



## Types and timing of child maltreatment and early school success: A population-based investigation

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### ABSTRACT

The purpose of the present study was to investigate the prevalence of types of child maltreatment and co-occurring risks in an entire county population of children in public education and to examine the unique relations of the child maltreatment types and timing on children's early academic success while accounting for the children's multiple-risk context. A cohort of 11,835 second grade students who were born in the county and attended the public school district served as participants. Information on first reported experiences of substantiated physical abuse, neglect, unsubstantiated child maltreatment reports, health, maternal, and social risks, and academic and behavioral outcomes was obtained and linked through a county-wide integrated data system. Results indicated that after controlling for demographics and the set of other risks, substantiated child neglect and unsubstantiated reports were associated with poorer outcomes than physical abuse. Also, first substantiated child maltreatment and unsubstantiated reports prior to kindergarten were related to a more comprehensive set of poor outcomes than post-kindergarten first reports. The differential patterns that emerged for the association between age of first reported maltreatment by type and educational outcomes were discussed with implications for future research and policy.

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### 1. Introduction

The 2003 reauthorized Keeping Children Safe Act [CAPTA; P.L. 108–36, 2003] emphasizes the importance of cross-system collaboration for promoting the well-being of child victims of maltreatment. This emphasis is urgently needed for the largest group of maltreated children, children 0–7 years, who are disproportionately at high risk for poor developmental and educational outcomes. Of the nearly 900,000 children who were victims of a substantiated allegation of child abuse or neglect in the US in 2008, over 50% of them were between the ages of 0–7 years (U.S. Department of Health and Human Services, 2010). Moreover, the likelihood of poor developmental and educational outcomes of these young children in the protective service system is further intensified by other known risks associated with maltreatment (Barth et al., 2007).

Recent studies have documented the co-occurrence of child maltreatment with different specific health, maternal, or social risks. A handful of studies have demonstrated high rates of co-occurrence between health risks and child maltreatment. Young children in the child welfare system disproportionately live in neighborhoods that are high in lead toxicity (Jones-Harden, 2007) and between 40 and 60% of

them have experienced birth risks (poor prenatal care, low birth weight, or premature birth) (Needell & Barth, 1998; Rouse & Fantuzzo, 2009; Jones-Harden, 2007; Wulczyn, 1994). Studies have also indicated a high co-occurrence between child maltreatment and maternal risk factors. Children who have been maltreated are more likely than their peers to have been born to a teenage mother or a mother with less than a high school education (Barth et al., 2007). Finally, a growing body of research has documented the co-occurrence between various social risks and child maltreatment. One of the most commonly cited co-occurring social risks is poverty (Berrick, Needell, Barth, & Jonson-Reid, 1998; McGuinness & Schneider, 2007; Rouse & Fantuzzo, 2009). Estimates for the co-occurrence of this risk with maltreatment range from 58% to 81% (Rouse & Fantuzzo, 2009; Wodarski, Kurtz, Gaudin, & Howing, 1990). Additionally, young maltreated children are also disproportionately more likely to experience major disruptions such as homelessness or out-of-home placement (Culhane, Webb, Grim, Metraux, & Culhane, 2003; Park, Metraux, & Culhane, 2004; Rouse & Fantuzzo, 2009).

The *America's Cradle to Prison Pipeline* report by the Children's Defense Fund (2009), highlights the constellation of risks experienced by young children who experience maltreatment. They note how these risks jeopardize children's early school success and place them on a pathway toward school drop-out and incarceration. Altering this trajectory requires identifying and intervening at key developmental points to prevent early school failure. A body of studies has found that

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children with histories of child maltreatment evidence poor early academic achievement in reading, language, and mathematics (Allen & Oliver, 1982; Crozier & Barth, 2005; Eckenrode, Laird, & Doris, 1993; Hildyard & Wolfe, 2002; Kendall-Tackett & Eckenrode, 1996; Kurtz, Gaudin, Wodarski, & Howing, 1993; Kinard, 1999; Reyome, 1993; Rouse & Fantuzzo, 2009; Stone, 2007; Wodarski et al., 1990; Wulczyn, Barth, Yuan, Harden, & Landsverk, 2005). Additionally, experiences of child maltreatment are associated with poor social and behavioral adjustment to school. These children are more likely than their peers to evidence poor social skills and classroom behavior problems (Kurtz et al., 1993; Reyome, 1993; Rouse & Fantuzzo, 2009; Wodarski et al., 1990). Experiences of maltreatment are also associated with high rates of school suspensions (Eckenrode et al., 1993; Rouse & Fantuzzo, 2009) and high rates of truancy (Rouse & Fantuzzo, 2009).

This body of research linking child maltreatment and various risks to early school failure is limited by key factors that reduce its ability to inform cross-agency policy and practice. Very few studies have simultaneously accounted for the many risks that young maltreated children experience when trying to determine the unique effects of maltreatment on educational outcomes. Given the documented high co-occurrence of other known risk factors with child maltreatment, it is critical to examine the unique risk that maltreatment poses to early school success within a multiple risk context. Additionally, many studies investigating child maltreatment rely heavily on parental self-report to determine a child's involvement with multiple service systems. Parents are asked to recall the specifics of their involvement with the child welfare system – including when it started and what services were provided and why the child received these services. However, as noted by Jonson-Reid and Drake (2008), parents have difficulty in accurately recalling the nature and timing of service provision – limiting the reliability and validity of the data. Finally, many studies are not conducted using truly representative samples, or adequate comparison groups. Some studies compare groups of children who experienced different types of maltreatment; while others do not include any comparison group. This is important because without a representative sample or an appropriate comparison group, it is not possible to know whether adverse school success outcomes are associated with maltreatment experiences or with other un-measured characteristics of the sampling population – typically there are no non-reported children in the research sample and they are rarely population-based.

The National Survey of Child and Adolescent Well-Being (NSCAW; NSCAW Research Group, 2002) longitudinal study was conceived to provide a more comprehensive look at children in the child welfare system. This longitudinal study is following a nationally representative sample of children who are in the child welfare system to examine how their experiences in the system relate to their development and well-being. This study extends the prior research by employing a nationally representative sample of children, and by measuring indicators across time. However, while the study is based on a representative population of children in the child welfare system, *it does not include a comparison group of children not in the child welfare system* (NSCAW Research Group, 2002; Waldfogel, 2000). Additionally, data for this study are primarily based on self-report data collected in parent interviews and the interview participants were recruited across many states and counties that have different definitions of substantiated child maltreatment (NSCAW Research Group, 2002; Jonson-Reid & Drake, 2008). Finally, there is only limited information collected on the multiple risk factors that young children with histories of maltreatment have experienced and these come from self-report (NSCAW Research Group, 2002). Addressing these limitations requires research informed by a comprehensive conceptual framework that integrates knowledge across systems for policy relevant populations.

The purpose of the present study was to use a developmental epidemiology conceptual framework to investigate the prevalence of child maltreatment and co-occurring risks in an entire county's

population of children in public education and to examine the unique relations of the child maltreatment type and timing on children's early academic success accounting for children's multiple-risk context. This framework integrates aspects of developmental science to understand the relations of multiple risk factors, event-specific characteristics (such as timing and type), as well as the critical nature of early proximal relationships on child development (Bronfenbrenner, 2005). The epidemiological components of the framework emphasize the use of population-based data collected by key frontline sentinels in existing public surveillance systems to discover the prevalence and effects of hypothesized risks that occur in the population at low-frequencies (Buka & Lipsett, 1994).

Increasingly, integrated administrative data-systems are being recognized as a viable capacity for conducting research guided by a developmental epidemiological model on children in public child welfare systems (Cicchetti, 2004; Jonson-Reid & Drake, 2008). These systems address the challenges of self-report data by making use of data that are routinely collected by frontline public health sentinels working directly with children and families. Furthermore, since public health and educational sentinels are charged with collecting data on *all of the children* they work with, these data are collected for entire populations of children (rather than samples of children receiving only protective services) – making them representative of the whole population of children. Finally, as noted by Jonson-Reid and Drake (2008), integrating administrative datasets across systems can provide the capacity for understanding children's risk experiences in context. For example, integrating child welfare data with public shelter utilization data and birth record data can provide information on whether a child involved with the child welfare system was also involved in the public housing system, and whether or not the child experienced any known birth risks. Of particular importance is connecting early care and *public education* data systems which have been historically disconnected.

The present study made use of the Kids Integrated Data System (KIDS). KIDS is an existing system that was developed through a collaboration between a university, county municipal agencies, a county public school district, and a local foundation. This data system systematically integrates administrative data that have been readied for research use from county agencies, including the public child welfare system, public shelter system, public health system, and public education. A dataset constructed through KIDS was used to answer the three major research questions of the present study. First, what was the prevalence of substantiated child physical abuse, child neglect, and unsubstantiated abuse reports within an entire cohort of second grade children in the county's public school district? Second, what was the co-occurrence of child physical abuse, child neglect, and unsubstantiated abuse reports with other health, maternal, and social risk factors? Third, what was the relation of type of maltreatment by age of first reported occurrence with second grade academic achievement and academic engagement behaviors, controlling for demographics and publically monitored maternal, health, and social risk factors?

## 2. Methods

### 2.1. Participants

The present study was conducted in a large northeastern county with an entire cohort of second grade children enrolled in a large public school system serving the county. The criteria for inclusion in the study were: (a) enrollment in the public school system in second grade during the academic school year; (b) born in the municipality; and (c) complete data for at least one of the primary outcome measures. There were 11,835 students who were born in the municipality and enrolled in 2nd grade during the academic year. The number of students who had complete data for the 2nd-grade outcomes ranged from 10,344 to 11,835. Thus, the subset of 10,349 children contained complete data

for all outcomes. Children were equally distributed between males (51.6%) and females (49.4%), with an average age of 8.5 years (SD .52) at the end of second grade. Sixty-seven percent were African American, 15% Caucasian, 14% Hispanic, and 4% Asian or Other. This group was not demographically different from the 2nd grade cohort.

## 2.2. Procedure

The Kids Integrated Data System was used to integrate municipal services data for the study cohort of second-grade students (KIDS; Fantuzzo, Culhane, Rouse, Bloom, & Roig, 2006). This system allowed for individual-level data integration across all relevant municipal agencies that maintain archival, administrative records on children and youth, ages 0 to 21 years. As such, researchers were able to obtain children's entire histories of involvement with public service agencies from birth through the end of second grade. A Memorandum of Understanding between the City, State, and the University provides guidelines for data access to ensure confidentiality standards. KIDS employs advanced technical methods to ensure data quality and integrity. Complex computer algorithms are used to match individuals and services across systems over time. Data management includes reliability and validity auditing of all data elements as well as the maintenance of data standards for quality.

For the present study, a linked dataset of the Department of Public Health (DPH), Department of Human Services (DHS), Office of Supportive Housing (OSH), and the School District was obtained. All identifying information, such as names, addresses, etc., were used solely for matching purposes and the final dataset was stripped of identifiers other than identification numbers. After the matching was completed, individual level data on each child were then extracted using identification numbers and appended to the core dataset. The final dataset was stripped of all identifiers and contained information on birth records, maternal education, substantiated child maltreatment, family homeless experience, family poverty, and educational outcomes. Thus, a large dataset was formed that contained information on birth records, maternal education, family homeless experiences, family poverty, child maltreatment, out-of-home placement, and academic educational outcomes for each child.

The matching process used to link the data into an integrated dataset was completed using a personal computer and *Link-King Software* (2000). Data from each of the participating agencies were standardized prior to the matching process. Additionally, duplicate records were eliminated from each dataset prior to matching. Probabilistic and deterministic matching algorithms were used to link children across the datasets. Link-King software was used to create 'unique identifiers' that were matched probabilistically across data systems (Whalen, Pepitone, Graver, & Busch, 2000). Scores were generated for each pair of records indicating the likelihood of an accurate match. Matches that did not meet thresholds for accuracy were manually checked and errors corrected. Deterministic matching procedures were also used. This process involved identifying specific cutoff criteria to determine a "quality" match – such as requiring at least 75% of the name string to match. If matches were not reconciled through these methods, the record was deleted. Once the matching process was completed, observations for which there were possible false positive errors were identified. These observations comprised less than 1% of all matches in each dataset and were manually cross-referenced across each of the datasets to ensure accuracy. Only children with complete birth records were included in the final dataset.

## 2.3. Measures

### 2.3.1. Teen mother

The Department of Public Health provided information on the mother's age at the time of the child's birth from children's birth

records. A binary variable was created to classify children as having been born to a teen mother. Children whose mother was 19 years old or younger at the time of their birth were identified as having been born to a teen mother.

### 2.3.2. Low maternal education

The Department of Public Health provided information from children's birth records on the mother's education level at the time of the child's birth. The number of years of education completed by the child's mother at the time of birth was collected from these records. A binary variable was created to classify children as having a mother with less than a high school education. Low-maternal education was indicated for children whose mothers were at least 18 years old and had completed less than 12 years of formal schooling at the time of the child's birth.

### 2.3.3. Elevated lead

Lead data were provided by the Department of Public Health. A binary variable was created to determine whether or not the child had tested positive for elevated blood lead levels (EBLL). The standards used by the Center for Disease Control were used to classify whether or not a child had screened positive for EBLL. Given that each child could be screened multiple times for EBLL, if he/she was found to have  $\geq 10 \mu\text{g/dL}$  during any screening, the child was identified as having an elevated EBLL – and coded as having experienced this risk factor. If a child never tested positive for elevated EBLL, he or she was coded as not being at risk.

### 2.3.4. Inadequate prenatal care

Prenatal care data were provided by the Department of Public Health through their birth data records. A binary variable was created to classify children as having received inadequate prenatal care. Children identified as having received no prenatal care, prenatal care only in the third trimester, or fewer than four prenatal visits were considered to have received inadequate prenatal care.

### 2.3.5. Poverty

Children were defined as having had an experience of poverty if they received a free or reduced school lunch. These data were recorded in a dataset maintained by the School District. A binary variable was created to determine the presence or absence of poverty. Children identified as qualifying for a free or reduced lunch either in second grade or in a prior year were considered to have experienced poverty.

### 2.3.6. Homeless experience

Homeless experience is defined as whether or not the child had ever been placed in a homeless shelter. Information regarding children's homeless experiences was collected by both OSH and DHS. A binary variable was created to determine the presence or absence of homeless experience. If a child's parent was identified within the OSH database or a child was identified as having been placed in a DHS-funded homeless shelter, the child was considered to have had a homeless experience.

### 2.3.7. Out-of-home placement

Out-of-home placement was identified using data provided by DHS. DHS maintains a database of all placement services that are paid for by the Agency. There are five types of out-of-home placement services provided by DHS: kinship care, foster care, group home care, institutional care, and supervised independent living. A binary variable was created to determine the presence or absence of out-of-home placement experience. Children with a history of at least one placement in kinship care, foster care, group home care, or non-homeless shelter institutional care by the end of second grade were considered to have experienced the risk factor of out-of-home placement.

### 2.3.8. Maltreatment type

DHS also provided data on child maltreatment type and age at time of report. DHS maintains a database tracking system that archives each allegation of child maltreatment. Substantiated child maltreatment allegations are designated by a Child Protective Services (CPS) or General Services Report (GPS) that is substantiated, indicated, or founded based on the state definition of child maltreatment. Unsubstantiated child maltreatment allegations are designated by a CPS or GPS identified as unsubstantiated, unfounded, or not-indicated. Using the Child Maltreatment Coding System developed by Shonk and Cicchetti (2001), substantiated allegations were classified by type (physical abuse and neglect). Then, four variables were created to document children's first substantiated allegation by type and age of occurrence (Pre-K Physical Abuse; Pre-K Neglect; Post-K Physical Abuse; Post-K Neglect). Additionally, two binary variables were created to document whether or not a child had *only* had unsubstantiated reports of child maltreatment prior to kindergarten (Pre-K Unsubstantiated) or post-kindergarten (Post-K Unsubstantiated). Children with only documented reports of unsubstantiated child maltreatment and no history of substantiated abuse were documented as having experienced unsubstantiated child maltreatment.

### 2.3.9. Academic achievement

The TerraNova, Second Edition (CTB/McGraw-Hill, 1997) is a group-administered achievement test considered to be among the most reliable and valid of all standardized achievement tests; it is also known as the California Achievement Tests, Sixth Edition. Standard scores are provided across two subtests related to reading; reading and language. Standard scores were also provided for math and science subtests. The TerraNova was nationally standardized on a stratified sample of 114,312 students (grades 1–12) from 778 school districts during the fall of 1999 and another 149,798 students (grades K–12) in the spring of 2000. Stratification variables included geographic region, urbanicity, socioeconomic status, and special needs. The TerraNova demonstrates acceptable internal consistency, with Kuder–Richardson Formula 20 coefficients for all subtests and total scores ranging from the mid 80s to 90s. Extensive validity work has been conducted on the TerraNova. Items were carefully reviewed to ensure adequate content validity, comparisons with the Test of Cognitive Skills, Second Edition and with InView (CTB/McGraw-Hill, 2001) indicate evidence of construct validity, and correlations between subtests and total scores support criterion-related validity. For the present study, TerraNova scores on each of the subtests were dichotomized at the 15th percentile. Children scoring below the fifteenth percentile were coded as 'at risk' for inadequate school performance. Children performing at or above the 15th percentile were coded as having adequate school achievement.

### 2.3.10. Academic engagement

All academic engagement data were provided by the School District. The *Learning Behaviors Performance Assessment (LBPA)* is a teacher evaluation of children's learning behaviors within the classroom. There are eleven items rated on a scale ranging from 1 (*Improvement Needed*) to 3 (*Competent*). These items included, for example, "follows directions", "asks for help when necessary", and "contributes information to class discussions". Performance scores across all eleven variables were averaged to create composite scores. Each composite score was then standardized using the entire cohort of second grade performance assessments (N = 16,271). Internal consistency was demonstrated for LBPA ( $r = .90, p < .001$ ). Criterion-referenced validity for LBPA was established with the Learning Behaviors Scale (LBS; Stott, McDermott, Green, & Francis, 1988) ( $r = .48, p < .0001$ ). For the present study, LBPA scores were dichotomized at the 15th percentile. Children scoring below the fifteenth percentile were coded as 'at risk' for inadequate academic engagement. Children scoring at or above the 15th percentile were coded as having adequate academic engagement.

The *Social Skills Performance Assessment (SSPA)* is similar in format to the LBPA and consists of nine items. Items included, for example, 'works cooperatively with others', 'displays a positive attitude' and 'displays appropriate behavior in work and play'. Performance scores across all nine variables were averaged to create composite scores. Each composite score was then standardized using the entire cohort of second grade performance assessments (N = 16,271). Internal consistency was demonstrated for the Social Skills Performance Assessment ( $r = .95, p < .001$ ). Convergent and divergent validity for the Social Skills Performance Assessment was established with the Adjustment Scales for Children and Adolescents (ASCA; McDermott, 1993) in relation to underactive and overactive social problems in the classroom ( $r = .18-.70$ ). For the present study, Social Skills scores were dichotomized at the 15th percentile. Children scoring below the fifteenth percentile were coded as 'at risk' for inadequate academic engagement. Children scoring at or above the 15th percentile were coded as having adequate academic engagement.

### 2.3.11. Poor attendance

Attendance data were obtained from the School District's computerized records. A binary variable was constructed to indicate children with poor attendance. To create a dichotomous variable, the percentage of days absent were calculated for each student and divided into quartiles. Attendance was coded as poor if absentees fell into the highest quartile and low if it fell into the lowest three quartiles.

Suspension data were obtained from the School District's computerized records. Children were identified as experiencing suspension if they were identified in the School District database as having experienced one or more in-school or out-of-school suspensions.

## 2.4. Data Analysis

### 2.4.1. Prevalence and characteristics of child maltreatment

The first set of analyses was conducted to develop an understanding of the demographic characteristics and prevalence of maltreatment characteristics for a cohort of second grade children. Frequency analyses were used to determine the prevalence of these experiences within the population of children with a history of substantiated neglect or physical abuse and children with a history of unsubstantiated child maltreatment.

### 2.4.2. Unique influence of child maltreatment characteristics on academic achievement and academic engagement

Multiple logistic regression was used to examine the association of child maltreatment characteristics on multiple outcomes of second grade academic achievement and academic adjustment, while controlling for demographics, and maternal, health, and social risk factors. This multivariate statistical technique was chosen because it is frequently used in epidemiology research to assess the unique impact of targeted risks on individual outcomes (Scott, Mason, & Chapman, 1999). It produces odds ratio that quantify the magnitude of risk associated with each risk variable for each outcome (Nash & Bowen, 2002) while controlling for the influence of other variables (e.g. demographics and other risk factors). The overall chi-square statistic was examined to determine if the model was significant and therefore whether the individual Wald chi-squares could be examined. For each significant Wald chi-square, the odds-ratio was inspected to assess its relative importance for the outcome variable. The odds-ratio is more easily interpreted as the degree of risk exerted by the independent variables on the dependent variable.

## 3. Results

### 3.1. Prevalence of maltreatment, health, maternal and social risks

Descriptive statistics were used to determine the prevalence of child maltreatment type and health, maternal, and social risks in the

cohort (Table 1). Findings revealed that approximately 7.1% of children in this cohort experienced a substantiated allegation of physical abuse and 9.4% experienced substantiated neglect. Additionally, 12.3% of children in the cohort had an unsubstantiated report of child maltreatment by the end of second grade. Frequency analyses also provided information on the prevalence of health, maternal, and social risk factors in the cohort. One quarter of the children had tested positive for high blood lead level, and over half had received inadequate prenatal care. Approximately 13% of children in this cohort were born to a teen mom, and 32% were born to a mother who had less than a high school education. In terms of social risks, nearly 20% had been homeless, 5% had been in foster care, and almost 50% lived in poverty.

3.2. Co-occurrence of maltreatment with health, maternal, and social risks

The co-occurrence of child maltreatment with other health, maternal, and social risk factors was also examined. The prevalence of health, maternal, and social risks was higher among children with histories of substantiated physical abuse or neglect than for the general cohort (Table 2). For instance, approximately 17% of children who experienced neglect were born to a teen mom, 40% tested positive for high blood-lead levels, 64% received inadequate prenatal care, 45% had been homeless, 25% had been in foster care, and 63% had lived in poverty. The prevalence of these risk factors for children with histories of unsubstantiated maltreatment reports was lower compared to children with histories of substantiated physical abuse and neglect, but higher than children without reports.

3.3. Child maltreatment and academic achievement

The influence of child maltreatment characteristics on academic achievement was evaluated using a series of logistic regression models. Score statistics indicated that child demographics, maternal, health, and social risk factors, and child maltreatment characteristics were all significantly related to children's second grade academic achievement. Table 3 presents the odds ratios and probability levels for the independent effects of each demographic characteristic, maternal, health, social risk factor, and child maltreatment characteristics on each academic achievement outcome. After controlling for the effects of demographics and maternal, health, and social risk factors, children who experienced neglect prior to kindergarten were at increased risk for poor performance on standardized assessments of reading, language, and science relative to their peers. Experiences of unsub-

Table 1 Demographics and maternal, health, and social risks (N = 11,835).

	Entire cohort
Child demographic dimensions	
Gender (boys)	51.6%
African American	67.3%
Hispanic	13.7%
Asian	3.7%
Health risks	
Elevated blood lead level	25.9%
Inadequate prenatal care	51.8%
Maternal risks	
Teen mom	12.7%
Low maternal education	31.9%
Social risks	
Homelessness	18.8%
Out-of-home placement	5.2%
Poverty	46.7%
Maltreatment characteristics	
Physical abuse	7.1%
Neglect	9.4%
Unsubstantiated	12.3%

Table 2 Co-occurrence of child maltreatment and maternal, health, and social risks.

	Physical abuse (N = 619)	Neglect (N = 834)	Unsub Maltx (N = 1390)
Child demographic dimensions			
Gender (boys)	55.7%	53.3%	53.5%
African American	78.5%	79.9%	71.2%
Hispanic	10.5%	10.6%	12.7%
Asian	1.8%	.84%	1.2%
Other	.16%		
Health risks			
Elevated blood lead levels	37.6%	40.3%	33.0%
Inadequate prenatal care	62.8%	64.4%	59.4%
Maternal risks			
Teen mom	17.5%	17.9%	15.8%
Low maternal education	42.0%	44.1%	38.6%
Social risks			
Homelessness	40.1%	45.3%	29.7%
Foster care	22.5%	25.5%	8.1%
Poverty	60.3%	63.7%	56.4%

stantiated child maltreatment prior to kindergarten evidenced the most pervasive influence on second grade achievement outcomes – with children who experienced their first unsubstantiated allegation of child maltreatment prior to kindergarten being at increased risk of poor performance on all academic achievement outcomes relative to their peers. Experiences of child physical abuse prior to kindergarten and post-kindergarten were not significantly associated with poor performance on any of the academic achievement outcomes.

3.4. Child maltreatment and academic engagement

The risk of child maltreatment experiences on academic engagement was also assessed. Table 4 presents the odds ratios and probability levels for the independent effects of each demographic

Table 3 Odds ratios for end of the year academic achievement by maltreatment characteristics (kind).

	TN Reading	TN Math	TN Language	TN Science
Child demographic dimensions				
Gender (Boys)	1.67****	1.26****	1.83****	1.02
African American	1.78****	3.09****	1.98****	3.23****
Hispanic	1.88****	2.71****	2.01****	3.04****
Asian	.70	.66	.76	1.64*
Health risks				
Elevated blood lead levels	1.37****	1.22***	1.36****	1.36****
Inadequate prenatal care	1.30****	1.28****	1.12*	1.13*
Maternal risks				
Teen mom	1.23*	1.19*	1.29**	.99
Low maternal education	1.58****	1.36****	1.68****	1.37****
Social risks				
Homelessness	1.30****	1.15*	1.39****	1.06
Out-of-home placement	.82	.89	.96	.94
Poverty	1.43****	1.24****	1.38****	1.14*
Maltreatment characteristics				
Pre-K Physical Abuse	1.20	1.26	1.05	1.21
Pre-K Neglect	1.31*	1.24	1.42*	1.35*
Post-K Physical	1.13	.91	1.16	1.03
Post-K Neglect	1.11	1.35	1.23	1.41****
Pre-K Unsub	1.23*	1.34****	1.32****	1.27****
Post-K Unsub	1.50*	1.52	1.79**	1.22

Note: Significance is based on Wald chi-square statistics. N = 11,249 for TN Reading. N = 11,316 for TN Math. N = 11,249 for TN Language. N = 11,203 for TN Science.  
 \* p < .05.  
 \*\* p < .01.  
 \*\*\* p < .001.  
 \*\*\*\* p ≤ .0001.

**Table 4**  
Odds ratios for end of the year academic engagement by maltreatment characteristics.

	Learning behaviors	Social skills	Attendance	Suspensions
Child demographic dimensions				
Gender (boys)	2.63****	2.70****	1.28****	3.77****
African American	1.54****	2.71****	1.13	2.33****
Hispanic	1.36**	1.62****	.99	1.32****
Asian	.23****	.18****	.22****	.26**
Health risks				
Elevated blood lead levels	1.25***	1.23****	1.06	1.05
Inadequate prenatal care	1.20**	1.16**	1.17**	1.15
Maternal risks				
Teen mom	1.56****	1.62****	2.00****	1.58****
Low maternal education	1.50****	1.47****	1.51****	1.29**
Social risks				
Homelessness	1.28****	1.47****	1.40****	1.51****
Out-of-home placement	1.05	1.12	.81	1.13
Poverty	1.33****	1.13*	1.81****	1.20*
Maltreatment characteristics				
Pre-K Physical Abuse	1.35****	1.28	.87	1.14
Pre-K Neglect	1.59****	1.42****	1.98****	1.28
Post-K Physical	1.10	1.09	1.30	1.16
Post-K Neglect	1.38*	1.44**	1.57**	1.88***
Pre-K Unsub	1.26**	1.29**	1.34****	1.54****
Post-K Unsub	1.60*	1.34	1.45	1.63

Note: Significance is based on Wald chi-square statistics.

$N = 10,344$  for Learning Behaviors.  $N = 10,344$  for Social Skills.  $N = 10,642$  for Attendance.  $N = 11,829$  for Suspensions.

- \*  $p < .05$ .
- \*\*  $p < .01$ .
- \*\*\*  $p < .001$ .
- \*\*\*\*  $p < .0001$ .

characteristic, maternal, health, and social risks, and child maltreatment characteristics on each of the school adjustment outcomes. Experiences of neglect were also associated with poor academic engagement at the end of second grade when controlling for the presence of other risk factors. Children who experienced neglect between kindergarten and the end of second grade were 38% more likely to evidence poor learning behaviors; 44% more likely to evidence poor social skills; 57% more likely to have poor attendance; and 88% more likely to have been suspended from school, relative to their peers who did experience neglect between kindergarten and second grade. Neglect experiences prior to kindergarten were associated with poor performance on learning behaviors and social skills performance assessments – and children who experienced neglect prior to kindergarten were almost twice as likely as their peers to have poor school attendance. Similar to the academic achievement outcomes, unsubstantiated allegations of child maltreatment prior to kindergarten evidenced the most pervasive influence on second grade academic engagement outcomes. Children who experienced their first unsubstantiated allegation of child maltreatment prior to kindergarten were at increased risk for poor outcomes on the learning behaviors and social skills performance assessments, and at increased risk for poor school attendance and suspensions relative to their peers. Experiences of child maltreatment prior to kindergarten were associated with poor learning behaviors with children who experienced physical abuse prior to kindergarten being 35% more likely to evidence poor learning behaviors than their peers. First experiences of physical abuse between kindergarten and the end of second grade were not significantly associated with any of the second grade academic engagement outcomes.

#### 4. Discussion

The purpose of the present study was to evaluate the relations between age of first reported maltreatment by type of maltreatment on academic achievement and academic engagement for an entire

cohort of second grade students in public education in a large city in the Northeast. This study indicated that nearly seven percent of this cohort had experienced physical abuse by the end of second grade and nine percent had experienced neglect. The prevalence of both neglect and physical abuse for this cohort is greater than the national averages for this age group (.4% for physical abuse and 1.9% for neglect) (U.S. Department of Health and Human Services, 2010). This is consistent with studies demonstrating that children living in large urban centers are disproportionately more likely to be victims of maltreatment than children living in other geographic areas (Jones-Harden, 2007).

This study explored the co-occurrence of health, maternal, and social risks with child maltreatment. Children with histories of neglect and physical abuse disproportionately experienced higher rates of health, maternal, and social risks than children without histories of maltreatment; and children with histories of neglect evidenced slightly higher rates of co-occurrence than children with histories of physical abuse. Eighteen percent of children in the cohort experienced homelessness, whereas 40% of children with histories of physical abuse and 45% of children with histories of neglect experienced homelessness. Similarly, 26% of children in the cohort had elevated blood lead levels, compared to 38% of children with a history of physical abuse and 40% of children with a history of neglect. Children with histories of neglect were also more likely than other children to experience poverty (64% – compared to 47% in the general cohort and 60% of physically abused children). Other studies have identified high rates of co-occurrence between child maltreatment and other risks factors however these studies have not differentiated rates of co-occurrence by type of maltreatment (Park et al., 2004; Jones-Harden, 2007; Rouse & Fantuzzo, 2009). Our findings indicated that child neglect is more likely associated with a multiple risk context suggesting a closer association between child neglect and poverty (Berrick et al., 1998; Rouse & Fantuzzo, 2009).

In addition to substantiated allegations of child maltreatment, this study also examines the prevalence and co-occurrence of unsubstantiated reports of maltreatment. Findings demonstrate that 12% of children in this cohort had unsubstantiated reports of child maltreatment by the end of second grade. Leiter and Johnson (1994) also found a similar rate of unsubstantiated child maltreatment across an entire county in South Carolina. Children with a history of unsubstantiated reports evidenced lower rates of co-occurrence of health, maternal, and social risks than children with substantiated reports but, they had higher rates of these risks than children in the cohort who were never reported. These findings suggest that the co-occurring risk experiences of children with histories of unsubstantiated maltreatment reports are more similar to those who have substantiated reports than the children with no reports.

These high rates of co-occurrence between publically monitored health, maternal, and social risk factors and maltreatment reports call for multivariate models that control for the presence of these risks when examining the unique relations of maltreatment on early school achievement and social adjustment to school. In addition to using models to control for demographic and co-occurring risks, the present study made an important distinction between when the first report of maltreatment occurred (i.e., prekindergarten or post-kindergarten). Pre-kindergarten experiences of child neglect were associated with poor academic achievement outcomes. Relative to their peers, children who experienced neglect prior to kindergarten were 31% more likely to evidence poor outcomes on a standardized reading assessment; 42% more likely to do evidence poor language outcomes; and 35% more likely to evidence poor science outcomes. Similarly, children who were the subjects of unsubstantiated maltreatment reports prior to kindergarten evidenced poorer reading, math, language, and science outcomes relative to their non-reported peers but at rates lower than their neglected peers. First experiences of physical abuse – regardless of the time period of first substantiate report were *not* significantly associated with any of the academic achievement outcomes.

The relations between child maltreatment types and academic engagement were also examined. Again, these models controlled for other risks and demographics. Findings indicated that child neglect, both prior to kindergarten and after kindergarten, was significantly associated with each of the academic engagement outcomes. Children who experienced neglect prior to kindergarten were more likely than their peers to evidence poor classroom learning behaviors, poor social skills, and low attendance. Child neglect occurring between kindergarten and second grade was significantly associated with poor learning behaviors, poor social skills, and low attendance — as well as school suspensions. Similarly, unsubstantiated child maltreatment reports prior to kindergarten were found to be significantly related to poor learning behaviors, poor social skills, low attendance, and school suspensions. Experiences of physical abuse prior to kindergarten were associated with only poor classroom learning behaviors.

Overall with respect to substantiated child maltreatment, the findings indicate first, that early child maltreatment is associated with the most comprehensive set of poor academic and behavioral outcomes for second grade children and second, that child neglect is related to a more comprehensive set of poor educational outcomes than physical abuse. These findings are consistent with prior research documenting that experiences of neglect have a more pervasive adverse association with academic achievement than physical abuse (Crozier & Barth, 2005; Eckenrode et al., 1993; Hildyard & Wolfe, 2002; Kurtz, Gaudin, & Howing, 1999; Kurtz et al., 1993; Wodarski et al., 1990). Prior research has also found a significant relationship between child neglect and classroom behaviors and suspensions — with children who experienced neglect being more likely than their peers to evidence poor classroom behaviors and to be suspended (Eckenrode et al., 1993; Hildyard & Wolfe, 2002; Kendall-Tackett & Eckenrode, 1996). Researchers hypothesize that one of the reasons neglect may be so detrimental to early development is that it represents a failure to provide for the child's basic needs (physical, emotional, supervisory, etc) (Hildyard & Wolfe, 2002). Furthermore, neglect is typically indicative of a 'chronic' condition rather than an isolated event (such as physical abuse) (Hildyard & Wolfe, 2002, p. 680). Young children whose basic needs are left unmet for an extended period of time may simply not have the resources they need to master early developmental competencies — including those needed for early school success.

The present study identifies the deleterious association between unsubstantiated reports of maltreatment and poor early academic achievement and engagement. These findings are consistent with prior research that showed that children with unsubstantiated maltreatment reports evidenced similar levels of poor outcomes as children with substantiated reports (Hussey, English, Knight, Lau, Dubowitz, & Kotch, 2005; Leiter & Johnson, 1994). Moreover, children with histories of unsubstantiated maltreatment reports also evidenced high rates of co-occurrence with health, maternal, and social risk factors, which were similar to children with substantiated reports of child maltreatment. However, research indicates that these children are less likely than the children with substantiated reports to receive intervention services that could help lessen the adverse effects of these cumulative risk experiences (Hussey et al., 2005).

Findings on the influence of unsubstantiated reports point to the need to understand the policy context in which determinations of child maltreatment are made. While the Keeping Children Safe Act (CAPTA; P.L. 108–36, 2003) established federal definitions of child abuse and neglect, child welfare services are administered at the state and county level — and each state sets its own threshold for substantiating child abuse or neglect. The state in which this study was conducted has one of the highest thresholds and requires that a child must be at *imminent* risk of *severe* injury or harm, in order for child abuse or neglect to be substantiated. This high threshold may further contribute to blurring the lines between the experiences of children who have only unsubstantiated reports with children who have substantiated allegations.

Future research should explore the distinctions between substantiated and unsubstantiated allegations of child maltreatment by more closely examining the threshold for defining substantiation. Additionally, future studies should also focus on more carefully examining how type and number of unsubstantiated allegations relate to early school success. It would be important to make a distinction between the services offered to children with substantiated allegations, versus services offered to children with unsubstantiated allegations, when assessing child outcomes.

The present investigation extends the research on the relations between child maltreatment and the educational well-being of young urban children by (1) accounting for the effects of children multiple risk context, (2) employing existing child welfare sentinels and a disciplined integrated data system, and (3) differentiating types of maltreatment investigations across an entire county population of children in public education. An integrated administrative data system was used to explore the influence of timing and type of maltreatment on early school success. A recent article by Jonson-Reid and Drake (2008) underscored the benefits of using these systems for child welfare policy and planning. First, since administrative data systems are designed to collect data on *all* children served by a given social service system, it is possible to use the data to study low frequency events within an entire population of children. For example, the present study used the Kids Integrated Data System (KIDS) to measure several low frequency events — including child maltreatment, homelessness, and out-of-home placement within an entire population of second grade children born in the municipality. Second, since data on children's maltreatment, health, maternal, and social risks were collected by public health sentinels as part of routine service provision, they were not subject to the same self-report biases as data collected through interviews or surveys. The use of population-based data collected by key frontline sentinels made it possible to understand the association between maltreatment type and academic achievement and engagement in a multiple risk context.

Future research should focus on including additional risk factors, as well as additional information of the kinds of child welfare services provided to children with histories of physical abuse and neglect. The present study did not include data from the behavioral health system. These systems routinely collect data on maternal depression and substance abuse. Given the high co-occurrence of these risks with child maltreatment, it would be important for future studies to include these risk factors (Stone, 2007). Additionally, given the risk associated with experiences of physical abuse and neglect, it would be important to develop an understanding of the constellation of services offered to children and families experiencing these risks; and the degree to which these services mediate the adverse effects of maltreatment experiences.

The relation of pre-kindergarten maltreatment experiences with poor second grade outcomes points to the need for quality early intervention and prevention services for young children being investigated for child maltreatment. A recent study conducted by Rosenberg and Smith (2008) found that the rate of Part C eligibility for children with unsubstantiated reports of maltreatment was similar to children with substantiated reports of maltreatment. However, children with unsubstantiated reports of maltreatment were less likely to receive early intervention services (Rosenberg & Smith, 2008). Involving the early intervention and early childhood education systems in cross-agency collaborations will increase the likelihood that young children in the child welfare system will be able to benefit from access to quality early childhood education experiences (Fantuzzo et al., 2005; Jozefowicz-Simbini, Debra, & Israel, 2006).

Young, maltreated children face multiple threats to their development and early school success. Addressing the complex needs of these young children requires an integrated public surveillance system with the capability of cross-system collaboration. The present study demonstrates how an integrated data system could help build

the capacity for more responsive systems and service provision for young maltreated children.

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