monitor students' progress in naming letters throughout the 18 weeks of measurement. Each probe consisted of 110 letters with four shapes (at the beginning, middle, end or basic) arranged on a page. Students are asked to point to each letter and name it as quickly as they can, reading across the rows. The score for LNF represents the number of letters a child can name correctly within one minute. Three base line data were administered in the first and last week of assessment and the median score was used to represent the most reliable data of the students' performance. Identical procedures were used for Arabic CBM LSF probes.

Both the LNF and LSF probes are adapted from the work of Kaminski & Good in 1998. In addition, all probes were given to university's instructors and teachers in the field to judge the appropriateness of the letters frequencies and format. Their suggestions were taken into consideration in making the final version of the probes. All probes were administered individually. Two copies of the sheet were prepared. The students had a copy of the Arabic CBM LNF or LSF sheet in front of her or him, and the teacher had a copy of the Arabic CBM LNF or LSF sheet to write on, a timer, a pencil, and the directions for administration. If a student incorrectly named a letter or did not respond within three seconds of a letter presentation, the student was asked to try the next letter. A letter was considered unknown if the student did not correctly identify a letter or sound within three seconds on the two assessments.

### *Translating the CBM LNF and LSF instructions into Arabic language.*

The researcher used appropriate translation procedures (Brislin, 1986) prior to administer Arabic CBM LNF and LSF to a sample of Jordanian students. First, two native speakers of Arabic, who were also fluent in English, independently translated the Arabic CBM LNF and LSF instructions into Arabic. Second, a back translation of the Arabic version into English by a bilingual resident of the United States who is fluent in both English and Arabic languages was conducted. Third, all translators reached a reconciliation of the forward-backward translations. Finally, a pre-test was conducted with a convenience sample of 20 first grade students to assess the ease of comprehension, possible ambiguities, and alternative administration wording.

*The Arabic language Grade Point Average (Arabic GPA).* By the end of the second semester of the academic year 2011, all participants of this study were tested by their schools to measure their Arabic language skills. A100-point (the final grade) that represented each student's general skill in Arabic was provided to the researcher by the teachers. The Jordanian Arabic test focused mainly on three basic literacy skills: reading comprehension, writing, and spelling. The Arabic GPA is a numeric average of all grades achieved in classes at a given school semester. The purpose of GPA is to provide a barometer as to overall performance of a student in his or her classes, as well as create a system that allows for comparisons between students, and a class ranking system. In the Jordanian educational system, students are ordered and assigned a numerical rank against their peers based on their GPA, starting with number 100 for the student with the highest GPA and 0 for students with the lowest GPA. The rubric for Arabic

GPA is excellent (90-100), very good (80-89), good (70-79), satisfactory (60-69), minimal pass (50-59), and failure (< 50).

*Procedural and Inter-rater Reliabilities.* Instruments that have adequate reliability will measure true if they yield the same scores across different examiners. Instruments that have poor reliability will usually yield markedly different scores when administered by different people. Two types of reliability were investigated in this study: procedural and inter-rater reliabilities. To ensure consistency of testing administration across Arabic CBM probes, the teachers read from scripts and used timers. The fidelity of testing administration was tested by using a detailed checklist to ensure each test was administered as it was intended and described in the manuals of CBM testing (Hosp, Hosp, & Howell, 2007). Procedural reliability was obtained during 100% of testing sessions with an average reliability of 100 percent. The teachers scored each Arabic CBM probe and entered the data into an excel sheet. The researcher checked randomly 25% of the scoring sheets. The average inter-rater reliability of scoring fidelity data was 99% (range 98%-100%). In terms of data entry reliability, all of the excel data (100%) were checked against the paper scores and all discrepancies were resolved by examining the original protocols. In addition, the researcher had weekly updates and discussions with the teachers to address the crucial points of administering the probes.

## Results

### *Descriptive Data Analysis*

Tables 1 and 2 present the descriptive analysis including the means, standard deviations, and percentile ranks that represent the average performance of all study measures among students with and without reading difficulties by the end of the academic semester. This descriptive information was helpful in understanding the data and making initial inferences on the differences between Arabic CBM LNF and LSF among the two study groups. The contents of the table demonstrate that students' performance in Arabic CBM LNF was higher than their performance in Arabic CBM LSF. In addition, students with reading difficulties perform in the lowest 20th percentile of average reader norms.

Descriptive statistics also allowed providing visual graphs that facilitated more convenient presentation of the data. Figures 1 and 2 display the average weekly performance of Arabic CBM LNF and LSF across the 18 weeks for average readers. Students with average reading ability progressed on their Arabic CBM LNF skill from 36.82 Letter Names Correct Per Minute (LNC) on the first probe to 42.91 by the last week of the semester. The estimated growth rate was .33 LNC per week. Their progress in Arabic CBM LSF skill was from 24.83 Letter Sounds Correct Per Minute (LSC) on the first probe to 30.63 by the last week of the semester. The estimated growth rate was .32 LSC per week. Figure 3 displays the average weekly performance of Arabic CBM LNF and LSF across the 18 weeks for students with reading difficulties. Students with reading difficulties progressed on their Arabic CBM LNF skill from 20.5 LNC on the first probe to 24.21 by the last week of the semester. The estimated growth rate was .20 LNC per week. Their progress in Arabic CBM LSF skill was from 13.33 LSC on the first probe to 19.79 by the last week of the semester. The estimated growth rate was .35 LSC per week.

### *The Relationship Between Letter Fluency Measures and Arabic GPA*

The Kolmogorov-Smirnov statistic was performed to test the hypothesis that the data were normally distributed for average readers. The data displayed normal distributions for all study measures  $D(100)$ . The statistics ranged from .12 to .18; all statistics were not significant ( $p > 0.05$ ). Slightly lower performances (positively skewed distributions) were detected in the distributions. To improve the shape of the distributions, the responses of outliers whose scores were  $\pm 2$  SD or more from the group mean were replaced by a value equal to the next highest non-outlier-score plus 1 unit of measurement (Tabachnick & Fidell, 2001). Then, criterion-related validity was investigated by conducting Pearson product moment correlations between letter fluency measures and Arabic GPA. Arabic CBM LSF was significantly correlated with the Arabic GPA,  $r = .68$ ,  $p < .01$  (two-tailed), and the Arabic CBM LNF was also correlated, but with less magnitude, with the Arabic GPA,  $r = .20$ ,  $p < .05$  (two-tailed).

## Discussion

The overarching purpose of this study was to investigate the role of Arabic LNF and LSF in predicting first grade Arabic language GPA for Jordanian students. It also aimed to examine variation growth trajectories of LNF and LSF among first grade students with and without reading difficulties in the second semester of the academic year of 2011. The findings indicate that both resulting coefficients of procedural and inter-rater reliabilities for Arabic CBM LNF and LSF were very high. These findings



mirror reliability coefficients for CBM LNF and LSF presented in previous research (Elliott et al., 2001; Fuchs & Fuchs, 2004; Speece & Case, 2001).

Other interesting finding that compared to the CBM LNF and LSF from AIMS web (2007), Jordanian students read fewer number of letter names and sounds per minute than American norms. This can be attributed to the fact that speed reading of letter names and sounds are a new practice for them. In addition, some characteristics of the Arabic system may result in a great difficulty for children reading Arabic. Most of these factors or characteristics are related

**Table 1. Descriptive information of average Arabic CBM LNF, LSF, and Arabic GPA performance by average readers**

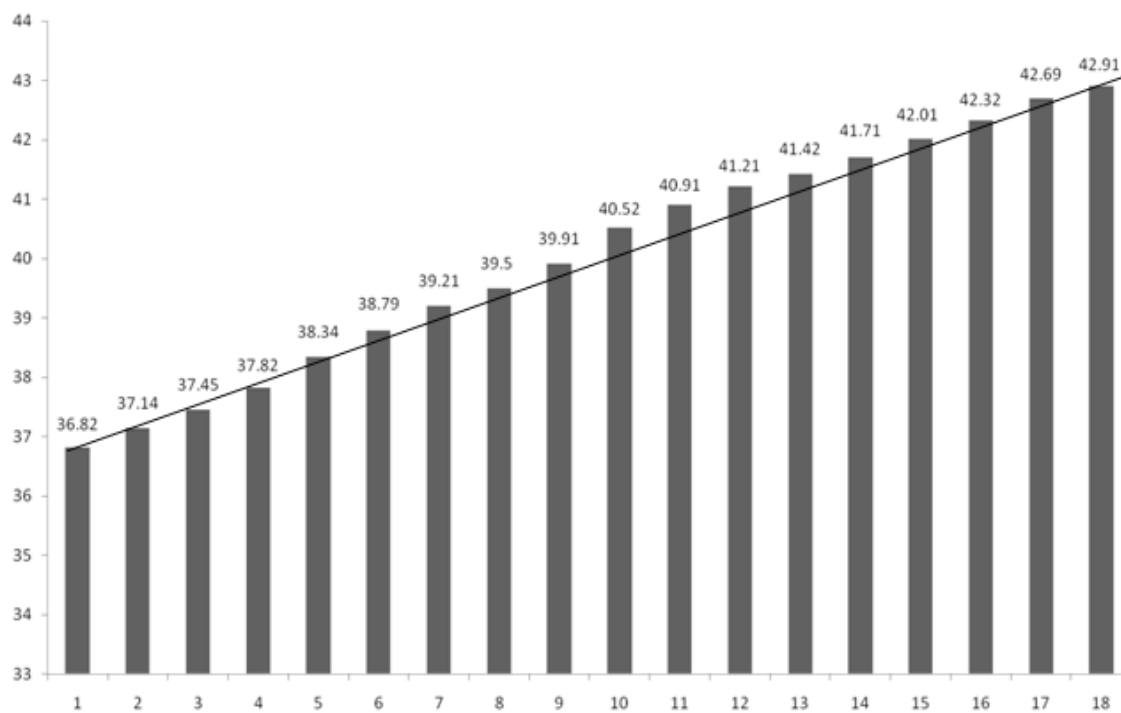
Measure	Range	Mean	Standard Deviation	Percentile	
Arabic CBM LNF	26-52	40.03	5.77	90%	48.10
				75%	43.20
				50%	40.20
				40%	36.20
				20%	30.20
Arabic CBM LSF	15-46	28.06	7.93	90%	39.13
				75%	29.23
				50%	27.23
				40%	25.23
				20%	20.23
Arabic GPA	64-95	77.06	8.14	90%	89.90
				75%	80.75
				50%	78.00
				40%	75.00
				20%	70.00

Note. Number of Students = 100, CBM = Curriculum Based Measurement, LNF = Letter Naming Fluency, LSF = Letter Sound Fluency, GPA = Grade Point Average.

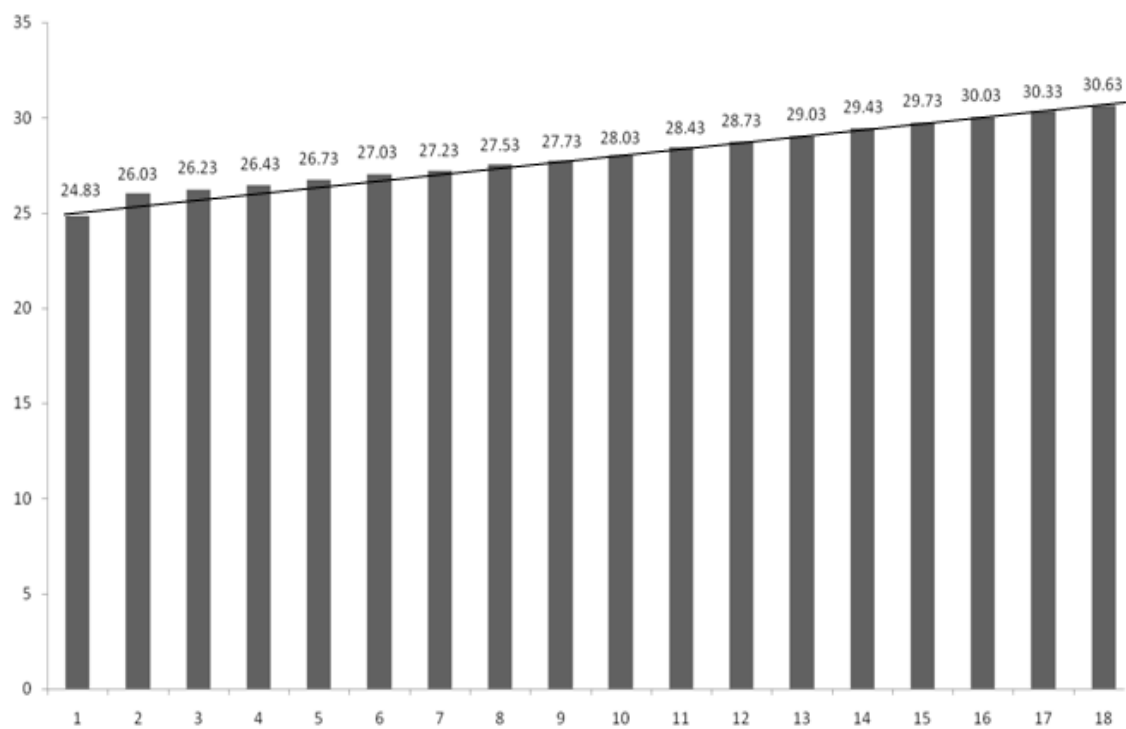
**Table 2. Descriptive information of average Arabic CBM LNF, LSF, and Arabic GPA performance by students with reading difficulties**

Group	Range	Mean	Standard Deviation	Percentile	
Arabic CBM LNF	12-35	22.29	5.43	90%	29.40
				75%	26.00
				50%	21.00
				40%	19.40
				20%	18.00
Arabic CBM LSF	10-29	16.58	5.17	90%	27.80
				75%	18.00
				50%	15.00
				40%	14.00
				20%	12.13
Arabic GPA	51-77	67.88	7.67	90%	75.80
				75%	73.00
				50%	70.00
				40%	69.00
				20%	60.00

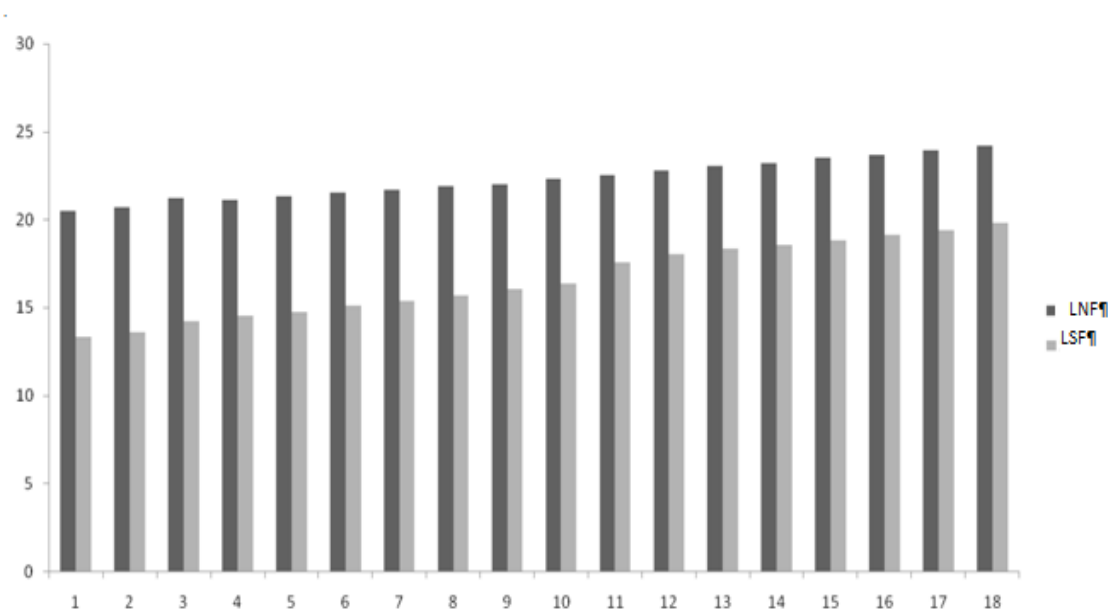
Note. Number of Students = 25, CBM = Curriculum Based Measurement, LNF = Letter Naming Fluency, LSF = Letter Sound Fluency, GPA = Grade Point Average.



**Figure 1 Graphic display of the weekly mean performance of average readers on Letter Naming Fluency measure reported in Letter Names Correct Per Minute**



**Figure 2. Graphic display of the weekly mean performance of average readers on Letter Sound Fluency measure reported in Letter Sounds Correct Per Minute**



**Figure 3. Graphic display of the weekly mean performance of students with reading difficulties on Letter Naming Fluency (LNF) and Letter**

Sound Fluency (LSF) measures to the orthographic features of Arabic language (for review see Abu-Rabia, 2002; Abu-Rabia & Siegel, 2002; Breznitz, 2004). As noted in the introduction section, in Arabic script the correct form of a particular letter can vary depending on its position in a word. Letters have four different forms (at the beginning, middle, end or basic). Additionally, many groups of different Arabic letters are strikingly similar in shape. Consequently, this orthographic feature may reduce the distinctiveness and hence, the recognition of Arabic letters or sounds and the acquisition of letter-sound rules may be slowed if the letter recognition itself is acquired slowly.

With regard to students with reading difficulties, descriptive data make it clear that growth rate is greater among students with average reading ability than for those with reading difficulties. Students with reading difficulties perform in the lowest 20th percentile of average reader norms. This finding suggests that Arabic CBM letter fluency measures can discriminate between those students with and without Arabic language problems. It seems that both measures may be used for identifying students who are at risk for reading failure with different accuracy based on the correlation with Arabic Language GPA.

As was hypothesized, although students' LNF progress was higher than LSF, still LSF had a higher correlation with Arabic language achievement than LNF at the end of the first grade. This can be justified by the fact that most of the Arabic letters have names that differed significantly from its sounds. For example, /alif/ is the letter name while the letter sound is /a/. Rapid processing of grapheme-phoneme codes would indicate a great depth of knowledge of the alphabetic principal than just focusing on letter names only. Contradictory to this finding, some researchers suggested that knowing letter names is a better predictor of later reading than knowing letter sounds because learning letter names helps children acquire letter sounds since many letter names contain the letter sounds (Share, 2004; Treiman et al., 1998). On the other hand, studies have failed to show that teaching letter names to students enhances their reading ability (e.g., Ehri, 1998) and, in fact, have demonstrated that successful learning of letter-sound correspondences that leads to reading acquisition can occur without knowledge of letter names (Bruck, Genesee, & Caravolas, 1997; Mann & Wimmer, 2002).

#### *Limitations, Implications, and Future Research*

Although the results of this study are promising, and suggest a potential new tool to examine and predict reading in Arabic, the study has several limitations. This study was conducted with a small sample size of the first grade students. Future studies should replicate this research with larger samples across multiple grades. Also, data were collected for 18 school weeks, whereas a typical school year spans 36 to 38 weeks. It would be useful to know how an estimated growth rates change over an entire school year. Although Arabic GPA cannot be considered a standardized assessment due to the certain degree of subjective judgment that teachers should made about students reading ability, the use of it was imperative in this study since no standardized assessment was existed in Arabic to be used for the

purpose of the study. Despite the limitations, the outcomes of this study have substantial implications for future practice and research of assessment of reading in Arabic and for the educational system in Jordan.

The results of this study indicated that Arabic CBM LSF can be used to inform language outcome that includes reading for students in the first grade. This study suggests that existing Arabic CBM LSF measure may be adequate for universal screening as long as multiple probes are collected per occasion to rank and identify students who will struggle in reading. Research has shown that early literacy skills are strong predictors of later reading failure. Identifying students who are at risk for reading failure can help educators prevent reading problems before they start. The results of this study suggest that Arabic CBM LSF can be used to predict Arabic language GPA by the end of the first grade. However, the instructional utility of LSF continues to be unclear as LSF is not intended to directly measure those skills, but rather, is considered to be a general indicator of risk for later reading difficulty. More research is still needed on the LNF and LSF and its corresponding instructional implications regarding Arabic language skills development.

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## THE USE OF THE ARABIC CBM MAZE AMONG THREE LEVELS OF ACHIEVERS IN JORDAN

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*This study examined the applicability of the Arabic version of the Curriculum Based Measurement Maze (CBM Maze) for Jordanian students. A sample of 150 students was recruited from two public primary schools in Jordan. The students were ranked into high, moderate, and low achievers in terms of their performance in the Arabic course. Then all of them were administered the Arabic CBM Maze probes. The students' scores in the Arabic CBM Maze were less than the previous American studies and norms. The results indicated that the Arabic CBM Maze is a reliable, valid, and cost effective measure. In addition, the Arabic CBM Maze is a good predictor of the Arabic language Grade Point Average. Moreover, it can be concluded that the Arabic CBM Maze may be used with confidence to differentiate the students' levels of reading achievement.*

Reading skills deficits are a common characteristic of students referred for special education services (Daly, Chafouleas, & Skinner, 2004; Lentz, 1988; Winn, Skinner, Oliver, Hale, & Ziegler, 2006). According to the report released by the National Assessment for Educational Progress (NAEP) in reading, 43% of fourth graders cannot read at the basic literacy level (Daane, Campbell, Grigg, Goodman, & Oranje, 2005). Reading receives a great amount of attention because students require skills in reading comprehension to access information and concepts in various curriculum areas (Brown-Chidsey, Davis, & Maya, 2003). Thus, students who display poor reading skills are more likely to experience difficulties in other academic areas, such as history, geography, and economics (Espin & Deno, 1993). These reading deficits are likely contribute to unsuccessful outcomes for students, such as high dropout rates, grade retention, and overall poor achievement (Malmgren, Edgar, & Neel, 1998; Wagner, D'Amico, Marder, Newman, & Blackorby, 1992).

However, when a child's reading problems are recognized early, school failure can, to a large extent, be prevented or reduced (Raikes et al., 2006). Early intervention to prevent development of reading difficulties can be an effective way to ameliorate this problem (Torgesen et al., 1999), and screening and progress monitoring can identify students who require such intervention (Compton, Fuchs, Fuchs, & Bryant, 2006). In view of this fact, it is of critical importance to have a valid and reliable assessment instrument to be used in identifying students who are at-risk of reading failure.

A commonly used and well-researched method for assessing students' reading is the curriculum based measurement (CBM). The CBM is considered to be a type of authentic assessment practice that is designed to provide prevention and intervention services to students (Hoover & Mendez-Barletta, 2008). The CBM's validity and reliability are well established (National Center on Response to Intervention, 2010). The CBM is a set of standardized procedures that were initially designed to index the level and rate of student achievement within the basic skill areas of reading, mathematics, written expression, and spelling (Deno, 1985; Deno, 2003). Researchers indicate that the CBM can provide accurate information about a student's academic standing and progress, which can then be used for a variety of psycho-educational decisions that include: (a) identifying students for special services (Fore, Burke, & Martin, 2006; Marston, Mirkin, & Deno, 1984; Shinn, 1989); (b) formulating goals and objectives for Individualized Educational Plans (IEPs; Deno, Mirkin, & Wesson, 1984); (c) monitoring student progress and improving educational programs (Fuchs, Deno, & Mirkin, 1984); (d) transitioning students to less restrictive environments (Fuchs, Fuchs, Hamlett, Phillips, & Bentz, 1994); (e) evaluating school programs (Germann & Tindal, 1985); and (f) predicting how well students will perform on

statewide competency tests of achievement (Crawford, Tindal, & Stieber, 2001; Fore, Boon, & Martin, 2007).

In the area of reading, two types of CBM measures have been used in research and practice: the CBM oral reading fluency (ORF) and the CBM Maze. On the CBM ORF measure, student performance is measured by requiring students to read aloud passages of meaningful text for one minute. The number of words read correctly is scored as the reading rate (Deno, 1985). Although assessment of ORF is the primary CBM of reading used in research and practice (Reschly, Busch, Betts, Deno, & Long, 2009), the CBM Maze is growing in popularity as an additional measure. On the typical CBM Maze tasks, students are presented with a passage of approximately 250 words in which every seventh word has been deleted and replaced with three options. The increased use of the CBM Maze is partly due to efficiency of administration and because teachers perceive it as more reflective of reading comprehension than the ORF (Fuchs & Fuchs, 1992; Fuchs, Fuchs, & Maxwell, 1988). Recently, the CBM Maze has been receiving more attention due to the fact that it can be administered to a group of students at one time, whereas the CBM ORF is individually administered. Because the CBM Maze is group administered, an entire classroom or even an entire grade level can be assessed in less than five minutes. In addition to being potentially more efficient, the CBM Maze task might be more appropriate than the CBM ORF for use in screening for students in the intermediate (e.g., fourth and fifth) grades. After third grade, the primary emphasis of reading instruction switches from fluency to comprehension, and this switch may be reflected in the choice of universal screening measures.

#### *The CBM Maze*

The CBM Maze is a widely used assessment system for the universal screening of academic skills. Universal screening programs assess all students in a population (e.g., classroom, school, or district) with the intent of identifying those who are not making sufficient progress and addressing their academic needs with research-based interventions. The CBM Maze can be useful as a screening tool only if it differentiates readers by ability. The CBM must provide a reliable indicator of a student's overall proficiency in the academic skill of concern (e.g., reading). Because considerations of reliability and validity, time involved in assessment, and sensitivity to differences also are key considerations in selecting universal screening measures, many schools find that the CBM Maze is a useful screening tool.

In regard to the psychometric properties, the CBM Maze has been shown to provide a valid and reliable measurement of reading skills in elementary-, middle-, and high-school students (Brown-Chidsey et al., 2003; Espin & Foegen, 1996; Fuchs & Fuchs, 1992; Miura-Wayman, Wallace, Ives-Wiley, Ticha, & Espin, 2007; Shinn, Deno, & Espin, 2000). Results from previous research have indicated that the Maze has adequate technical characteristics, is sensitive to improvement of student performance over a school year, and can reveal inter-individual differences in growth rates (Shin et al., 2000). Moreover, several studies support the alternate form, reliability, sensitivity to growth, and predictive validity of the CBM Maze (e.g., Espin, Wallace, Lembke, Campbell, & Long, 2010; Graney, Martínez, Missall, & Aricak, 2010; Shin et al., 2000) has been established. In addition, CBM Maze has been found to correlate with state accountability tests (Fore et al., 2007).

With the emphasis on accountability, a growing focus is to use the CBM to predict student performance on state competency tests of achievement (Tindal & Marston, 1990). Tindal et al., (2003) indicated that predicting student performance on statewide competency tests of achievement is critical. More efficient measures that can provide similar information can be extremely valuable for teachers. Measures that give teachers snapshots of students' conceptual understanding of academic concepts at their grade level can fill the need for formative progress monitoring. In addition, justification for predicting achievement scores can be found in the school accountability movement that has put a premium on educators' providing evidence of student learning (Ysseldyke, Thurlow, & Shriner, 1992). For the purpose of this study, it is expected that predicting students reading in Arabic will present many obstacles due to the complex nature of the Arabic orthography.

#### *The Challenges of the Arabic Language*

Several graphical features of the Arabic language create certain difficulties in learning and teaching reading skills. First, Arabic is an alphabet language with 28 letters, written in a joined fashion from right to left (Abu-Rabia & Siegel, 2002). All letters are consonants except three long vowels. Another three short vowels (diacritics) do exist in the form of separate diacriticals, not as independent graphemes. When any of these diacritics appear on certain letters, it gives the letter a completely different sound; for example, the letter *k* could have any one of the sounds *ka*, *ki*, or *ku*. If the same letter *k* comes in a word

where it does not need a vowel, its sound will be *ek*. Therefore, when these diacritics or short vowels appear in the script Arabic shows a high degree of regularity and the students can read by predicting the sound of the letters. However, in most modern and printed Arabic text (grade four and above) vowel signs are not given or given partially, therefore reading relies more on the context rather than spelling and Arabic script becomes more irregular (Abu Rabia, 2002; Abu Rabia & Siegel, 2002). Second, the Arabic script is written in a cursive fashion while each individual letter has multiple forms or shapes according to its position within the word. Many letters, furthermore, have similar graphemes but their phonemes are completely different. The Arabic alphabet consists of letters with almost twenty letters having graphic similarity with at least one or two other letters (Brenznitz, 2004). Third, a greater influence of orthographic processing over-and-above phonological processing could be related to diglossia (the existence of a formal literary form of a language along with a colloquial form used by most speakers) in Arabic. Saiegh-Haddad (2007) has argued that differences between the spoken form of Arabic experienced by the preschool child (e.g., a local dialect) and the standard form of Arabic used in education and writing disrupts the construction of phonological representations of Arabic. Fourth, the glottal stop in Arabic, referred to as the Hamza, although a fully functioning consonant, is treated as a diacritical mark and has many different ways of writing depending on its position in the word resulting in various complex spelling and reading conventions (Elbeheri, Everatt, Mahfoudhi, Abu Al Diyar, & Taibah, 2011). Finally, the Shaddah, one of the diacritics used with the Arabic alphabet, is marking a long consonant. Shaddah is not a vowel. It indicates a place where the written language is showing only one consonant, but you are expected to pronounce two consonants. Normally, this means that you have to hold (sustain) the sound of that letter for twice as long as you normally would.

With all of the challenges of teaching and learning Arabic, it is a necessity to explore valid and reliable measures that can be used for predicting reading skills and identifying students with reading difficulties in the Arab world. This study is intended to investigate the applicability of the CBM Maze procedure in the Arabic language.

#### *Significance of the Study*

The main aim of most tests is to determine the academic levels of the students, particularly exceptional students who are far behind or far ahead of classmates. In Arab countries very limited research exists that addresses effective assessment practices for students who are severely deficient in reading or superior in reading (Al-Mannai & Everatt, 2005). The difficulty and complexity of the orthography of the Arabic language may explain the need to validate a screening and progress monitoring tool such as the CBM Maze test in Arabic to predict reading skills in the early stages of schooling. The educational systems in the Arab countries lack valid and reliable assessment tools that can be used to identify students who are at risk of developing reading difficulties (Al-Mannai & Everatt, 2005; Elbeheri et al., 2011). For example, researchers in Jordan have stated in numerous reports and articles that the Jordanian educational system is in need of valid assessment tools to identify students with reading disability and provide them with appropriate interventions (Al-Khateeb, 2008; Al-Natour, 2008).

Students with reading difficulties need a classroom-based measure of reading that is sensitive, efficient, and otherwise acceptable to teachers. The literature base on the CBM Maze measure is well established. However, there is a need for an examination on the use of the CBM Maze for students who speak languages other than English. Specifically, the CBM tools need to be validated in the Arabic language. Developing a formal assessment tool that can be used to find students with reading difficulties then follow their progress is a critical need in Jordan as well as other Arab countries. Students who have special needs in the Arab world are usually expelled or drop out from public schools because early adequate service and assessment are not provided to help them succeed. There is a need for a screening and progress monitoring instrument for the purpose of identifying at-risk children at time of school entry and providing identified children with systematic interventions (Al-Khateeb, 2007, 2008; Al-Natour, 2008; McBride, 2007). When a child's problems are recognized early, school failure can to a large extent be prevented or reduced (Raikes et al., 2006). To the author's knowledge, no studies have been conducted to investigate the applicability, reliability, and validity of the CBM Maze measure with Arabic speaking children.

#### *Purposes of the Study*

The purposes of this study were to explore the CBM Maze applicability, reliability, and validity with three levels of Jordanian students who speak Arabic. This study addressed the following three major questions:



*Study Question 1:* To what extent will the Arabic CBM Maze be a reliable measure of reading ability among three levels of achievers?

*Study Question 2:* What is the relationship between the Arabic CBM Maze and the Arabic Language Grade Point Average among three levels of achievers?

*Study Question 3:* To what extent do high achievers, moderate achievers, and low achievers differ in their Arabic CBM Maze scores?

## Method

### *Participants*

The sample of the study consisted of 150 students from fourth grade. These students were divided into three sub-samples. These samples were classified into high achievers, moderate achievers, and low achievers in their Arabic course with 50 participants for each one. The Arabic teachers and the researcher of this study ranked the participants into high, moderate and low achievers. Both the teachers' judgment and the students Arabic GPA of the first semester of 2011/2012 were used to group the students. The Arabic GPA cutoff points for classifying students were 69 and below for low achievers, 70 to 85 for moderate achievers, and 86 and above for high achievers. Then, all participants were chosen randomly and consent forms were sent to parents seeking their agreement of participation. Parents who agreed to let their children participate in the study were requested to complete a short questionnaire that addressed the inclusion criteria of this study. The participants were selected from a larger set of students (446) who were assessed to meet the requirements for inclusion in the study: intelligence within the average range, native speakers of Arabic, no noted emotional or behavioral disorder, no noted attention disorders, and no sensory impairments. The mean age of the participants was nine years and eight months with a range of 115-119 months. Of the total sample, 75 were male and 75 female. These students enrolled in the second semester of 2011/2012. All participants were administered the Arabic CBM Maze probes. Participants were recruited from two public primary schools in a college town in the southern region of Jordan.

The data collection was completed by the researcher and two trained teachers residing in the southern region of Jordan. These teachers have a degree in special education and childhood education. The measures of the study, the Arabic CBM Maze instructions translation, and reliability are described in the following sections.

*The Arabic language GPA.* The Arabic GPA reflects a student's ability on three basic Arabic skills: reading (word reading and reading comprehension), writing, and spelling in the accredited Arabic curriculum in Jordan. The Arabic GPA is a numeric average of all grades achieved in classes at a given school semester. The purpose of GPA is to provide a barometer as to overall performance of a student in his or her classes, as well as create a system that allows for comparisons between students, and a class ranking system. In the Jordanian educational system, students are ordered and assigned a numerical rank against their peers based on their GPA, starting with number 100 for the student with the highest GPA and 0 for students with the lowest GPA. The rubric for the Arabic GPA is excellent (90-100), very good (80-89), good (70-79), satisfactory (60-69), minimal pass (50-59), and failure (< 50). In this research, the mean Arabic GPA of the high achievers was 89.9 with a range of 86 to 98 and standard deviation of 4.50. For moderate achievers, the mean was 78.7 with a range of 70 to 85 and standard deviation of 4.33. The mean was 61.9 with a range of 50 to 69 and standard deviation of 6.52 for low achievers.

*Translating the CBM Maze instructions into Arabic.* The researcher used appropriate translation procedures (Brislin, 1986) prior to administer the Arabic CBM Maze to a sample of Jordanian students. First, two native speakers of Arabic, who were also fluent in English, independently translated the CBM Maze instructions into Arabic. Second, a back translation of the Arabic version into English by a bilingual resident of the United States who is fluent in both English and Arabic languages was conducted. Third, all translators reached a reconciliation of the forward-backward translations. Finally, a pretest was conducted with a convenience sample of 15 fourth grade students to assess ease of comprehension, possible ambiguities, and alternative administration wording.

*The CBM Maze probes.* The content of the probes were selected from several literature-based reading series used in the educational system in Jordan as supplementary materials to the accredited curriculum of fourth grade. Using a table of random numbers to select page numbers within books, potential passages were examined and excluded if they contained excessive dialogues, poetry, plays or many unusual or foreign names. Moreover, all probes were partially vowelized just like the accredited curriculum that students are exposed to. Then a pool of probes was selected by the author and the Arabic curriculum specialist who works in the curriculum department in the Ministry of Education in Jordan.

Each probe includes approximately 300 words. Researchers have tried to reduce variability in individual students' data due to passage difficulty by using readability formulas to measure text difficulty (Griffiths, VanDerHeyden, Skokut, & Lilles, 2009). In this study, the researcher used the Spache formula to reduce the variance of the scores on the Arabic CBM Maze (Good & Kaminski, 2002). This formula considers difficulty of vocabulary and sentence length. In addition, all probes were given to three university's instructors and three teachers in the field to judge the difficulty of grammar and word order. Their suggestions were taken into consideration to make the final version of the probes (see "Appendix" for the Arabic CBM Maze sample). The procedure was identical to the one used with English CBM Maze probes.

To save set-up time and obtain a more accurate score, three equivalent probes of the Arabic CBM Maze materials were administered to the group of students in one testing session. The median score of these three probes were used to provide the valid data point on the student's performance. The researchers counted the total number of responses attempted in three minutes and the total number of errors then subtracts the total number of errors from the total number attempted. Their performance is then based on the Words Correctly Restored (WCR) score (Hosp et al., 2007). To establish test-retest reliability, other three equivalent probes of the Arabic CBM Maze materials were administered to the same group of students in the second day and the median scores were used to represent their performance.

*Procedural and inter-rater reliabilities.* To ensure consistency of testing administration across the CBM probes, the researchers read from scripts and used timers. The fidelity of testing administration was tested by using a detailed checklist to ensure each test was administered as it was intended and described in the manuals of the CBM testing (Hosp et al., 2007). Procedural reliability was obtained during 100% of testing sessions with an average reliability of 100 percent. The teachers scored each CBM Maze probe and entered the data into an excel sheet. The researcher checked randomly 30% of the scoring sheets. The average inter-rater reliability of scoring fidelity data was 99% (range 98%-100%). In terms of data entry reliability, all of the excel data (100%) were checked against the paper scores and all discrepancies were resolved by examining the original protocols.

## Results

### *Preliminary Data Analysis*

First of all, to improve the shape of the distributions, the responses of outliers whose scores were  $\pm 2$  standard deviation or more from the group mean were replaced by a value equal to the next highest non-outlier-score plus 1 unit of measurement (Tabachnick & Fidell, 2001). Table 1 presents the descriptive analysis included calculating the means, standard deviations, and percentile ranks among high achievers, moderate achievers, low achievers and all achievers of the Arabic CBM Maze performance in WCR. This descriptive information was helpful in understanding the data and making initial inferences on the differences among all groups. Descriptive statistics also allowed providing visual graphs that facilitated more convenient presentation of the data. Graph 1 displays the average performance of the Arabic CBM Maze of the three students' levels. In general, the preliminary results indicate differences among all groups. A closer inspection of the data analysis that addressed study's questions is followed.

**Figure 1. Graphic display of the mean performance on the CBM Maze measure reported in Words Correctly Restored in three minutes.**

**Table 1. Descriptive Information of the CBM Maze Performance in WCR for All Groups**

Group	Number of Students	Range	M	SD	Percentile	
High Achievers	50	23-32	27.4	2.06	90%	30
					75%	29
					50%	27.5
					25%	26
					10%	24.1
Moderate Achievers	50	13-24	18.48	2.74	90%	22
					75%	21
					50%	18
					25%	16.75
					10%	14.10
Low Achievers	50	4-13	8.84	2.34	90%	11.90
					75%	10
					50%	9
					25%	7
					10%	5.10
All Achievers (Students)	150	4-32	18.24	7.96	90%	29
					75%	22
					50%	15
					25%	10
					10%	6.10

Note. WCR = Words Correctly Restored; M = Mean; SD = Standard Deviation.

#### *The Arabic CBM Maze Test-Retest Reliability*

The median baselines scores of the students' performance on the two consecutive days were correlated to establish test-retest reliability. The correlations coefficients were .84, .85, .83, and .89 for low achievers, moderate achievers, high achievers, and all achievers respectively. These resulting coefficients are large enough to demonstrate that the Arabic CBM Maze has acceptable test-retest reliability. In addition, The Standard Error of Measurements (SEMs), reported in Table 2, can be used to estimate the confidence interval that surround a particular CBM Maze score. The SEM is based on the formula  $SEM = \frac{SD}{\sqrt{r}}$ ; (SD-Standard Deviation and r- reliability) and establishes a zone within which an individual's true score probably lies. The smaller the SEM, the more confidence one can have in the test's results. Arabic CBM Maze has small SEMs (range from .84 to 1); examiners can use it with confidence.

**Table 2. Test-Retest Reliability and SEMs for the Arabic CBM Maze**

Grade Level of Sample	First Testing		Second Testing		<i>r</i>	SEMs
	M	SD	M	SD		
<b>High (n = 50)</b>	27.40	2.06	28.26	1.92	.83	.84
<b>Moderate (n = 50)</b>	18.48	2.74	18.72	3.09	.85	1
<b>Low (n = 50)</b>	8.84	2.34	9.54	2.30	.84	.93
<b>All Achievers (n = 150)</b>	18.24	7.96	18.84	8.05	.89	.87

Note. M = Mean; SD = Standard Deviation; r = Correlation Coefficient; SEMs= Standard Errors of Measurement.

#### *The Relationship between the Arabic CBM Maze and the Arabic GPA*

The Arabic CBM Maze scores were correlated with the Arabic GPA for all participants and in all levels. All of the coefficients were statistically significant at the  $p < .05$  level. They range in magnitude from moderate (for moderate achievers) to large (for all achievers). The correlations coefficients were .40, .32, .35, and .81 for low achievers, moderate achievers, high achievers, and all achievers respectively.

### *The Average Arabic CBM Maze Differences among Three Levels of Achievers*

To explore differences among the three levels of achievers, one-way independent Analysis of Variance (ANOVA) was performed. All assumptions of performing ANOVA were examined. No violations of normality and homogeneity of variance were detected. The variances were equal for all three groups,  $F(2, 147) = 2.73, p > .05$ . There were significant differences among the three groups of achievers in terms of their CBM Maze scores,  $F(2, 147) = 749.27, p < .001, \omega = .90$ . In addition, there was a significant linear trend,  $F(1, 147) = 1497.80, p < .001, \omega = .90$ , indicating that as the level of achievement increased, the CBM Maze increased proportionately.

### **Discussion**

The primary purpose of this study was to broaden the knowledge base regarding the applicability of the CBM Maze assessments in Arabic language with Jordanian students. Very rigorous steps were performed to assure the accurate translation of the CBM Maze instructions. In addition, procedures were taken to assure that all Arabic CBM Maze probes were equivalent in difficulty. It can be concluded that compared to the CBM Maze from AIMS web (2008), Jordanian students restored fewer number of correct words. This can be attributed to the fact that speed reading within three minutes is a new practice for them. It may be the case that the culture-related content of the literary works had an effect on the students' reading scores. In addition, some characteristics of the Arabic system may result in great difficulty for children reading Arabic. Most of these factors or characteristics are related to the orthographic features of Arabic language (for review see Abu Rabia, 2002; Abu Rabia & Siegel, 2002; Breznitz, 2004). The study's questions will be discussed in the following sections.

### *The Arabic CBM Maze Reliability*

The Arabic CBM Maze reliability was investigated by procedural, inter-rater, and test-retest reliabilities. The resulting coefficients were very high for procedural and inter-rater reliabilities. Although test-retest reliability is high enough as well, a sizable proportion of the variance in scores was attributable to overall mean differences in performance across probes, most likely reflecting differences in difficulty across probes. These findings mirror reliability coefficients for the CBM maze presented in previous research (Shin et al., 2000). In addition, very small SEMs were detected in this study which leads to the conclusion that the Arabic CBM Maze scores are consistent across a short period of time and across different examiners.

### *The Relationship between the Arabic CBM Maze and the Arabic GPA*

Although the Arabic GPA cannot be considered a standardized assessment due to the certain degree of subjective judgment that teachers should make about students reading ability, the use of it was imperative since no standardized assessment was existed in Arabic to be used for the purpose of the study. Examinations of criterion validity between the Arabic GPA and the Arabic CBM Maze yielded interesting results because relationships were significant and high when merge all level of achievers. The significant correlation between the Arabic CBM Maze and the Arabic GPA aligns with previous research documentation of correlations existing between this measure and standardized assessments (Fewster & Macmillan, 2002; Fore et al., 2007; Shin et al., 2000). Predicting student performance on Arabic competency tests of achievement is critical. More efficient measures such as the Arabic CBM Maze that provide similar information can be an extremely valuable tool for teachers. The results of this study indicated that the Arabic CBM Maze can be used to inform language outcome that including reading comprehension for students in fourth grade. These results support other researchers' assertions that an important relationship exists between academic language proficiency and reading skill acquisition (e.g., Thomas & Collier, 2002).

### *The Use of Arabic CBM Maze as Universal Screening Tool*

In this research, significant differences were found among the three groups of achievers in terms of their Arabic CBM Maze scores. In addition, there was a significant linear trend indicating that as the level of achievement increased, the Arabic CBM Maze increased proportionately. This study suggests that the existing Arabic CBM Maze measure may be adequate when group administration is necessary or desirable for universal screening so long as multiple probes are collected per occasion to rank the students and identify students who will struggle in reading.

In conclusion, the CBM Maze has been shown to be a valid and reliable measurement of reading skills in elementary-, middle-, and high-school students (Brown-Chidsey et al., 2003; Espin & Foegen, 1996; Fuchs & Fuchs, 1992; Miura-Wayman et al., 2007; Shinn et al., 2000). In this line, the results of this

research have indicated that the Arabic CBM Maze has adequate technical characteristics. Arabic CBM Maze has been found to correlate with fourth students' Arabic GPA and can be used as universal screening tool to identify exceptional students who are far behind or far ahead of classmates in reading comprehension.

#### *Limitations, Future Research, and Implications*

This study has several limitations that should be considered. First, data were only collected on fourth-grade students; consequently, the generalizability of findings to other grades is unknown. Second, the sample size was relatively small and came from public school district. Third, the study examined concurrent relationships at one point in time. Future studies would need to be conducted that examined related validity factors such as sensitivity to progress and predictive validity. Additional development and field testing of the Arabic CBM Maze probes is recommended prior to more widespread use of the CBM Maze for absolute decisions (e.g., comparing specific scores to cutoffs or progress monitoring for individual students). Future research should further compare the instruments with other student populations to evaluate superiority with regard to efficiency in administration and scoring and to predicting high-stakes outcomes.

Teachers are challenged to meet the wide range of needs of an increasingly diverse student body while at the same time ensuring that all are progressing toward high academic standards. It is thus critical that they have the means to identify students who are not making sufficient progress toward those standards and to make instructional decisions based on technically sound data. This study indicates that the CBM Maze, which has been demonstrated to be reliable and valid measures for many students who speak English, also shows promise in measuring reading comprehension in Arabic. Teachers in the Arab world should consider other valid and reliable assessment tools such as CBM Maze for use in both general and special education systems. Particularly important aspects of CBM Maze for use in Arabic speaking countries are the ease of administration, the low cost, and the reliability of the measure.

#### **Appendix. Sample of the Arabic CBM Maze Probe**

وادي الجواهر  
في إحدى الرحلات البحرية للسندباد هبَّت على السفينة التي كانت تحملهُ عاصفةٌ شديدةٌ، ولم يتمكن (صاحبُ، قائدُ، صانعُ) السفينة والبخارة من السيطرة عليها، فقدفَّتهم (الرياحُ، الغيومُ، الأمواجُ) العالية إلى ساحل جزيرة بعيدة، فنزلوا فيها، وكانت (سماؤها، أرضها، ماؤها) مغطاةً بالأشجار. وسار السندباد بين (المنازل، الأشجار، الصخور) بعيداً عن الآخرين، فرأى شجرة غريبة، فأكل من (أغصانها، أوراقها، ثمارها) دون أن يعلم أن هذه الثمار تسبب النوم، فراح في (نوم، نشاط، حزن) عميق. أفاق السندباد بعد نوم طويل، فركض نحو (الجبال، الزمال، الشاطئ) مدعوراً، فلم يجد السفينة وبقي وحيداً في هذه (الجزيرة، القرية، المدينة) الموحشة، ولما حل الظلام زاد خوفه، ولكنه لم ييأس، وواصل (الأكل، النوم، السير)، ولما أدرك التعب نام.

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## WHAT IS BEHIND THE DIAGNOSIS OF LEARNING DISABILITY IN AUSTRIAN SCHOOLS? AN EMPIRICAL EVALUATION OF THE RESULTS OF THE DIAGNOSTIC PROCESS

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*Every school system has to deal with children with Learning Disabilities (LD). However, the concepts of LD, the assessment procedures, the diagnostic criteria as well as their interpretation vary widely from country to country. What they usually seem to have in common is that general cognitive abilities, as measured by standardized IQ tests, are seen as an important aspect of the label.. In Austrian schools the diagnosis of LD is largely based on expert opinions provided by special education teachers. The diagnostic procedure is quite unregulated and open to individual interpretation. As a rule, standardized tests are not used in this connection. In the present study the characteristics of children with a diagnosis of LD are evaluated in terms of standardized testing. Thirty-seven pupils diagnosed as having LD and 136 regular school children were assessed at the end of the 5<sup>th</sup> grade in Austrian schools using standardized tests of intelligence, reading, writing and arithmetic skills and questionnaires regarding social integration in class, emotional integration in school and cultural capital of their families. Compared with a group of pupils without LD, matched for IQ and age, the LD children showed significantly worse basic arithmetic and reading skills, inferior social integration in class and lower familial cultural capital. A stepwise logistic regression analysis indicated that poor basic arithmetic and reading skills were the strongest predictors of having a diagnosis of LD. Other variables, including IQ, had significantly less weight. The results are seen as indication of the fact that precise guidelines for diagnosing LD in the school system and a transition to a system of evidence-based allocation of resources are urgently needed.*

The construct of Learning Disabilities (LD) refers to children who have significant academic difficulties in school, for which neither other disabilities (e.g. sensory impairment, mental retardation or emotional and behavioral disorders) nor lack of schooling can be found as a cause (Lloyd, Keller & Hung, 2007). In almost all school systems, these children are labeled with Special Educational Needs (SEN) to give them a legal right for additional assistance and support in school. Within the population of pupils with SEN children with LD form the largest group. However, due to the fact that the diagnosis of LD is at first glance not caused by somatic-medical reasons, but rather by the specific criteria of a given school system, the diagnosis of LD is under a constant legitimacy pressure.

The specific concepts of LD vary widely from country to country. Thus the size of the population of children with LD is also different in any given country (Sideridis, 2007). In the US, for example, 5% of the entire student population belongs to the group of students with LD, whereas in Germany only 2.6 % of the entire populations of schoolchildren are diagnosed as having LD (Hallahan, Lloyd, Kauffman,



Weiss & Martinez, 2005; KMK, 2010). In addition, the OECD categorizes pupils for its country comparisons in three groups. Pupils with disabilities are categorized in group (A), pupils with learning difficulties are assigned to group (B) and pupils with disadvantages to group (C). This differentiation implies that children with disabilities can be found in group A, children with specific learning difficulties or severe to moderate learning problems belong to group B and finally group C consists of children who are disadvantaged due to social or economical circumstances. 5.7% of all schoolchildren in the US and 2.2% of all pupils in Germany were recognized under the heading of specific learning difficulties. Furthermore, pupils with severe to moderate learning problems count for 1.4% of the entire population of schoolchildren in the US and for only 0.6 % in Germany (OECD, 2007).

But not only the definitions of LD are different from country to country, there is also considerable variability concerning the assessment procedures and the diagnostic criteria which lead to the diagnosis of SEN in general and of LD in particular. In some countries the diagnostic decisions are based on relatively explicit and well defined guidelines (e.g. discrepancy model in US), in others the assessment procedures in the school system are only very vaguely defined (e.g. Germany and Austria). Traditionally in German speaking countries a below average IQ was considered as most effective diagnostic criterion of LD, since this allowed a general *objective* assessment of the cognitive performance of a child without a school reference (Grünke, 2004). However, since the 1970's, IQ testing is seen increasingly critically (Bundschuh, 2010) especially by teachers and educational practitioners. As a result, IQ is no longer used as sole indicator of LD in present governmental recommendations in Germany nor in Austria. Nevertheless, many researchers still regard low intellectual abilities as the most important aspect of a diagnosis of LD (Kretschmann, 2006) and recommend the administration of a language-free IQ test in addition to standardized academic achievement tests as part of the diagnostic process (Kany & Schöler, 2009; Kottmann, 2006). The discrepancy model is only applied to the diagnosis of Dyslexia or Dyscalculia in German speaking countries. Children with LD were excluded from the discrepancy model because their abilities are generally below average. An allocation of *SEN-Lernen* (i.e. the official recognition of LD by the school system and thereof the allocation of special educational resources to the school) is only given to children with severe learning difficulties (Schröder, 2008; Klauer & Lauth, 1997). Other disabilities (e.g. sensory impairment, mental retardation or neurological problems) or a lack of schooling have to be ruled out as causes of the problems (Lloyd et al., 2007).

Information about the school career of children diagnosed with LD in German speaking countries is rather sparse. A handful of empirical studies were carried out in order to explore further the school performance of children who were diagnosed with *SEN-Lernen*. In secondary school the children usually show a delay in school achievements of at least two years compared to children of the same age without SEN (Haeberlin, Bless, Moser & Klaghofer, 1991). This is confirmed by present cross-sectional studies (Tent, Witt, Bürger & Zschoche-Lieberum, 1991; Wocken, 2000, 2005). In Germany, seventh grade pupils in special schools for children with *SEN-Lernen* did not even accomplish the requirements of fifth grade in a general-education secondary school (Hauptschule) (Wocken, 2000).

A further characteristic of pupils with LD is their problematic social position. In fact, specific characteristics like social marginalization or migration background, respectively, are important confounding factors (Schröder, 2005, Huber, 2006). It is therefore not astonishing that in Germany in addition to IQ and school performance of the children, a lower social and educational status of the parents was found to be a strong predictor of LD as well (Wocken, 2000).

#### *The situation in Austria*

Historically the Austrian special education school system developed quite similar to the German one. However, during the last two centuries the school system in Austria was explicitly shaped into the direction of inclusive education of pupils with SEN. Today, about 51,2 % of all children with SEN are educated in integrative settings in regular schools. Austria has thus an integration rate which is comparable to the rates of England (50.3%), Finland (53%) and Poland (53,2%) (European Agency, 2010). However, it is important to note that the integration rate differs considerably between the nine federal states of Austria. In Styria, for example, the integration rate is about 80%, whereas in lower Austria it is only around 20% (Statistik Austria, 2010).

The Austrian system differentiates primarily between pupils with and without SEN. In contrast to Germany, the distinction between different types of SEN is only made on the basis of different curricula, which the SEN children are assigned to. So, children with LD have to be assigned to a *general special education curriculum* (Allgemeine Sonderschule) (Feyerer, 2009). Therefore, statistical data concerning

the prevalence of LD in Austrian schools is hardly available and the prevalence can only be estimated at 1.5 – 2% (Buchner & Gebhardt, 2011). Conventionally, SEN are diagnosed by a special education teacher usually in the first or second year of elementary school (Volksschule). Only in some special cases and only with consent of the parents this is complemented by an expert opinion of a school psychologist. As a result IQ tests are hardly ever used in the process of diagnosing LD in Austria. Usually the diagnosis is based on performance deficits in math and German language which are observed and described by the special education teacher. If the parents of the child are in agreement with the diagnosis, the school gets extra funding and resources for the child with LD.

In the 5<sup>th</sup> grade a further assessment is done and, moreover, a reclassification of the curriculum, which the child is assigned to, is possible. Over the next years in secondary school the classification of the child usually remains stable until the end of schooling. Due to the diagnosis of SEN resources for additional support are again allocated to the school. These resources determine the class placement, curriculum mapping and instructional methods as well. One of the key aspects, however, is the fact that the number of pupils with SEN has a significant impact on the available resources for a given class and school.

In regular classes with three to five pupils with SEN an additional special education teacher is employed full time. If there are less than three pupils with SEN in a regular class an additional support teacher is employed only on an hourly basis. The average time this support teacher is paid per pupil with SEN depends on the type of disability. In case of LD and behavioural difficulties the support teacher can spend in class four hours weekly per pupil with SEN. In case of physical disabilities six hours (but only as long as the physical disability goes along with an impairment of educability), for children with sensory disabilities 8 hours and for children with cognitive disabilities 10 hours per week are paid.

Finally, the size of *integrative classes* (i.e. the regular classes which are also attended by pupils with SEN), differs in the federal states of Austria. In Carinthia, for example, the maximum class size is 19 in primary and 21 in secondary school. In contrast, in Styria the recommended number of pupils per class is 24 in primary and 25 in secondary school. So, in average, an integrative class in a secondary school in Styria (where our empirical study was carried out) consists of five pupils with SEN and 20 pupils without SEN.

#### *Research objective*

At the moment little is known about the achievements and school performance of Austrian pupils with LD. In order to obtain a more accurate empirical impression of the performance profile of pupils with LD the present study examined pupils in the fifth grade. As mentioned above, this is the relevant age after which the diagnosis of SEN usually remains stable until the end of schooling. The present study tries to examine in what respect pupils with LD differ from pupils without LD. The first research objective of the present study was to answer the question how pupils with a diagnosis of LD differ from pupils without LD apart from IQ. In the second step it was planned to develop a model of retrospectively explaining the diagnosis of LD on the basis of the results of psychometric tests or questionnaires. It was assumed that primarily IQ together with school achievement in math, reading and spelling should play an important role in this context. Furthermore, the children's social integration in class and the cultural capital of their families of origin were expected to make further important contributions.

#### **Method**

In 2010, 96 pupils with SEN visited the fifth grade of public schools in Graz/Austria (Landesschulrat für Steiermark, 2011). Of these, 43 pupils (45%) were examined in the present study. 37 out of these 43 pupils had been diagnosed with LD and were now taught according to the *general special education curriculum* (Allgemeine Sonderschule). Eight pupils with LD attended the only remaining special school in Graz, the other 29 pupils attended eight integrative classes in regular secondary schools together with 144 pupils without SEN. The average number of pupils per class was 23, in which four to six pupils with SEN were included. The pupils with LD in integrative classes spent an average of  $M = 22.55$  hours per week in inclusive settings and  $M = 4.41$  hours per week in segregated settings.

The school testing took place over two days and only those pupils were included in the data analysis who had completed all components of the examination. Consequently, only 125 pupils without disabilities and 32 pupils with LD could be included in the analysis. 60% of the pupils' disabilities had already been diagnosed in the first grade. Migration background of the pupils (at least one parent born abroad) was very prevalent in the whole sample, regardless of SEN, with approximately 41%.

### *Instruments*

The psychometric tests CFT20-R, ELFE 1-6, SLRT II, HSP, ERT 4+ & FDI 4-6 were used in the study. The Culture Fair Intelligence Test CFT20-R (Weiß, 2008) is a language-free intelligence test that measures the basic intelligence of children from the age of 8.5 to 19 years. Individuals with low proficiency in German are not disadvantaged by the testing tasks. It is applicable as a group test ( $r_{tt} = .80$ ).

The Reading Comprehension Test for First to Sixth Graders ELFE 1-6 (Lenhard & Schneider, 2006) measures reading comprehension. In doing so, basic reading strategies as well as the ability to understand sentences ( $\alpha = .92$ ) and texts ( $\alpha = .97$ ) can be determined. From the Salzburg Reading- und Writing-Test SLRT II (Moll & Landerl, 2010) only the one minute reading subtest was used. This test constitutes an individual reading test that specifically examines decoding speed of words ( $\alpha = .90$ ) and pseudo-words ( $\alpha = .98$ ).

The Hamburg-Writing-Test HSP 1-9 (May & Malitzky, 1999) examines strategies of writing of pupils from the first to ninth grade. The number of correct graphemes is used as raw score ( $\alpha = .92$ ).

The Eggenberg Calculation Test ERT 4+ (Schaupp, Holzer & Lenart, 2010) measures the arithmetic skills of children from fourth to fifth grade. From this test the Basic Arithmetic Scale ( $\alpha = .82$ ) was used. The Basic Arithmetic Scale assesses the calculation abilities regarding addition, subtraction, multiplication and division.

The questionnaire FDI 4-6 (Häberlin et al., 1991) measures the degree of social integration in class (e.g. *I'm very happy with my classmates*) and emotional integration in school (e.g. *I like going to school*). The questionnaire was evaluated in a Swiss survey of pupils from fifth to sixth grade ( $\alpha = .89$ ;  $\alpha = .93$ ). Additionally, in order to get an estimation of the cultural capital of their families of origin, the children were asked to rate the number of books in the households of their families and teachers were asked to estimate the hours of inclusive schooling and to name the type of SEN of a specific pupil.

### **Results**

In order to control for IQ and age, the first analysis was performed on the basis of matched pairs. 26 pupils with a diagnosis of LD and 26 pupils without LD but with comparable IQ and age were assigned pairwise. Six pupils with LD had to be excluded from the analysis due to the lack of control pupils with comparably low IQ.

The age correlation of the *twins* in the two resulting groups was  $r = .85$  and the IQ correlation was  $r = .98$ . Although they had quite comparable IQs, pupils with LD performed significantly worse in mathematics, reading fluency, reading comprehension and spelling than their twins without LD. Moreover, the number of books was lower in the homes of pupils with LD than in homes of the control children. In terms of social integration, pupils with LD reported feeling less socially integrated in class. With regard to emotional integration in school the two groups did not differ significantly. In order to provide a general overview, the mean scores of the twin pairs as well as the means of all pupils without LD are presented in Table 1. In all measures of academic performance the means of the children with LD were significantly lower than the means of their test twins without LD.

In order to estimate the relative weight of these variables as (retrospective) predictors of a diagnosis of LD, a stepwise logistic regression analysis was performed according to the procedure proposed by DeMaris (1995). Initially this method was mainly used in epidemiological research, but it is now increasingly often applied in research on children with special needs (e.g. Shifrer, Muller und Callahan, 2010; Ihle & Esser, 2008). A logistic regression analysis was chosen due to the fact that the dependent variable was dichotomous (pupils with diagnosed LD versus pupils without a diagnosis of LD). The potential predictors were: Gender (females: 1, males: 2), age, number of books in household, cognitive abilities (IQ), reading comprehension, decoding speed of words, correctly written graphemes, basic arithmetic skills and degree of reported social integration in class and emotional integration in school.

In the stepwise procedure four significant models emerged. The first model already yielded an overall percentage of 90.5% correct assignments, which increased in the fourth model up to 92.4 %. Overall, the models explained a large proportion of variance (model 1: Nagelkerkes  $R^2 = .537$  and model 4: Nagelkerkes  $R^2 = .692$ ). The Hosmer-Lemeshow test was not significant at any stage, hence, the regression model appears to be well calibrated (Backhaus, Erichson, Plinke & Weiber, 2008). The

predictors basic arithmetic, reading comprehension, cognitive abilities and social integration in class were included in the regression model, whereas the rest of the predictors showed no (further) detectable effect. As can be seen in table 2 poor basic arithmetic and reading skills were the strongest predictors of having a diagnosis of LD. Other variables, including low IQ, had significantly less weight.

**Table 1: Comparison of Pupils With and Without LD by Means of One-Sample T-Tests**

	Paired sample		<i>t</i>	<i>df</i>	All pupils without SEN
	Pupils with LD	Regular pupils			
Age	11.93 (0.76)	11.79 (0.85)	-1.650	25	11.48 (0.74)
IQ	78.15 (9.46)	79.54 (8.81)	3.363***	25	93.96 (11.93)
Basic Arithmetic	3.65 (2.76)	7.73 (3.03)	5.025***	25	8.47 (2.79)
Reading Comprehension set	10.38 (4.82)	14.50 (4.84)	3.512***	25	15.62 (4.38)
Reading Comprehension text	7.31 (3.03)	10.85 (3.86)	3.628***	25	12.72 (3.91)
Word-decoding	53.92 (19.27)	77.73 (24.95)	4.243***	25	75.87 (21.23)
Pseudoword-decoding	38.38 (13.03)	50.88 (13.78)	4.170***	25	48.37 (13.50)
Graphem (Spelling)	223.35 (35.70)	258.50 (39.61)	3.275***	25	261.74 (22.65)
Number of books	2.20 (1.04)	2.96 (1.31)	2.618**	24	3.16 (1.13)
Emotional integration	26.22 (16.01)	29.50 (17.15)	.633	25	27.40 (15.71)
Social integration	33.50 (9.98)	40.92 (10.12)	2.581**	25	41.44 (10.21)

Note. \*\* =  $p < .01$ , \*\*\* =  $p < .001$ . Standard deviations appear in parentheses below means.

**Table 2: Stepwise Logistic Regression Models for the Prediction of Having a Diagnosis of LD**

Variable	Model				<i>SE(b)</i>	<i>Exp(b)</i>
	1 <i>b</i>	2 <i>b</i>	3 <i>b</i>	4 <i>b</i>		
Basic Arithmetic	-.667**	-.547**	-.434**	-.430**	.138	.651
Reading Comprehension text		-.265**	-.218**	-.206**	.088	.814
IQ			-.071*	-.072*	.031	.930
Social integration				-.071*	.030	.931
Model $\chi^2$	66.67**	80.50**	86.70**	92.73**		
df	1	2	3	4		

All model chi-squares are significant

\* $p < .05$ , \*\* $p < .01$

## Discussion

In previous publications, especially from German speaking countries, low general cognitive abilities, as measured by IQ-tests, are usually seen as the most important criterion for assigning pupils to *SEN-Lernen* (Kany & Schöler, 2009; Kottmann, 2006; Kretschmann, 2006). Therefore, it was quite surprising, that (for the pairwise comparisons) in our sample for nearly all LD children (with only a few exceptions) control children with comparable IQs but without a diagnosis of SEN could be found. In other words, almost the same number of children with relatively low IQs could be found in both groups, a first indication of the fact that general cognitive abilities obviously did not constitute the utterly important difference between children diagnosed with LD and regular schoolchildren. Moreover, the observed differences in school performance between the test twins were not at all expected and strikingly large. In this pairwise comparison the LD children showed not only significantly worse school performances, especially in math and reading, they also felt less well socially integrated in their classes and came from

families with lower cultural capital, although their intelligence and age were quite similar to the control children without SEN.

These impressions were finally confirmed by the results of the regression analysis. Again, the most important predictors of having a diagnosis of LD were poor school performance in basic arithmetic and reading comprehension. In contrast, the predictors *IQ* and *social integration* were far less important and *number of books* did not even appear in the significant regression models.

In sum, the results of the present study seem to indicate that the usual diagnostic procedure in the Austrian school system leads to a diagnosis of LD primarily on the basis of poor school performance in math and reading, regardless of the actual cognitive abilities of a child. With regard to educational assessment in Austrian schools it thus seems, that not very much progress has been achieved during the last 100 years, because already at the turn of the 19<sup>th</sup> to the 20<sup>th</sup> century children who failed to learn were assigned on the basis of their poor school performance to *special classes for backward children* (Hilfsklassen). However, today a wide variety of standardized educational diagnostic tools is available, by which not only the school performance of a child but also his or her cognitive abilities and other relevant aspects could reliably be evaluated. The achievements, advantages and benefits of modern educational testing still are largely ignored by the Austrian educational system.

Moreover, the introduction of reliable and valid school performance tests would provide the opportunity to evaluate and document the school progress of pupils with and without SEN. Additionally, the results of these tests would provide teachers with more detailed information in order to provide optimal support for the children. Furthermore, it would be useful to introduce and implement a *response to intervention* (RTI) model in the school systems of German speaking countries as well (Gresham & Vellutino, 2010). This would be in particular important due to the fact that the support of children with SEN currently does not take place in the context of evidence-based programs.

However, it is important to emphasize that the results of the present study cannot be generalized without caution. This is mainly due to the fact that our sample contains a relatively high proportion of children with migration background and from socially disadvantaged families, compared to the rest of Austria. As always, further empirical studies are urgently needed.

### Conclusion

To sum up, as long as the SEN of specific pupils are assigned primarily on the basis of poor school performance and subsequently determine the allocation of resources to the schools, the diagnosis of SEN will remain an instrument for schools that often seems to be more concerned with resource allocation than with optimal support for the children. Thus usually the child with SEN is identified during the first or second year in school. If a child once is associated with this diagnosis he or she usually will not lose this label (and the resource gaining status for the school) until the end of the school time. According to the results of the present study, a transition to a system of evidence-based allocation of resources appears to be urgently needed.

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