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Maternal History of Childhood Maltreatment and Children's Cognitive and Social Development.

B.J. Zvara¹, M. Burchinal² [Family Life Project Key Contributors]

¹Gillings School of Global Public Health, The University of North Carolina at Chapel Hill

²Frank Porter Graham Child Development Institute, The University of North Carolina at Chapel Hill

Abstract

A growing literature provides evidence of long-term effects of childhood sexual trauma (CST), however the intergenerational consequences of CST are not well understood. In the current study we examine the adjustment of children whose mothers reported a history of CST compared to children whose mothers did not report childhood trauma across multiple domains of functioning. Data for these analyses were obtained from a longitudinal study of low-income, rural families. Propensity score matching (PSM) methodology was used to create a contrast group matched on maternal family of origin variables in an effort to isolate and examine the long-term associations of maternal CST history beyond the effects of other childhood adversities such as poverty (total $N = 204$). After controlling for numerous child and primary caregiver covariates, findings indicate that a maternal history of CST is related to higher levels of teacher reports of behavioral problems and academic skills in the classroom setting in Kindergarten and First grade. This study adds to the growing literature on the effects of maternal CST on offspring development. Implications for interventions with children with mothers reporting a history of CST and directions for future study are proposed.

Keywords

Maternal childhood trauma; offspring development; propensity score matching; social competence; cognitive development

Childhood sexual trauma (CST) results in significant and long-lasting consequences for the victim (Putnam, 2003; Banyard, 1997). Women with CST histories report numerous psychosocial problems in adulthood including elevated rates of depression and depressive symptoms (Cry, McDuff, & Wright, 2006; Briere & Elliot 1994). Many women with CST histories report problems parenting and nurturing their children (Trickett, Noll, & Putnam, 2011; DiLillo, Giuffre, Tremblay, & Peterson, 2000; Zvara, Mills-Koonce, Carmody, & Cox, 2015). There is increasing evidence that maternal history of CST places the next generation at risk for maladaptive developmental outcomes (Roberts, O'Connor, Dunn, Golding, 2004; Collishaw, Dunn, O'Connor, Golding, 2007; Zvara, Mills-Koonce, Carmody, & Cox, 2017). Much of this research suggests a mediational pathway linking maternal CST to behavior problems and conduct disorders (Roberts, et al., 2004; Zvara et al., 2017) through parenting behavior, parenting stress, and maternal mental health. Despite the growing interest reflected

in the literature, the field of study has numerous limitations, including sampling, because much of the prior research has come from clinical samples or samples of convenience (DiLillo, 2001), thereby weakening the generalizability of the results. In the current study, a propensity matched design was used to extend current knowledge and understanding of adjustment of children whose mothers reported a history of CST compared to children whose mothers did not report childhood trauma.

There is robust evidence that children with better socioemotional adjustment and rudimentary academic skills at school entry may be better poised for later success (Duncan et al., 2007; Sabol & Pianta, 2012). This body of work supports the premise that home environments characterized as responsive and nurturing to child needs, lay the foundation to achieve language milestones (Landry, Smith, Swank, Assel, & Vellet, 2001), score higher on cognitive tests (Landry, Smith, Swank, & Miller-Loncar, 2000), develop better social skills (Calkins, Smith, Gill, & Johnson, 1998), and have fewer emotional and behavior problems (Goldberg, Corter, Lojkasek, & Minde, 1990). This may be problematic for children of mothers reporting a history of CST given elevated rates of depression and parenting difficulties among women with trauma histories. However, despite the growing interest in the development of offspring of mothers with CST histories, little is known or understood about the school adjustment for children of CST survivors. In the current study, we examine socioemotional and cognitive development in middle childhood, a period when children are transitioning to formal schooling and must adjust to the demands of classroom routines (Pianta, Rimm-Kaufman, & Cox, 1999). Given the multiple risk factors to children whose mothers report a history of CST, it is likely that they may be at greater risk for early school difficulties, however, these associations have not been well examined.

Furthermore, much of the current research examining the relations between maternal history CST and offspring adjustment has centered on two developmental stages, infancy/toddlerhood and in adolescence and far less attention has been on other stages of adjustment such as early school aged children. Middle childhood, defined as a period between ages six to 12, are also critical years that carry long-lasting influence (Weisner, 1984). This developmental stage, as children transition to formal schooling, is marked by adaptation to the demands of classroom settings, negotiating academic skills, and building peer relationships. Although early research posited middle childhood as a dormant period (Long, Henderson, & Ziller, 1967), recent advances in neuroscience suggest that during this developmental period, the brain is actively undergoing synaptic pruning, which is a process whereby some areas are enhanced, while others are selectively diminished (For review, See, Mah & Ford-Jones, 2012; Knudsen 2004), reflecting a processes of gradual consolidation of abilities and behaviors. Research further supports that this process is heavily dependent on the child's environment (Fox, Levitt & Nelson, 2010; Feldman, & Knudsen, 1998).

Proximal Influences on Child Development

Social competence refers to a constellation of skills and behaviors that children need for successful social adaptation including the ability to successfully and independently engage in social interactions, establish, and maintain relationships with others (Rose-Krasnor, 1997). This key developmental challenge presents itself in children's relationships with

family members, peers, and teachers. Social competence is believed to be necessary to succeed in both academic and non-academic settings (McClelland, Morrison, & Holmes, 2005; Mendez, Fantuzzo, & Cicchetti, 2002). Socially competent children tend to have better interactions with teachers (Goble, Hanish, Martin, Eggum-Wilkens, Foster, & Fabes, 2016; Hamre & Pianta, 2001) and less likely rejected by peers (Kupersmidt, Burchinal, & Patterson, 1995; Buhs & Ladd, 2001). Indeed, withdrawal from peers in the classroom setting was associated with inattention, passivity, and lack of motivation for learning activities, whereas more positive play interactions with peers was associated with more active engagement in the classroom learning activities (Coolahan, Fantuzzo, Mendez, & McDermott, 2000). These findings suggest that emotional dysregulation and difficulty relating to peers in the early school years may be predictive of long-term problematic outcomes including greater behavioral problems, academic difficulties, and higher dropout rates (Burchinal et al., 2006; Webster-Stratton & Reid, 2004).

Similarly, there is growing evidence that children with language deficits and general knowledge often experience problems gaining acceptance and avoiding rejection by peers (Pentimonti, Murphy, Justice, Logan, & Kaderavek, 2016). The ability to communicate effectively aides children in understanding play activities with peers (Birch & Ladd, 1997). Further, evidence supports the premise that social competence and academic skills are related (Graziano, Reavis, Keane, & Calkins, 2007) with findings suggesting that behavior problems undermine academic achievement and vice versa across childhood and into adolescence (Masten et al., 2005).

Despite the clinical and research interest in the development children whose mothers report a history of childhood trauma, much of the existing literature examining an intergenerational consequence of CST examined childhood maltreatment more broadly (i.e., physical abuse, neglect) (Noll, 2008; Zuravin and Fontanella 1999). Although limited, existing research provides evidence that having a mother with a history of CST leaves children at increased risk for maladjustment including behavior problems (Collishaw et al., 2007; Roberts et al., 2004; Zvara et al., 2017) as reported by mothers. What is not yet known is if maternal trauma history is related to elevated risk for learning deficits for children. This is particularly important given evidence achievement gaps as early as in Kindergarten forecast poorer performance throughout the academic and life trajectory (Alexander, Entwisle, & Dauber, 1993; Baydar, Brooks-Gunn, Furstenberg, 1993; Duncan et al., 2007; Gutman, Sameroff, & Cole, 2003) and that early gaps in achievement tend to increase over time (Alexander, Entwisle, & Olson, 2001). Given that approximately one if five women in the United States report a history of CST, understanding the classroom experiences of children with mothers reporting CST has important implications for therapeutic intervention.

Moreover, although there is increasing interest in understanding the relations between maternal history of CST and offspring adjustment, the current body of knowledge is correlational in nature. A randomized controlled trial would allow for causal inference, but the very nature of CST would make it impossible to use a randomized trial methodology to study the effects of maternal CST on offspring. However, the use of econometric quasi-experimental methods, including propensity score analysis have the potential to minimize selection bias allowing for stronger causal inference. This statistical approach was developed

by Rosenbaum and Rubin (1983) to draw causal inferences from observational data. The central premise of propensity score matching (PSM) is identifying a “treatment” (e.g., CST history or No CST history). It then matches the treated and the untreated on a variety of background and individual characteristics, thus achieving statistically what randomization to treatment and control conditions would achieve by design.

Current Study

The current study sought to address a significant gap in the literature on the associations between maternal CST and offspring adjustment in the classroom setting. Using novel statistical methods, we examined whether a maternal history of CST was related to their child’s (a) social competence and (b) cognitive development at school entry. This study is among the first to test the associations between maternal childhood trauma history and offspring adjustment using a quasi-experimental design and has the potential to provide key information to inform targeted interventions.

Data and Method

Participants and Procedures

For the current analyses we used a subsample from the Family Life Project (FLP), a longitudinal study of low-income families, recruited from two areas of rural poverty, Southeast North Carolina and the Appalachian Mountains in Central Pennsylvania. A birth cohort of 1,292 families enrolled in the FLP by completing the first home visit when the family’s infant was two months old. Of these, 144 biological mothers reported that they had experienced childhood sexual trauma at or before the age of 14. We used propensity score matching procedures to create a contrast group of families based on carefully chosen covariates (the procedures for the propensity matching are described in greater detail in the analysis plan). Briefly, women who reported CST (as assessed by the Trauma History Interview, Green, 1996) were matched on mothers’ childhood demographic variables from the family of origin to a group of women (controls) who did not report a history of CST ($n = 204$). Data for the matching procedures were collected from home visits at child age 2-, 36- and 58- months old. At the Kindergarten and First grade assessments, teachers completed questionnaires about the child’s academic and social competence in the classroom setting, via a secure online survey site.

Measures

Trauma history questionnaire.—At either the 36- or 58-month home visit, all participants in the FLP study completed the THQ (Green, 1996) depending on time restriction for the visit. Participants only completed the THQ once. A 24-item self-report measure, THQ examines experiences with potentially traumatic events, such as crime, general disaster, and sexual and physical assault, using a yes/no format. For each event endorsed, respondents were asked to provide the frequency of the event, their age at the time the event occurred, and the nature of their relationship with the abuser. For the purposes of this study, the item relating to sexual abuse/assault asked, ‘Has anyone ever done something sexual to you against your will, such as made you have intercourse, oral or anal sex, touched

private parts of your body, or made you touch theirs, or otherwise forced you to have unwanted sexual contact?" If answered yes, follow-up questions asked about the age at the time of the sexual trauma, frequency, and relationship of the victim to the perpetrator.

Child socioemotional development.—Using a secure online survey site, teachers were asked to complete questionnaires to assess socioemotional development of the child in the FLP study. To get a more comprehensive assessment of social; competence, we used two questionnaires. The *Social Competence Scale* (SCS; Conduct Problems Prevention Research Group, 2002), is a 12-item teacher-reported measure which asks respondents to rate on a seven-point likert-type scale (where 1 = *Almost Never* and 6 = *Almost Always*) the frequency with which the child exhibited a number of behaviors over the previous 6 months. For the current study, we used three of the subscales, emotion regulation, oppositional behavior, and prosocial skills. Example items include "copes well with disappointment or frustration" (emotion regulation subscale), and "listens to other people's point of view" (prosocial skills subscale). Higher scores on these subscales indicate greater competence. Cronbach's alphas for the social competence subscales were as follows: emotion regulation .83, prosocial behavior .93, aggressive/oppositional Behavior .93.

The child's teacher also completed the *Strengths and Difficulties Questionnaire* (SDQ; Goodman, 2001), a 25-item emotional and behavioral screening questionnaire designed to assess the psychosocial adjustment of children. Teachers were presented with a list of statements and were asked to rate on a three-point likert-type scale (where 0 = *Not True* and 2 = *Certainly True*) how true that statement was of the child's behavior over the last six months. The peer problems and conduct problems subscales were used in the current study. Example items "rather solitary, tends to play alone", for peer problems and "often has temper tantrums or hot tempers" for conduct problems. Cronbach's alphas for peer problems and conduct problems at the grade 1 visit were $\alpha = .80$, and $\alpha = .84$, respectively.

Child academic skills.—To get a broad assessment of academic ability, we used five indicators from two measures of academic skills, the Woodcock-Johnson Psycho-Educational Battery III (WJ-III; Woodcock, McGrew, & Mather, 2001) and the Test of Preschool Early Literacy (TOPEL; Lonigan, Wagner, Torgeson, & Rashotte, 2007). The WJ-III psycho-educational battery is a nationally-normed, individually administered test of academic achievement. The norm-referenced tests assess students' cognitive abilities, aptitudes, and academic achievement and that were designed to be representative of the US population from ages 24 months to 90+ years. For this study, we used standard scores for three tests of academic achievement: Letter-Word Identification, which assesses basic reading skills; Applied Problems, which assesses basic math skills; and Picture Vocabulary, which assesses expressive language skills. All tests within the WJ-III battery have been shown high levels of reliability (α 's of .80 or higher) and validity (Woodcock et al., 2001). We also used two indicators from the TOPEL (Test of Preschool Early Literacy), a norm-referenced test that was designed to identify young children who may be at risk for literacy problems which was administered to all children in the FLP at the Kindergarten school assessment. For this study, we used the Phonological Awareness and Print Knowledge subtests. The Phonological Awareness subtest is a 27-item test that assesses children's

ability to manipulate sounds, such as saying what is left after specific sounds are dropped from a word or combining separate sounds to form a word (Cronbach's $\alpha = .69$). The Print Knowledge subtest is a 36-item test that assesses children's ability to identify specific letters and to associate letters and sounds (Cronbach's $\alpha = .62$).

Covariates.—For the current study we report two sets of covariates. First, to generate the propensity matched sample, we used maternal report of family of origin demographics variables. The selection of matching variables for the PSM were chosen based on theoretical and empirical considerations. Children with verified sexual trauma histories often come from home environments that can be characterized as having a lack of economic resources, parents with a low level of education, and adverse environmental conditions such as social isolation (Erickson & Egeland, 2002; Ethier, Couture, & Lacharité, 2004). Thus, the covariates for the PSM procedures included maternal childhood demographic information including whether the participants' family of origin received AFDC (Aid to Families with Dependent Children), food stamps, or Medicaid or lived in public housing. Mothers' education level from the family of origin and additional trauma's experienced in childhood (e.g., physical abuse) were used as the matching variables. By controlling for additional maltreatment and trauma experiences of childhood through the matching procedures, we were able to isolate the effects of CST. Details of matching procedures have been previously published (Zvara et al., 2015).

Second, for the analyses examining group differences for offspring of mothers with and without CST histories, we included a broad range of covariates that were found in the previous research to be associated with child socioemotional and cognitive development (Bradley & Corwyn, 2002; McLoyd, 1990; Dodge & Pettit, 2003). Covariates included family's income-to-needs ratio, maternal education, race and child sex. Given that the overwhelming majority of African American families resided in one study site, study location was also included as a covariate to address a potential confound between site and ethnicity.

Data Analyses Plan

The analyses were conducted in three stages. First, we used propensity matching procedures to create two groups of mothers with and without CST histories. The second step was to assess the quality of the matching procedures using diagnostic statistical tests that reflect the similarity or balance across the two groups. The next stage of the analysis plan for this study was to explore group differences between children whose mothers reported CST history and the contrast group for teacher reports of social competence and academic skills. All hypotheses regarding group differences for children's social competence and academic skills were tested using MANOVA to draw inferences about the correlation between the groups. All tests were run with $\alpha = .05$ and were performed using SPSS (version 19.0).

Results

Preliminary Analyses

As previously reported (Zvara et al., 2015) the PSM yielded a sample of 204 mothers 105 with CST histories matched to 99 mothers without trauma histories. Although all 144 women reporting CST were entered into the PSM procedures, thirty-nine (39) of these participants did not have exact matches with women in the not abused group, and thus were not included in the final subsample for this analysis. The final subsample for the current study after completion of the PSM procedures was (n=204) 105 who experienced childhood sexual trauma matched to 99 women who did not, with similar background experiences.

In all, we ran two diagnostic tests to examine the validity of the PSM procedures. The results of the diagnostic tests suggested that the matching methods performed well at reducing the standardized mean difference with each covariate when compared to the unmatched data (Table 1). Meaning, that based on the selected covariates, the two groups are more similar to each other than with the larger sample (i.e., the full FLP sample from which the comparison group was drawn). A second diagnostic test was with the use of logistic regression. All matching variables were regressed on childhood trauma history. There were no significant differences between the groups post-matching on any of these variables. This means that, based on childhood family of origin variables, the two groups were statistically not different from each other leaving childhood sexual trauma (yes or no) as the one differentiator among those variables considered.

Descriptive Statistics

The children in the CST group were 50% male and 50% African American and in the not CST (NCST) group were 49% male and 44% African American. Independent sample t-tests (see Table 2) indicated no significant difference between the two groups with regard to maternal age or maternal education, but the NCST group had significantly lower 5–54 month mean income-to-needs ratio, $t(204) = 2.53, p < .001$.

MANOVA Results on Child Outcomes.

Social Competence.—The MANOVA tested group differences on the Social Competence Scale measures of emotional regulation, prosocial behaviors and oppositional behaviors and SDQ measures of peer problems and conduct problems. Control variables included maternal education and race, income to needs, child and sex and study location (table 3). The overall model indicated significant CST group differences on the social competence measures, $F(5, 89) = 2.57, p < .05$; Wilkes Lambda = .90; Partial eta squared = .10. Review of the findings revealed that Levene's test of equality of error variances were non-significant for all dependent variables. With a significant MANOVA, the individual ANOVAs were examined for CST group differences. Findings suggest that children whose mothers reported CST, were reported to exhibit greater oppositional behavior ($(\beta = .33, p < .05)$, $F(1, 89) = 5.7, p < .05$); peer problems, ($(\beta = .14, p < .05)$, $F(1, 89) = 4.3, p < .05$); and conduct problems, ($(\beta = .28, p < .01)$, $F(1, 89) = 10.0, p < .01$).

Cognitive and Academic Skills.—The MANOVA tested group differences with regards to cognitive development, using WJ Picture Vocabulary, WJ Test AP Applied Problems, TOPEL Phonological, and TOPEL print Knowledge as the dependent variables of interest. The MANOVA indicated CST group differences, $F(5, 79) = 2.8, p < .05$; Wilkes Lambda = .87; Partial eta squared = .13. Review of the findings revealed that Levene's test of equality of error variances were non-significant for all dependent variables. With significant MANOVA group differences, the individual ANOVAs were examined. The CST group had lower vocabulary scores on Picture Vocabulary test than did the NCST group ($\beta = .49, p < .05, F(1, 147) = 5.7, p < .05$), but the two groups did not reliably differ on the other measures of academic skills at school entry.

Discussion

There is growing evidence to support the hypothesis that CST is associated with consequences across the lifespan (Briere & Jordan, 2009; Cicchetti & Toth, 2005; Briere & Runtz, 1990). Less well understood is how the impact of maternal CST history exerts its influence on the next generation. The current study adds to the body of evidence that children of mothers with trauma histories may be at risk for developmental difficulties across domains of functioning necessary for school success. Methodologically, this study has several strengths. By using a large sample of mothers with extensive data, we were able to employ propensity matching techniques to create groups of children whose mothers had similar family of origin backgrounds but differed on whether they reported a history of CST. Using measure of psychological adjustment and cognitive and academic skills collected from teachers, this study adds additional rigor to the study of CST and its potential impact across generations.

This study extends the current research on the relations between maternal history of CST by demonstrating that maternal childhood trauma history is associated with significant risk to the social and cognitive development of children whose mothers report a history of CST. Overall, children with mothers reporting a history of CST manifested more problems in social competence than did children in the control group. Specifically, after controlling for numerous child and family factors, including maternal education, race, household income-to-needs, child sex, and study site, children whose mother reported CST were observed by their teachers to show more aggressive and oppositional behavior, conduct problems, and have difficulties with peer relationships. Moreover, children in the CST group were also reported by teachers as having scored lower on the picture vocabulary scores of the Woodcock-Johnson (WJ-III). When considered against the backdrop of the larger literature on school readiness and achievement gaps, the findings from this study suggest that children of mothers with CST histories may be at elevated risk for difficulties in the classroom setting and learning deficits. Given evidence that early difficulties in social and academic capabilities tend to increase over time (Alexander et al., 2001), the findings from this study would suggest that intervention and prevention efforts focused on mothers with CST histories should be expanded to include children.

These findings may best be interpreted within the larger literature on developmental psychopathology that has shown that family environmental characteristics such as parenting

behavior and parental depression are among the strongest predictors of social and cognitive adjustment in young children (NICHD Early Child Care Research Network, 1999). Given the existing evidence that mothers with trauma histories report greater depression and parenting problems (Briere & Elliot 1994; Cry et al., 2006; Zvara et al., 2015), it is likely that mothers in the CST group may engage in behaviors that impact children's development by not providing the support, scaffolding, modeling necessary for children to acquire competency in these skills. Given previous work by Landry et al., (2001) suggesting that consistent and predictable caregiving facilitates children's engagement with the learning and social environment, it may be that mothers struggling with own emotional states may be limited in their capacity to foster a warm, stimulating, and enriching environment for her child.

The growing evidence that middle childhood is a key developmental period during which children master and consolidate skills critical for school success provides an opportunity to identify areas for targeted intervention to mitigate the effects of maternal psychopathology. This brings into focus to the need for developmental models to understand the complex mediating influences on children's successful adaptation to the school environment, particularly for children whose mothers report a history of CST. Given the substantial number of children impacted by maternal trauma history, early intervention in schools, aimed at enhancing self-regulatory and social skills may benefit children across multiple domains. There is consistent evidence that behavior problems and academic success are related, with more recent reports suggesting a bidirectional relationship between the two (Kremer, Flower, Huang, & Vaughn, 2016; Morgan, Farkas, Tufis, and Sperline, 2008). This would suggest children's social behavior can promote or undermine their academic skills and their academic success may have implications for their behavior, as well as their opportunities to develop social relationships and skills. Identifying young children whose mothers report a history of CST and providing targeted interventions to increase picture and word knowledge may improve academic performance, both in the short and long term.

Limitations and future directions

Overall, this study has several strengths including the large sample size, teacher report of child outcomes that may be less biased by maternal psychopathology, and the use of propensity matched sampling techniques to create groups of children whose mothers did/did not report a history of CST, while controlling for additional maltreatment and trauma as well as other experiences of childhood adversity that may confound the experience of CST. Despite these strengths, there are several limitations that warrant note. This is a cross sectional study of children whose mothers did/did not report a history of CST limiting inferences about causality between maternal CST history and child development. We relied on retrospective reports of CST, and the passage of time may alter participants' recollections of the past (Goodman et al., 2003). It is also possible that some women may have chosen not to report their CST histories in the context of a research study. Therefore, it is possible that, within our control group, there may be women who experienced CST but did not report it.

Looking ahead, many important questions remain about the explanatory mechanisms involved in the transmission of risk for offspring of maltreated mothers. In order to fully

understand the associations between maternal CST and social competence and academic skills of offspring, future work should explore parent behavior, stress, and depressive symptoms, as they relate to child outcomes, specifically the role of parent behavior in mediating the association between CST and child adjustment. Importantly, given previous findings by Landry et al., (2001) that consistency of care is related to optimal adjustment, examining risk factors across early childhood may be particularly in identifying risk factors.

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Table 1
Balance Checking Before and After Propensity Matching for Abused and Not Abused Sample

Matching	Before			After Matching		
	SMD	p-value		SMD	p-value	% reduction in bias
Childhood Demographics of the Mother						
Received Aid to Dependent Children	.019	.35		-.029	.32	12%
Received food stamps	.15	.07		.03	.44	24%
Received Medicaid	.05	.09		-.06	.14	22%
Received public housing	.05	.004		-.017	.54	17%
Mother education (from family of origin)	-.35	.002		-.19	.40	4.5%
*Other trauma before age 14	.04	.006		-.02	.37	6.5%

Note.

SMD: Standardized mean difference;

* traumas other than sexual abuse (e.g., physical abuse) were summed and used as a covariate in the matching procedures.

Table 2

Means and Standard deviations of the all variables of interest

	CST (N=105) M (sd)	NCST (N=99) M(sd)
Maternal and Household Characteristics		
Maternal Age	25.5 (5.2)	26.1 (5.4)
Income to needs	1.40 (1.13)	2.10 (2.56)
Maternal education	14.1 (2.9)	14.5 (2.6)
Socioemotional Development Subscales		
Emotion Regulation	3.4 (.95)	3.4 (.75)
Aggression/Oppositional Behavior	3.8 (1.02)	3.84 (.92)
Prosocial Behaviors	2.72 (.89)	2.46 (.73)
Conduct problem	.54 (.49)	.24 (.30)
Peer Problems	.47 (.49)	.31 (.31)
Cognitive Development Subscales		
Picture Vocabulary	99.03 (10.2)	97.5 (10.7)
Applied Problems	100.1 (15.5)	101.6 (14.7)
Letter Word Identification	106.4 (12.9)	108.0 (13.1)
Phonological Knowledge	10.4 (15.2)	98.7 (18.2)
Print Knowledge	108.8 (8.4)	107.6 (10.1)

Table 3
Summary of a One-way Between Groups Multivariate Analysis of Variance (N= 204)

Dependent Variables	β	SE	Wilks L	df	F	P
Multivariate Models						
Social Competence at grade 1			.90	5,89	2.57 *	$P < .05$
Overall Model						
Emotion regulation	.001	.16		1,89	.810	.37
Aggression/oppositional	.33	.15		1,89	5.74 *	.02
Prosocial behaviors	.13	.19		1,89	.233	.63
Peer problems	.14	.07		1,89	4.28 *	.04
Conduct problems	.28	.08		1,89	10.0 **	.00
Cognitive Development at grade 1						
Overall Model			.89	5,79	2.76	$P < .05$
Picture vocabulary	.49	.21		1,88	4.08	.04
Applied problems	.43	.31		1,88	.296	.59
Letter-Word Identification	.19	.27		1,88	.414	.10
Print knowledge	.22	.21		1,88	.423	.52
Phonological	.27	.34		1,88	.558	.46

Note.

* $p < .05$,

** $p < .01$,

*** $p < .001$.