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Latent Class Analysis of New Self-Report Measures of Physical and Sexual Abuse

A dissertation submitted in partial satisfaction of the requirements for the degree

Doctor of Philosophy

in

Clinical Psychology

by

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The dissertation of Kate Brody Nooner is approved, and it is acceptable in quality and form for publication on microfilm:

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“The final forming of a person's character lies in their own hands.”

-Anne Frank

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ABSTRACT OF THE DISSERTATION

Latent Class Analysis of New Self-Report Measures of Physical and Sexual Abuse

by

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Doctor of Philosophy in Clinical Psychology

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San Diego State University, 2007

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The Longitudinal Studies in Child Abuse and Neglect (Longscan) have developed measures to assess how pre-adolescents perceive maltreatment to allow for a broader, more ecologically valid understanding of these experiences. These measures assess physical and sexual abuse in 12-year-old children, with the potential to capture experiences that Child Protective Services (CPS) and caregiver self-report may not identify. To integrate these self-report measures into a broader conceptualization of maltreatment, the following research questions are addressed:

a. What are the latent class profiles of the Longscan self-report measures of physical and sexual abuse? Demographic factors (e.g., gender, ethnicity, and study site) will be included in these analyses.

b. What is the agreement of youth self-report of physical and sexual abuse with CPS reports of those types of abuse?

Data from 845 children participating in Longscan who have completed the 12-year-old interview and have complete CPS record reviews are used to identify distinct classes of children. Latent class analysis, a latent variable framework that groups children into classes based upon their self-report, is employed to explore the class profiles for physical abuse, sexual abuse, and combined physical and sexual abuse. From these analyses, the best fitting models are determined and agreement is then evaluated in relation to CPS reports of physical abuse and sexual abuse. Results from the latent class analyses point to a 2-class solution for physical abuse, a 3-class solution for sexual abuse, and a 4-class solution for combined physical and sexual abuse. Follow-up analyses indicate that CPS reports and youth self-report agree at a rate of: 65% for the physical abuse model, 83% for the sexual abuse model, and 64% for the combined model. In cases where self-report and CPS reports differ, children tend to under-report abuse. Overall, the models reveal that 12-year-old children respond in a nuanced manner when asked to self-report abuse. Therefore, youth self-report of abuse can be meaningfully classified and incorporated to existing ecological-developmental models of child maltreatment.

CHAPTER 1

INTRODUCTION

What happens to children who are maltreated? Research consistently suggests that abuse in childhood derails development (Bolger & Patterson, 2001; Cicchetti & Toth, 1995). The experience of abuse and neglect in childhood, may not only put children at risk for immediate adverse outcomes, but also lay the groundwork for long-term deleterious physical and mental health outcomes (Repetti, Taylor & Seeman, 2002).

Researchers have utilized varying methodologies and assessed a range of samples to better understand the ways in which children are impacted by diverse maltreatment experiences. However, questions remain regarding the processes by which maltreatment impacts development. Despite literature reviews which call for explorations of maltreatment within an ecological-developmental framework, methodology reliant on indirect assessment, such as Child Protective Services (CPS) record review, to the exclusion of other methods remains a benchmark of child maltreatment research (Manly, Kim, Rogosch, & Cicchetti, 2001). The purpose of the proposed work is to examine a direct approach to the study of maltreatment that holds the unique possibility of revealing the child's perception of his or her maltreatment experience as well as the relationship of this perception to the CPS reports that have often served as the field's gold standard.

Data collected directly from children about their history of maltreatment could prove to be essential in improving protection and intervention. Specifically, it will be critical to gather maltreatment data from multiple sources (e.g., child report, CPS reports, parent report) because there is evidence that functioning is related to maltreatment when it is assessed in a variety of ways (McGee, Wolfe, Yuen, Wilson & Carnochan, 1995; Stockhammer, Salzinger, Feldman & Mojica, 2001; Winegar & Lipshitz, 1999). In addition, while information from different sources may overlap, there is also a good deal of uniqueness in each reporting source. Therefore, the incorporation of child self-report should lead to a more complete understanding of the complex effects of maltreatment on child development.

Researchers have developed youth self-report measures of abuse and neglect with the goal of incorporating these measures into existing explanatory models of child maltreatment. But how can researchers incorporate these measures without simplifying children's responses and diluting the heterogeneity of child maltreatment experiences? The present investigation seeks to answer this question by organizing children's responses to self-report measures of physical abuse and sexual abuse that capitalizes on the heterogeneity of children's responses while still creating meaningful classifications that can be related to maltreatment sequellae as well as longitudinal outcomes. The present investigation will take a first step in this yet uncharted work by classifying children based upon their self-report of physical and sexual abuse and then comparing the agreement of this classification to CPS reports of those types of abuse.

Maltreatment & Mental Health

Every year more than 900,000 children experience maltreatment in the United States, with an estimated incidence of 12.4 per 1,000 children (U.S. Congress, 2003). The experience of maltreatment in childhood represents a significant risk for a child at any developmental stage. The literature linking maltreatment to problematic outcomes is extensive. Childhood maltreatment is strongly associated with adverse physical, social, emotional, cognitive and psychological outcomes (Cicchetti & Toth, 1995; Bolger & Patterson, 2001; Cohen, Brown, & Smailes, 2001).

In addition, children who are removed from their primary caregivers because of the need for protection experience the added challenge of this environmental disruption. Identifying at-risk children and developing interventions to increase their resilience during these times of disruption may help to diminish the cascading negative mental and physical outcomes associated with maltreatment and removal. Assessing children's perceptions of their maltreatment experiences may help to identify those who are particularly vulnerable following removal and to improve interventions that target children's specific needs.

Abused children have significantly higher rates of mental health problems, including anxiety disorders, depression, and post-traumatic stress disorder, due to many factors including exposure to multiple risk factors and the disruption associated with placement in out-of-home care (i.e., an emergency shelter, foster care; Clausen et al., 1998). Estimates of the prevalence of developmental and mental health problems for

abused children vary from approximately 50 to over 80 percent, and these rates are significantly higher than the prevalence of such problems in socio-economically comparable samples (Landsverk & Garland, 1999; Pilowsky, 1995). In addition, there is emerging evidence that children in racial/ethnic minority groups have a greater unmet mental health need compared to Caucasian youth (Garland, Landsverk & Lau, 2003). Therefore, improving methods of detection and mental health interventions for abused children is warranted, with those in minority groups and/or out-of-home care being in greatest need.

In an investigation of the relationship between maltreatment and mental health, Carlin and colleagues (1994) examined prevalence rates of depression and physical abuse in women. The researchers were particularly interested in how depression rates may differ depending on "objective" and "subjective" physical abuse criteria. Carlin at al. (1994) found the highest rates of depression among women who defined themselves as physically abused (i.e., met "subjective" criteria) and also endorsed items indicative of abuse on the Emotional and Physical Abuse Questionnaire (i.e., met "objective" criteria for abuse). Women who did not meet "subjective" or "objective" criteria for physical abuse had the lowest rates of depression, while women who met "objective" but not "subjective" criteria were intermediate. Of note, not enough women met "subjective" criteria but failed to meet "objective" criteria did not have enough statistical power to be included in the analyses. These findings indicate the following: 1) women are not falsifying maltreatment experiences, 2) psychopathology is related to abuse, and 3) the relationship between psychopathology and abuse differs depending on the individuals

"subjective" and "objective" experience. This study suggests that children's perceptions of their own maltreatment experiences may also be salient in understanding causal factors of existing child psychopathology and, potentially, in identifying predictive factors of those who are at-risk for developing psychopathology later in life.

Operationalizing Maltreatment

Much of the previous research on maltreatment has been operationally defined using broad labels (i.e., occurrence versus non-occurrence of a single type of abuse abused) to categorize children. However, this method is somewhat limited in that: 1) it fails to account for the heterogeneity of maltreatment, and 2) it overlooks the variance in outcomes related to the severity of maltreatment. More specifically, children often experience more than one type of maltreatment and the effect of that maltreatment on later development is likely to be impacted by dimensions of maltreatment including severity and chronicity (Cicchetti & Manly, 2001; English et al., 2005; Litrownik, Newton & Landsverk, 2005). Approaches that group children using broad categories fail to detect the more nuanced maltreatment relationships, which are likely to be integral in understanding children's experiences.

Vital to research on child maltreatment is information about the type, severity, and frequency of exposure to child abuse and neglect. This information is important not only in capturing diverse maltreatment experiences but also in developing interventions and identifying at-risk children. In an attempt to more accurately gauge the frequency and heterogeneity of maltreatment experiences, Barnett, Manly and Cicchetti (1993)

developed the Maltreatment Classification System (MCS) as a tool for researchers to systematically classify maltreatment according to type, severity, frequency, and chronicity. The MCS is a valuable tool because it allows researchers to use allegations of maltreatment made to CPS, rather than depending on CPS designations. Using the MCS, researchers are able to review allegations and apply the MCS to characterize alleged maltreatment. Allegations must meet specific criteria to receive an MCS code for abuse or neglect. It is important to note, that every allegation does not necessarily receive a maltreatment code.

Even with this more comprehensive classification system, the source of this information has typically been reports of abuse that have been substantiated by CPS. However, child maltreatment researchers have suggested that relying on CPS designations of abuse is problematic (Drake & Johnson-Reid, 1999; English & Graham, 2000). A recent study of Washington State CPS reported that there are many factors that contribute to the CPS designation of substantiation (i.e., a founded CPS allegation, which receives further investigation) or unsubstantiation (i.e., an unfounded CPS allegation, which does not receive further investigation) (English et al., 2002). Some of these factors relate to characteristics of the abuse or neglect (e.g., severity, risk of imminent harm, and developmental age of the child), while other factors may have little to do with the alleged maltreatment (e.g. caseworker burden, individual state law, and previous history) (English et al., 2002). Recent research comparing substantiated with unsubstantiated CPS reports suggests that children whose cases are unsubstantiated may experience maltreatment that is just as severe as those that are substantiated. These investigations

found that substantiated and unsubstantiated cases are more alike than different in terms of perpetrator recidivism (Way et al., 2001), family risk factors for being re-reported to CPS (Wolock et al., 2001), school and delinquency outcomes (Leiter et al., 1994), and behavioral and emotional functioning (Hussey et al., in press).

However, relying on CPS allegations has also been reported to be an undercount of the actual incidence of child abuse and neglect in the general population (Sedlack & Boradhurst, 1996). Retrospective accounts (Briere & Runtz, 1988), social worker ratings (McGee et al., 1995), and interviews with caregivers (Stockhammer et al., 2001) represent important progress in building a multidimensional approach to examine maltreatment. Understandably, the sensitive and potentially traumatic nature of maltreatment led some researchers to obtain retrospective accounts of adults and adolescents rather than prospective child accounts (Briere & Runtz, 1988; Powers, Ekenrode & Jaklitsch, 1990; Rausch & Knutson, 1991 Stiffman, 1989). However, the results of these studies may still represent bias or inaccuracy, in that adult participants may have difficulty recalling or may inaccurately remember maltreatment that occurred in childhood (Kolko, Brown & Berliner, 2002). Much of what goes on in the family occurs behind closed doors; not only is this information not observable but adults who participate may not be willing to disclose what happens. Therefore, child accounts of maltreatment are warranted to reveal information and a perspective that is unavailable from other sources.

Self-Report

Initial concerns regarding directly assessing children regarding their experiences of abuse were related to the trustworthiness of children's accounts. However, research regarding memories of child trauma has demonstrated that children, as early as 5 years of age can reliably report physical and sexual trauma, even when asked suggestive questions (Ceci & Bruck, 1993). In addition, children become even less suggestible as they age, with suggestibility being comparable to adults by the time children reach pre-adolescence. In a review of the literature regarding memories of trauma in childhood, Ceci and Bruck (1996) also found that the format in which a child is interviewed significantly impacted suggestibility, with children being more susceptible to falsely endorsing suggestive questions about trauma in a face-to-face format than a self-administered format. However, in either format false reports in response to suggestive questions was infrequent, less than 6 percent among 5- to 7-year-old children (Ceci & Bruck, 1996). Further, evidence has pointed to inaccuracies in child report involving primarily omissions of trauma than commission.

In the maltreatment literature, child self-reports of maltreatment have often been compared to other reporting sources as a means of evaluating their reliability as indicators of maltreatment. These studies have revealed that child reports correlate reasonably well with CPS reports and parent reports (Bernstein et al., 1994; McGee et al., 1995; Werkele et al., 2001; Wingar & Lipshitz, 1999). However, it is important to keep in mind that agreement among reporting sources is impacted by a myriad of personal, legal and ethical considerations. In addition, individual informant heuristics,

privileged knowledge, as well as relationship to the victim generate variation in the reported account of child maltreatment. For example, in a national survey, the majority of parents interviewed endorsed the use of corporal punishment in disciplining their children; however, only 1% endorsed physical discipline, which characterized children as having been "beat up" by parents (Straus, Hamby, Finkelhor, Moore & Runyan, 1998). Kelleher and colleagues (1994) found that 1.4% of parents endorse using physical force when it is characterized as resulting in bruises, days in bed, or needing medical attention. However, when adolescents were surveyed in community-based surveys the rates of severe corporal punishment was higher, from 3 to 10% (Singer, Anglin, Song, & Lunghofer, 1995).

These findings have lead many maltreatment researchers to conclude that given the propensity for fear, shame and trauma, maltreatment is more often underreported by victims than the converse. Martin and colleagues (1993) characterized the tendency of victims to underreport in an investigation of childhood sexual abuse. They found the range of sexual abuse incidents reported were similar in a mail-in survey and follow-up face-to-face interview. However, assessment format significantly impacted rates of response depending upon the relationship of the victim to the perpetrator. In particular, women who reported only in the mail-in format were more likely to have been perpetrated by a family member than those who reported in the face-to-face format or both formats (Martin et al., 1993). In related work, large statewide self-administered surveys of adolescents reported the incidence rate of sexual abuse to be at 7% (Chandy, Blum, & Resnick, 1996a, 1996b), which is substantially lower than estimates of lifetime

prevalence of retrospective reports among men and women, which suggest 22.3% and 8.5% respectively (Gorey & Leslie, 1997).

The first studies of child self-report of maltreatment were implemented using adolescent samples. Researchers chose adolescents instead of children because they believed adolescents were more likely to have the emotional and cognitive maturity to self-report abuse without significant adverse consequences. However, one limitation of using adolescents involved in CPS is that there are fewer adolescents than children in the system, limiting sample sizes. McGee and colleagues (1995) explored self-report of maltreatment in a sample of 160 adolescents with active CPS files. They found that according to a global rating of severity, multiple maltreatment types were the norm rather than the exception, with 82% of children reporting emotional abuse, 84% physical abuse, 63% neglect, 53% witnessed violence, and 34% sexual abuse (McGee et al., 1995). In addition, the researchers found agreement in endorsement patterns among adolescents, their social workers, and a researcher's review of the adolescent's CPS file. For all three respondents, emotional abuse was most commonly reported and sexual abuse least. Overall, agreement of the adolescent with the two other respondents was highest for sexual abuse (> 90% agreement) and lowest for neglect (60%), which may be related to the specific nature of sexual abuse and the more diffuse nature of neglect (McGee et al., 1995). When disagreement between reporting sources was found, adolescents usually failed to report abuse indicated by the two other sources; however, with physical abuse, adolescents reported more abuse than was noted by the social worker or CPS file. Of note, the official CPS designation, recorded in the adolescent's

case file, did not significantly or accurately account for the type, severity, or chronicity of maltreatment experiences. In sum, these findings suggest that: 1) adolescents are not likely to be inflating or fabricating maltreatment experiences, and 2) official CPS designations are not sufficient in detecting or characterizing maltreatment.

In a study of psychiatrically hospitalized adolescents, Wingar and Lipshitz (1999) found that the adolescents' self-reports of childhood sexual abuse ($\kappa = .75$) and physical abuse ($\kappa = .65$) showed good rates of agreement with "best-estimate source based on information from clinicians, medical records, and child protective services reports," (p.350). Seven percent of the adolescents reported sexual abuse and 11% for physical abuse when the "best-estimate source" indicated none, another indication that the majority of children are accurately reporting their maltreatment experiences (Wingar & Lipshitz, 1999). This investigation further suggests that those who reported abuse when official sources pointed to none may not have been making false allegations but reporting abuse that was unknown to the system. Similarly, Everson and Boat (1988), found that children made false claims of sexual abuse to be relatively low, at a rate of 1.7-2.7% and adolescents at a rate of 8%. Overall, the findings of these studies provide support for the idea that children are accurate reporters of their maltreatment histories.

In a review of studies that have asked children directly about maltreatment or related experiences, Amaya-Jackson and colleagues (2000) found significant methodological variation among the 14 studies that met criteria for the meta-analysis. In particular, the studies varied in: sample size (range: 165 to >60,000); the age of

participants (age range: 5 years to 21 years); the format of administration (i.e., self-administered, telephone, interviewer-administered to a group, or face-to-face interview); the time frame assessed (e.g., most recent, past 3 months, ever); the number of questions used to screen for self–report (item range: 1 to 18); as well as the prevalence rates (sexual abuse: 1 to 31%; physical abuse: 11 to 31%). In addition, researchers differed in their definitions of maltreatment and the way in which these constructs were described to participants. Although this area of maltreatment research is still in its preliminary stages, this review demonstrates that there are many ways to effectively assess maltreatment in child populations. However, it will be important for researchers to keep in mind the ways in which methodological choices impact participant responses as well as the potential harm to children who disclose maltreatment. In sum, while Amaya-Jackson et al. (2000) provide evidence that sensitive information can be obtained from children regarding their maltreatment histories, they also highlight that there is a lack of consensus or empirical evaluation of the reliability and validity of these techniques.

Measure Development

Although some self-report measures have been developed to assess children's perceptions of maltreatment, there is a relative dearth of information about their relationship to maltreatment sequellae. Early studies that explored youth self-report took a first step in incorporating this dimension into explanatory models of maltreatment by evaluating the consistency of youth report. For example, McGee and colleagues reported good test-retest reliability of the clinical interviews in detecting abuse among child participants (Pearsons r = .70-.93) (McGee et al., 1994). However, it is unclear if the

interviews with the children were actually tapping maltreatment constructs or if they merely demonstrate interview consistency over time. These results suggest that systematic work is required to develop structured self-report assessment tools for children that are valid measures of maltreatment constructs before child responses can be compared to those of other reporting sources and before agreement or external validity of child self-report can be formally evaluated.

Others took a step beyond consistency of youth report and evaluated concordance of youth report and CPS reports. Wekerle and colleagues (2001) assessed the validity of a project developed self-report measure of child maltreatment by comparing responses of a sample of youths with CPS involvement with that of their social workers. They found that discordant child and social worker reports on the Child Maltreatment form took place primarily when the social worker endorsed maltreatment while the youth denied its occurrence. Moderate concordance was established for sexual abuse (κ = .68 to .75 across 4 items) and low concordance for emotional abuse (κ = .03 to .20 across seven items) and physical abuse (κ = .06 to .28 across eight items). The authors hypothesized that highest agreement is obtained for maltreatment that is associated with discrete, palpable acts, such as those commonly associated with sexual abuse. However, this theory does not account for the physical abuse findings, which is often characterized by discernable acts (Manly et al., 2001).

In an attempt to establish a measure of child trauma, Bernstein and colleagues (1994) developed and validated the Childhood Trauma Questionnaire (CTQ) in a large,

demographically diverse sample of adolescents. Later they validated this measure with an adolescent psychiatric population (Bernstein et al., 1997). These researchers developed the CTQ as a brief, relatively noninvasive screener for maltreatment experiences occurring in childhood and adolescence. The measure was administered to adolescents aged 12 to 17 with the hope of detecting abuse that social service, juvenile justice, and mental health settings miss. The CTQ assesses physical abuse, sexual abuse, emotional abuse, and neglect in a 70-item self-administered survey using a 5-point Likert-type scale, with response options ranging from "Never true" to "Very often true," (Bernstein et al., 1994). Adolescents respond regarding their experiences throughout their lives; as such, a limitation of the measure is that it does not distinguish between current and past abuse.

Principal Components Analysis revealed a 5-factor structure that was equivalent for males and females with the following factors: sexual abuse, physical abuse, emotional abuse, emotional neglect, and physical neglect (Bernstein et al., 1997). These factors were the same as those Bernstein and colleagues (1994) reported in the non-psychiatric adolescent population. Each CTQ factor correctly classified from 60 to 80% of abused adolescents for each of the five abuse categories. In addition, the CTQ factors were sensitive and specific when compared to therapists' ratings of maltreatment. Therapists identified 50% of the adolescents as being maltreated while the adolescents' responses on the CTQ indicated that 70% had experienced abuse. However, the CTQ succeeded in detecting more than 90% of the abuse identified by therapists. Overall, the CTQ appeared to be a valid measure of child maltreatment and indicated that

adolescents' accounts are credible, in that they are congruent with therapist reports. However, correlations of the CTQ should be interpreted cautiously as it is likely that the therapists obtained much of the maltreatment information directly from the child. Still, the CTQ demonstrates that children, including potentially fragile populations, such as those in psychiatric care, are capable of reliably reporting maltreatment experiences. In addition, this research further suggests that child maltreatment may be underreported in clinical settings and that psychometrically sound child self-report may increase rates of detection.

The present study moves beyond concordance or factor structure in that it organizes children's perceptions of maltreatment while preserving the complexity of that experience. In the present investigation, heterogeneity across individuals is modeled by grouping individuals, rather than items, into classes or profiles. By grouping children instead of items, researchers are able to see how the same item impacts different groupings of children. These groupings can then be used for multiple purposes including unraveling complex outcomes and developing prevention and intervention programs.

Present Investigation

This study will establish the latent class structure of a self-report measure of physical abuse and a self-report measure of sexual abuse developed by the Longitudinal Studies in Child Abuse and Neglect (Longscan) consortium administered to 12-year-olds in an audio computer-assisted self-interview (A-CASI). The purpose of determining classes of children based upon their self-report is twofold: 1) this approach captures the

complexity and diversity associated with individual abuse experiences, 2) it establishes a topology that can be examined with various outcomes. The measures of physical abuse and sexual abuse were administered to 12-year-olds because prior research has determined that children as young as 12 years of age are able to consent, without parental approval to psychiatric treatment (DeKraai & Sales, 1991). The researchers of Longscan acknowledge that little is known about the impact of maltreatment disclosure in research settings; however, after careful design, piloting, and consideration of ethical and legal mandates, the benefits associated with self-report were determined to exceed risks.

The definitions of maltreatment used in the development of the Longscan child self-report measures of abuse were based upon the work of Barnett, Manley, and Cicchetti (1991) and Hart, Brassard and Karlson (1996). Items were designed to assess specific harm experienced by the child as well as behaviors committed by perpetrators. These items were placed into one of three measures according to the following abuse constructs: psychological abuse, sexual abuse, and physical abuse/assault. It is hypothesized that asking about specific behaviors (e.g., "Has any adult ever tried to choke, drown or smother you?" p.737) rather than general constructs (e.g., "Have you ever been abused more maltreated by an adult?" p. 737) will facilitate children's ability to accurately report their maltreatment histories (Amaya-Jackson et al., 2001)[1]. For the present investigation, the sexual and physical abuse measures are assessed. The physical

[1] The first question in quotes is screening item 7 of the Longscan physical abuse self-report measure (Runyan et al., 1998). The second question in quotes is the screening item used in the Washington State Adolescent Abuse Study (Bensley et al., 1999).

abuse measure is comprised of 18 screening items and the sexual abuse measure of 12 screening items. Children are asked follow-up questions only if they respond affirmatively to the screening items. This ensures that the measure is time-efficient and avoids unnecessarily exposing participants to potentially upsetting questions.

Of particular interest is the way in which children respond, potentially capturing experiences that CPS reports and caregiver accounts may fail to detect. Grouping children into cohesive classes based upon their responses to these self-report measures of abuse is central to the incorporation of this important dimension into the repertoire of child maltreatment research. To achieve this goal, two specific queries were delineated and are presented as follows.

Question 1: *What are the latent class profiles of the Longscan self-report measures of physical and sexual abuse?* This question will assess the ways in which children can be meaningfully classified based upon their self-report and which items are most effective in generating distinctive classes. As part of this question, the role of background factors (e.g., gender, ethnicity, study site) in children's self-report will be explored. Latent class analyses will be used to statistically determine classes of children based upon their self-report in the following three ways: 1) physical abuse, 2) sexual abuse, and 3) combined physical and sexual abuse. These three sets of analyses will be exploratory, conducted iteratively, beginning with a one-class model and successively adding a class until the best fitting model is reached. Specific fit indices will be used to examine model fit and to compare the fit of models that differ by one class. The classes

generated from these analyses will provide an empirical foundation for researchers to make more informed predictions related to why a child falls into a particular class and to explore the outcomes related to being in a particular class.

Question 2: *What is the agreement of youth self-report of physical and sexual abuse with CPS reports of those types of abuse?* The purpose of this question is to evaluate whether the self-report measures of physical and sexual abuse are related in to CPS reports that are the accepted indicators of maltreatment in the field. In the literature, self-reported abuse and CPS reports are often compared to see how they align and diverge in assessing abuse. Therefore, as a second step in evaluating the Longscan self-report measures of physical and sexual abuse, follow-up analyses will be conducted using the best fitting solution for each the three latent class analyses: 1) physical abuse, 2) sexual abuse, and 3) combined physical abuse and sexual abuse. The best fitting physical abuse class solution will be compared to CPS reports of physical abuse; the same will be done for the sexual abuse class solution. The combined class solution will be compared to CPS reports of physical abuse and sexual abuse. It is hypothesized that the proportion of children who have a CPS report will differ by class, with children who endorse experiencing abuse having greater odds of having a CPS report. This hypothesis is expected for all three solutions.

CHAPTER 2

METHOD

Participants

Recruitment

The sample for this study was drawn from the Longscan consortium, which was established in 1990 with grants from the National Center on Child Abuse and Neglect. Longscan research is coordinated at the University of North Carolina with five satellite sites: Baltimore, Chicago, North Carolina, Seattle, and San Diego. The site specific break down of the 1354 subjects initially enrolled in Longscan is as follows: Baltimore—282, Chicago—254, North Carolina—243, San Diego—330, Seattle—254. Through the use of common assessment measures, similar data collection methods and schedules, data the five sites will be used in the present investigation. The Longscan consortium began interviewing children and their caregivers when the children were 4-years-old. The project is presently in its fifteenth year and comprehensive assessment of children, their caregivers, and their teachers have been completed or are in progress for ages 4, 6, 8, 12, 16, and 18. On these years, children and their caregivers receive comprehensive face-to-face interviews exploring critical issues in child abuse and neglect. Maltreatment data is collected from CPS record reviews at least every two years. Telephone interviews allow the sites to track families and assess service utilization and salient life events on years when there is not a face-to-face interview.

Sample Selection

As of June 2005, 845 children completed the Age 12 face-to-face interview: Baltimore—186, Chicago—94, North Carolina—164, San Diego—225, Seattle—176 (Table 1). The 845 participants in the present investigation came from an overall sample of 1354 Longscan participants. This multi-site sample represents a diverse ethnic, cultural, and sociodemographic population of children who were identified as having experienced substantiated maltreatment before 3.5 years of age or being at-risk for maltreatment. Inclusion in this study required that children completed the 12-year-old face-to-face interview. In addition, each participant had to have a complete CPS record review. This selection criterion was in place for two reasons: a) to ensure that participants completed the self-report measures and b) to allow for comparisons of the participants according to self-report and CPS report.

The Chicago site had 49 children who were still eligible for the Age 12 interview but had either not yet completed the interview or had not aged in (i.e., had not yet turned 12). The other four sites (Baltimore, North Carolina, San Diego, and Seattle) have no eligible children. Overall, 62 percent of the sample completed the age 12 interview. Thirty-four percent of the sample did not complete the interview and is no longer eligible for the Age 12 interview. Six percent of the sample is still eligible and has yet to complete the Age 12 interview (Table 1).

Table 1: This table contains the participants that were included in the present investigation from the entire sample (N = 1354). For each site, the table lists the number of subjects who were enrolled, who completed the age 12 self-report, who remain eligible and who did not complete the age 12 self-report and are no longer eligible

Site	Enrolled	Completed SR	Eligible	Not Completed SR
Baltimore	282	186	0	96
Chicago	245	94	49	102
North Carolina	243	164	0	79
San Diego	330	225	0	105
Seattle	254	176	0	78
Total	1354 (100%)	845 (62%)	49 (4%)	460 (34%)

Sample Demographics

There was an even gender distribution in the sample with 419 (49.6%) males and 426 (50.4%) girls. The study sample represented the ethnic diversity of each of the sites represented in the study: Baltimore (22%), Chicago (11.1%), North Carolina (19.4%), San Diego (26.6%), and Seattle (20.8%) (Table 2). However, the sample also reflects the overrepresentation of children from ethnic minority backgrounds, which is common in child welfare and at-risk populations. The sample was comprised of the following racial/ethnic categories: Non-Hispanic White (27.1%), Black/African American (54.4%), Hispanic (6.3%), Asian/Middle Eastern (0.4%), Mixed Race (10.9%), and Other (0.5%) (Table 3).

Table 2: This table contains the frequency and percent of participants from each of the five sites that comprise the investigation (N=845).

Site	Frequency	Percent
Baltimore	186	22.0%
Chicago	94	11.1%
North Carolina	164	19.4%
San Diego	225	26.6%
Seattle	176	20.8%
Total	845	100%

Table 3: This table contains the racial/ethnic categories of participants from each of the five sites that comprise the investigation (N=845).

Race	Frequency	Percent
Non-Hispanic White	229	27.1%
Black/African American	460	54.4%
Hispanic	53	6.3%
Native American / American Indian	4	0.5%
Asian; Middle Eastern	3	0.4%
Mixed Race	92	10.9%
Other	4	0.5%
Total	845	100%

Children from the San Diego and Seattle site were recruited for participation because of histories of maltreatment before 3.5 years of age. For Baltimore, Chicago, and North Carolina, a maltreatment report was not a requisite for inclusion. Age 12 data is still being collected for the Chicago site. Data is complete for the other sites: Baltimore, North Carolina, Seattle, and San Diego. Table 4 contains the percentage of coded CPS allegation reports of physical and sexual abuse from birth to age 12. 32% had a CPS report for physical abuse from birth to age 12 and 14.1% had a CPS report for sexual abuse from birth to age 12. 62.2% did not have a report for physical or sexual abuse; 8.3% had a report for both physical and sexual abuse. 23.7% had a report for only physical abuse; 5.8% had a report for only sexual abuse.

Table 4: This table contains the CPS reports of Physical and Sexual Abuse from birth to age 12 for each of the participants (N=845).

	No Sexual Abuse n (%)	**Yes Sexual Abuse n (%)**	**Row Total n (%)**
No Physical Abuse n (%)	526 (62.2%)	49 (5.8%)	575 (68%)
Yes Physical Abuse n (%)	200 (23.7%)	70 (8.3%)	270 (32%)
Column Total n (%)	726 (85.9%)	119 (14.1%)	845 (100%)

Procedure

When the participants were 4-5 years of age, baseline developmental assessments of the children were administered and the first standardized interviews were conducted with their caregivers. After this initial meeting, the children were tracked and interviewed at regularly scheduled intervals, with annual contact interviews (conducted over the phone with primary caretakers) at odd years of age, and face-to-face interviews at even years of age. Face-to-face interviews were conducted separately with the children and their primary caretakers. The self-report measures of physical and sexual abuse were administered to the child participants at the 12-year-old face-to-face interview. For participating in this two-hour interview, child participants were paid twenty dollars in cash for participation and their caregivers were paid thirty dollars.

Measures

Child Protective Services Report of Maltreatment

Child Maltreatment was measured by referrals to CPS made in the form of narrative accounts for suspected maltreatment from birth to 12 years of age. The review and coding of CPS maltreatment narratives includes data abstracted from county level files at each of the sites (i.e., Baltimore, Chicago, North Carolina, Seattle, San Diego). Child maltreatment information is coded from the narratives by type and severity using two classification systems. The first classification system was originally developed for use in the Second National Incidence Study (NIS-2; Cappelleri, Eckenrode, & Powers, 1993). The second classification system is a modified version of the definitions developed by Barnett, Manly and Cicchetti (1993) known as the Modified Maltreatment

Classification System (MMCS). The modifications made to the MMCS allow for further specification of sub-types of maltreatment and expanded severity ratings. This specification includes nine additional physical abuse sub-types and two neglect sub-types as well as greater specification of neglect and expanded emotional abuse sub-types. For the purposes of the proposed investigation, child maltreatment will be operationalized as the existence of one or more allegations of abuse and/or neglect. Narratives in which the family or sibling is the subject of the report, without specific mention or referral of the Longscan child, are not coded. Therefore, to be included in the Longscan data, the Longscan child must be clearly indicated in the narrative.

Trained abstractors at each of the sites review CPS files of Longscan participants and abstract information from the allegation narratives and summary narratives in the participant's CPS file. Since this is a multi-site investigation and CPS practices may vary by state, information is taken from these portions of the CPS file as a way to standardize the data collected across sites. Abstractors conduct lifetime searches of each participant's CPS file to ensure that all past referrals have been reviewed. The review schedule differs by site. The Seattle and San Diego sites review CPS files on an ongoing basis while the Baltimore and North Carolina sites review every two years in accordance with the Longscan face-to-face interview.

The abstracted narratives are then coded by trained coders according to the maltreatment type and severity utilizing both the NIS-2 and MMCS classification systems. Coders must meet strict training and reliability standards to become Longscan

coders and to maintain coding privileges. Coders record narrative information onto the maltreatment data collection form. Each form contains data from a single referral to CPS and the related set of findings. Coders complete a form at each review for each subject regardless of whether a record was found or not. This allows each site to be sure that CPS records were consistently reviewed for each participant.

Reliability of Coded Maltreatment Allegations

In 2005, reliability statistics for all five sides were conducted on the abstracted narratives coded by trained coders at each of the sites. Five percent of the total cases meeting the following criteria were randomly selected from the narrative pool in July of 2004. Selection criteria was as follows: (1) must be an allegation and findings narrative, (2) must be at least 1 valid NIS2 & MMCS code from the allegations sections and findings sections, (3) there is a valid date of referral and/or incident, and (4) the allegation/findings narratives are available in the dataset or can be obtained from the sites. Random selection was proportional to the total number of allegations at each site, such that each site had the correct proportion of narratives randomly selected for the reliability analyses.

Reliability statistics for the allegation narratives for physical and sexual abuse are presented, as only allegations for these types of abuse were used in the present investigation. Kappas for MMCS codes from the allegations narrative were 0.87 for physical abuse and 0.77 for sexual abuse. These kappa values are considered to be in the substantial to almost perfect range according to ranges established by Landis and Kotch

(1977). Similar results were obtained for Kappas of NIS2 allegation codes with a value of 0.88 for physical abuse and 0.78 for sexual abuse. Again, these kappa values are in the substantial to almost perfect range. Interclass correlation coefficients were obtained for the number of allegations coded for MMCS and NIS2 and = .79 and .74 respectively, both in the substantial range. In sum, the reliability of the coding of the physical and sexual abuse allegations is considered to be very good.

Self-Report of Maltreatment

At the Age 12 Face-to-Face interview, during the transition to adolescence, youth are asked about personal experiences of maltreatment. These are project-developed self-report measures of sexual abuse, physical abuse, emotional abuse and assault. The present investigation utilizes the sexual abuse and physical abuse self-report measures. Twelve-year-old children were selected for self-report because they have the cognitive and emotional skills to make informed responses to health care issues (Weithorn & Campbell, 1982), and should be able to answer sensitive questions about maltreatment. In recognition of the sensitive nature of youth self-report of maltreatment and the developmental need for autonomy and privacy during adolescence, youth measures were administered using a project-developed A-CASI (Audio-Computer Assisted Self-Interview).

The physical and sexual abuse measures are structured using stem questions describing specific perpetrator behaviors, which, if endorsed, trigger follow-up items. The physical abuse measure has 18 stem questions and the sexual abuse measure has 12

stem questions (Tables 4 & 5). Children who do not endorse a particular behavior are not asked follow-up items. Children are first asked if they have "ever" experienced a particular behavior related to physical or sexual abuse. If a child answers affirmatively, he or she is then asked if this behavior occurred, "before elementary school," or "since elementary school started." Other follow-up questions address behaviors that reflect a child's experience of a range of abuse behaviors and are not limited to CPS definitions of abuse. Follow-up items that query the time frame of occurrence of abuse will be evaluated in the present study.

The self-report measures were pre-tested in 24 face-to-face interviews. Subjects included children with CPS involvement and children with unknown CPS histories. Results from the pretest indicated that young adolescents were comfortable with the structure and the wording of the items. Clinicians administering the measures reported that maltreatment endorsements matched or slightly exceeded children's known histories. When endorsements exceeded known histories, the clinicians' opinion was that the endorsements were accurate.

Table 5: This table contains the stem items found in the Physical Abuse Self-Report (PHYA) measure administered at the age 12 interview.

#	Item	Question	Response
1	1	Has any adult ever hit you with something really dangerous, like a baseball bat or a shovel?	0 = No 1 = Yes
2	5	Has any adult ever hit you with something less dangerous, like a hairbrush or belt?	
3	9	Has an adult ever kicked or punched you?	
4	13	Has any adult ever bitten you?	
5	17	Has any adult ever pushed you around, like against a wall or down stairs?	
6	21	Has any adult ever burned or scalded you on purpose?	
7	25	Has any adult ever *tried* to choke, drown or smother you?	
8	29	Has any adult ever *made a threat* to cut or stab you with a knife, razor or something sharp like that?	
9	33	Has an adult ever actually stabbed you with a knife, razor, fork, or something sharp like that?	
10	37	Has any adult ever *threatened* to shoot you with a gun?	
11	41	Has any adult ever shot at you with a gun, but didn't hit you?	
12	45	Has any adult ever done something else that physically hurt you or put you in danger of being hurt?	
13	49	Has any adult ever bruised you, or given you a black eye?	
14	53	Has any adult ever broken one of your bones?	
15	57	Has any adult ever cut you in a way that caused you to bleed or need stitches?	
16	61	Has any adult ever knocked you out, or made you unconscious?	
17	65	Has any adult ever caused an injury to your eyes, ears, nose, or teeth?	
18	69	Has any adult ever wounded you by shooting you with a gun?	

Table 6: This table contains the stem items found in the Sexual Abuse Self-Report (SARA) measure administered at the age 12 interview.

#	Item	Question	Response
1	1	Has any adult or older kid ever made you look at something sexual, like pictures or movies?	0 = No 1 = Yes
2	5	Has anyone ever forced you to look at their sexual parts?	
3	9	Has anyone ever spied on you or TRIED to look at you without your clothes on when you didn't want them to?	
4	13	Has anyone ever touched your private parts or bottom in some way?	
5	17	Has anyone ever TRIED to touch your private parts or bottom in some way, but they weren't able to do it?	
6	21	Has anyone ever gotten you to touch their private parts or bottom in some way?	
7	25	Has anyone ever TRIED to get you to touch their private parts or bottom in some way, but they weren't able to?	
8	29	Has anyone else ever put some part of their body or anything else inside your private parts or bottom?	
9	33	Has anyone ever TRIED to put some part of their body or anything else inside your private parts or bottom, but they weren't able to do it?	
10	37	Has anyone ever put their mouth on your private parts or made you put your mouth on their private parts?	
11	41	Has anyone ever TRIED to put their mouth on your private parts or get you to put your mouth on their private parts, but they weren't able to do it?	
12	45	Has anyone ever made you do something else sexual with them or with another person that we have not already talked about?	

Analysis Plan

Latent Class Analysis

As previously described, the goal of this study is to establish groupings of children for the Longscan self-report measures of physical and sexual abuse individually and in combination. Latent class analysis (LCA) will be used to meet this goal because this analytic strategy can model the relationship between responses on the self-report measures (observed variables) and abuse classes (latent variables) (Lanza, Flaherty & Collins, 2003). LCA capitalizes on the heterogeneity inherent to abuse experiences because it uses variation in response patterns to meaningfully group children into classes. A series of three exploratory latent class analyses will be conducted to determine the class structure for: 1) physical abuse, 2) sexual abuse, and 3) physical and sexual abuse. LCA will be used to identify class membership among participants using observed variables; specifically, 12-year-old children's responses to the physical abuse and sexual abuse measures. The covariation among the observed variables will be explained by the latent classes. This analytic strategy is particularly effective for the proposed study because it will reveal how the probability of a child being in a particular latent class relates to all of the items for a particular measure and how class membership may change when different types of abuse (i.e. physical abuse and sexual abuse) are analyzed in conjunction.

In latent class models, participants' responses on the self-report measures will be used to estimate the number of abuse classes in the sample and the size of each class. From these estimations, the each class structure will be confirmed or refuted through an

iterative process beginning with a one-class solution and increasing successively until the best fitting solution is reached according to specified fit indices. The estimation procedure used in LCA is based upon the combined probability that a proportion of the population will fall into a given maltreatment class (i.e., *latent class probability*) and that a particular response to the self-report measure will occur (*conditional response probability)* (Lanza, Flaherty, & Collins, 2003). The probability of a particular response is conceptually similar to a factor loading in that these probabilities are the foundation from which the classes are derived. Since they represent probabilities, not regression coefficients, it is important to keep in mind that values close to 0 or 1 are desirable because they represent a strong relationship between the self-report item and the latent maltreatment construct.

The proposed relationships are depicted in the following figures: Figure 1 – Physical Abuse, Figure 2 – Sexual Abuse, Figure 3 – Combined Physical Abuse & Sexual Abuse. In each of these figures, the oval represents a categorical latent class variable, physical and/or sexual abuse. The arrows pointing from the oval to the rectangles represent the self-report items (i.e., observed variables). The arrows pointing to the oval represent background variables: CPS report, gender, ethnicity, and study site. Selection of the best fitting model for each of the three models (i.e., physical abuse, sexual abuse, and combined physical and sexual abuse) will be evaluated using the Lo-Mendell-Rubin Likelihood Ratio, an indicator associated with a probability (i.e., p-value), compares the fit of models that differ by one class (e.g., compares the fit of a 2-class solution to a 3-class solution) (Lo, Mendell, & Rubin, 2001; Vuong, 1989). A

probability of less than 5 percent (i.e., $p<0.05$) for the Lo-Mendell-Rubin test indicates that the model with more classes fits significantly better than the model with less (i.e., the 3-class solution fits significantly better than the 2-class solution). Overall fit indices including the Akaike Information Criteria, the Sample Size Adjusted Bayesian Information Criteria, and entropy will also be used to determine the best fitting model. To determine differences between the classes in gender, ethnicity, study site, and CPS report, additional Chi-Square tests and logistic regression analyses will be conducted on the best fitting models.

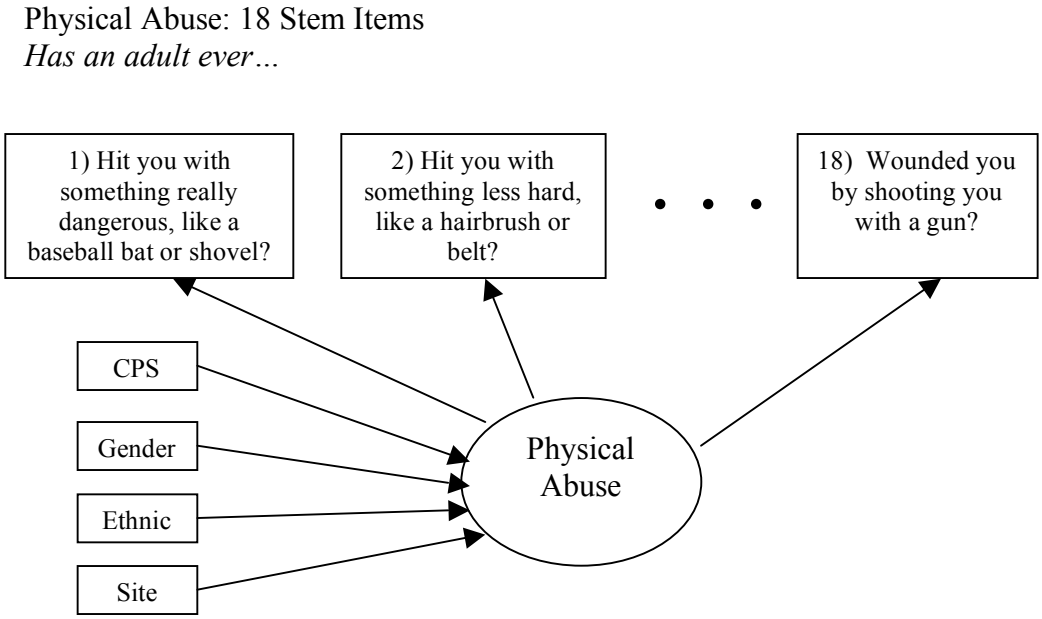

Figure 1: This figure contains the hypothesized latent class model for physical abuse. The categorical latent class variable is represented by an oval. The observed variables (i.e., self-report items) are represented by squares which have arrows pointed at them away from the oval. The covariates are represented by squares, which have arrows pointed from them toward the oval.

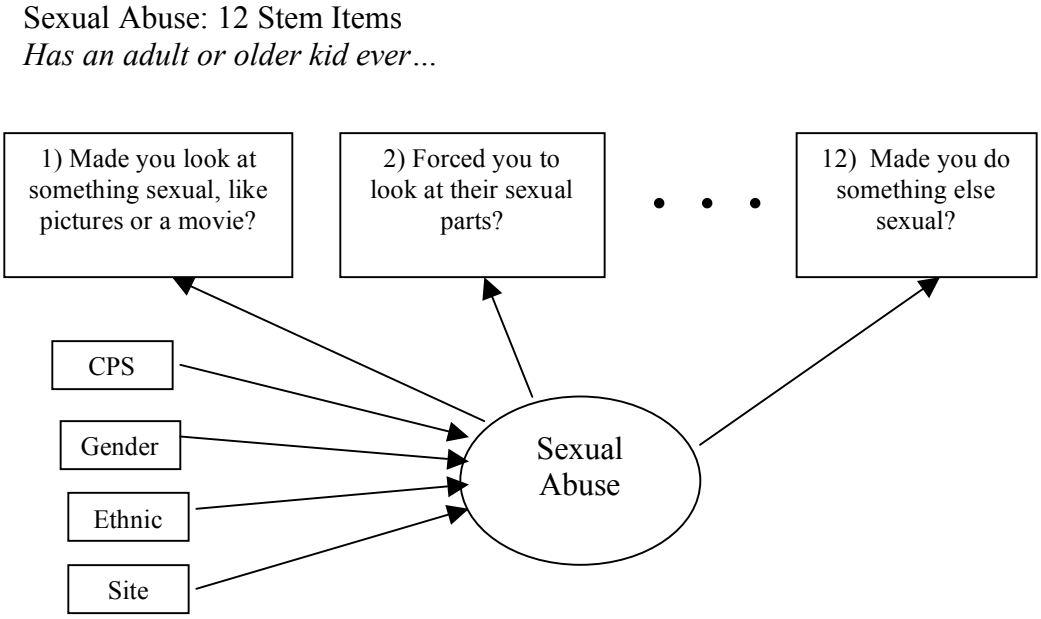

Figure 2: Hypothesized latent class model for sexual abuse. The categorical latent class variable is represented by an oval. The observed variables (i.e., self-report items) are represented by squares which have arrows pointed at them away from the oval. The covariates are represented by squares, which have arrows pointed from them toward the oval.

Physical & Sexual Abuse: 30 Stem Items = 18 Physical Abuse + 12 Sexual Abuse
Has an adult ever…

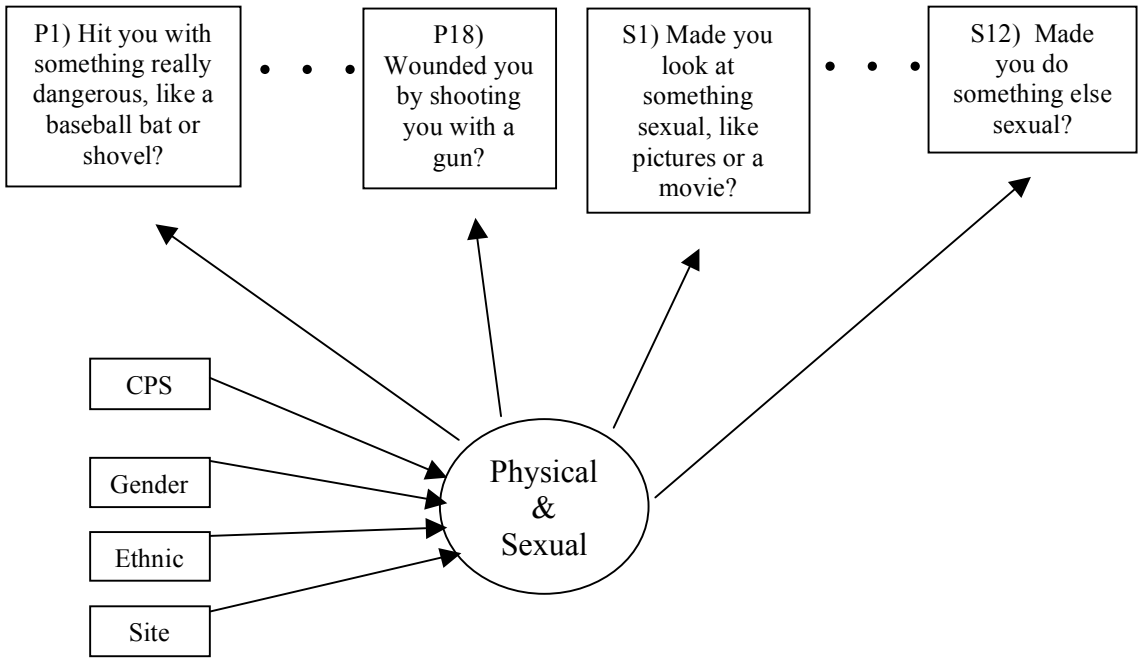

Figure 3: Hypothesized latent class model for combined physical and sexual abuse. The categorical latent class variable is represented by an oval. The observed variables (i.e., self-report items) are represented by squares which have arrows pointed at them away from the oval. The covariates are represented by squares, which have arrows pointed from them toward the oval.

CHAPTER 3

RESULTS

Missing Age 12 Interview

One-way analysis of variance tests were conducted to compare the difference between the subjects who completed the age 12 interview (N=845) and those who did not (N=460). Using a p-value cutoff of 0.01, the subjects who completed did not differ from those who did not by gender, ethnicity, physical abuse allegations, or sexual abuse allegations (Table 7). However, those who completed did differ from those who did not by study site. The Chicago site drove this difference; specifically, a significantly smaller proportion of children from the Chicago site completed the age 12 study as compared to the other four sites.

Table 7: This is an ANOVA summary table of the children who completed the age 12 interview (N=845) versus those who did not (N=460).

Test	F Statistic	Significance
Gender	1.02	.314
Ethnicity	4.10	.042
Physical Abuse	2.52	.134
Sexual Abuse	.120	.729
Site	13.65	<.001

Missing Data

Data for at less than 5% of the sample (N = 845) was missing. Maximum likelihood estimation was used to avoid dropping any cases with missing data. This approach typically yields less biased parameter estimates of missing data than alternatives (Schafer, 1997). No cases with missing data were dropped. Still, analyses were conduced comparing the cases with missing data to those with intact data and no differences were found by race, ethnicity, physical abuse, sexual abuse, or site.

Statistical Analysis Plan

Exploratory latent class analyses LCA were conducted with MPlus version 3.0 (Muthen & Muthen, 1998) to classify children from the multi-site Longscan Consortium based upon their responses to a youth self-report measure of physical abuse and sexual abuse. The analyses were performed in three stages. In the first stage, LCAs were conducted on the 18 binary items of the physical abuse youth self-report measure administered at the age-12 face-to-face interview. In the second stage, LCAs were conducted on the 12 binary items of the sexual abuse self-report measure administered at the same interview as the physical abuse measure. In the third stage, LCAs were conducted on the 30 items of the combined physical abuse and sexual abuse self-report measures (i.e., items from both measures were run simultaneously).

In LCA, classes were added iteratively until the model fit the data well both from a statistical and interpretive perspective. Random starting values were used. Latent class parameters were estimated using maximum likelihood estimation. Statistical criteria

were used in conjunction with model interpretability to determine the optimal number of classes for each: physical abuse, sexual abuse, and physical and sexual abuse. The statistical criteria that were used to guide this process were the lowest Akaike Information Criteria (AIC), the lowest sample size adjusted Bayesian Information Criterion (SS Adj. BIC), and the highest entropy. In addition, the Lo-Mendell-Rubin Likelihood Ratio significance level was used to determine if models that vary by one class significantly differ. *A priori* model interpretability guidelines require that each class in a given model is comprised of at least 1 percent of the sample (e.g., if the sample size is 800, then this would be a class with 8 children). Solutions that contain a class with less than 1 percent of the sample will be considered to be poor interpretively even if the statistical fit was adequate.

After the best fitting model was selected using the aforementioned criteria, logistic regression analyses were conducted on each of the items to ascertain the specific items that characterize each of the classes. Chi-Square tests and logistic regression analyses were conducted on the best fitting models to evaluate the background variables--gender, ethnicity, study site, and CPS report. Given the large number of significance tests, a conservative p-value of 0.01 was used for these analyses.

Physical Abuse Latent Class Analyses

Analyses of the 18 self-report items for physical abuse (n=819) indicate that the 2-class model was the best fitting solution as determined through the following process. (The results presented in this paragraph are found in Table 8.) The two-class solution

was interpretable and had a lower AIC and SS Adjusted BIC than the one-class solution. The two-class solution had a Lo-Mendell-Rubin Likelihood Ratio significance level $p<0.01$, indicating that the two-class solution had a superior fit than the one-class solution. The three-class solution was interpretable and had a lower AIC and SS Adjusted BIC than the two-class solution. According to the Lo-Mendell-Rubin Likelihood Ratio significance level $p<0.639$, there was not a significant difference in the fit of the two-class versus the three-class model to merit using the more complex 3-class model in this exploratory analysis. The fit of the four-class model was also interpretable and had a lower AIC but a higher SS Adjusted BIC than the three-class solution. Since the three-class solution did not fit better than the two-class solution, the Lo-Mendell-Rubin test comparing four versus three classes is not a meaningful comparison. The Lo-Mendell-Rubin test could not be used to compare the four-class and two-class models because this test can only compare models that differ by one class. The fit of the five-class model was not interpretable (i.e., for the 5-class solution, class 1 has 0.1% of subjects; Table 8) and had a higher AIC and SS Adjusted BIC than the 4 class model. Last, the entropy of the 2-class model was the highest of all of the models; a further indication of fit for the 2-class model.

Therefore, based upon the results from these exploratory LCA of the 18-item self-report physical abuse measure, the two-class solution was selected as the most robust model and will be presented in subsequent follow-up analyses. Class 1 has 73 members and Class 2 has 746 members. 8.9% of the children belong to the first class and 91.9% of children belong to the second.

Table 8: This table contains the fit indices for the latent class models of 18-item physical abuse measure (N = 819).

Model	AIC[a]	SS Adj BIC	Entropy[b]	LMR	Classes: n, %
1 Class	4136.60	4164.18	NA	NA	1: n = 819, 100%
2 Class	3723.82	3784.52	0.88	440.8*	1: n = 72, 8.9% 2: n = 746, 91.0%
3 Class	3697.31	3783.13	0.87	67.26	1: n = 17, 2.1% 2: n = 98, 11.9% 3: n = 704, 86.0%
4 Class	3705.22	3820.16	0.79	NA	1: n = 17, 2.1% 2: n = 51, 6.2% 3: n = 276, 33.7% 4: n = 475, 58.0%
5 Class	3717.74	3861.23	0.82	NA	1: n = 1, <0.1% 2: n = 16, 2.0% 3: n = 50, 6.1% 4: n = 277, 33.9% 5: n= 475, 57.9%

* $p < 0.05$
a = lower AIC and SS Adj. BIC values indicate better fit
b = entropy should be greater than 0.7. Values closer to 1 are better.

Table 9: This table contains the 2-class solution for the physical abuse model.

Item	Class 1 = 8.9% Physical Act with Injury	Class 2 = 91.1% Physical Act without Injury	Odds Ratio Class 1 reference
Phya1 = hit dangerous	0.850 0.150	0.994 0.006	0.023*
Phya5 = hit less dangerous	0.120 0.880	0.659 0.341	0.087*
Phya9 = kicked	0.461 0.539	0.964 0.036	0.026*
Phya13 = bitten	0.925 0.075	1.000 0.000	NS
Phya17 = pushed	0.528 0.472	0.985 0.015	0.020*
Phya21 = burned	0.935 0.065	0.987 0.013	0.136*
Phya25 = choked	0.862 0.138	0.998 0.002	0.006*
Phya29 = cut	0.945 0.055	1.000 0.000	NS
Phya33 = stabbed	0.967 0.033	1.000 0.000	NS
Phya37 = threaten shoot	0.934 0.066	0.978 0.022	0.193*
Phya41 = actually shot	0.967 0.033	0.997 0.002	0.063*
Phya45 = physically hurt	0.717 0.283	0.982 0.018	0.037*
Phya49 = bruised	0.490 0.510	0.981 0.019	0.016*
Phya53 = broken	0.966 0.034	0.995 0.005	0.126*
Phya57 = bleed	0.932 0.068	0.996 0.004	0.045*
Phya61 = knock out	0.965 0.035	0.995 0.005	0.126*
Phya65 = injure eye	0.897 0.103	0.996 0.004	0.029*
Phya69 = gunshot wound	0.989 0.011	0.995 0.005	NS

*$p<0.01$

Physical Abuse – Characterization of Classes for Two-Class Solution

The classes that comprise the 2-class solution for physical abuse were characterized based upon the proportion of affirmative (i.e., "yes") responses for each of the 18 items. (For specific item response probabilities refer to table 9). Twenty percent of children in class 1 (n=73, 8.9%) respond "yes" to the following five items: hit less danger, kicked, pushed, physically hurt, and bruised (Table 9). These items also represent highest peaks in the graph (Figure 4). Lesser peaks also occur for children in class 1 at the following two items: hit with dangerous object, choked and injure eye (Figure 4). For these items children in class 1 responded affirmatively greater than ten percent of the time but less than twenty percent of the time (Table 9). Based upon the response probabilities for class 1, this class was termed *Physical Act With Injury*.

Thirty-four percent of children in class 2 (n=746, 91.1%) respond affirmatively to being hit with less dangerous object (Table 9). For all of the other physical abuse items, more than 96 percent of children in class 2 respond "no." Based upon the item response probabilities for class 2, this class was termed *Physical Act Without Injury*.

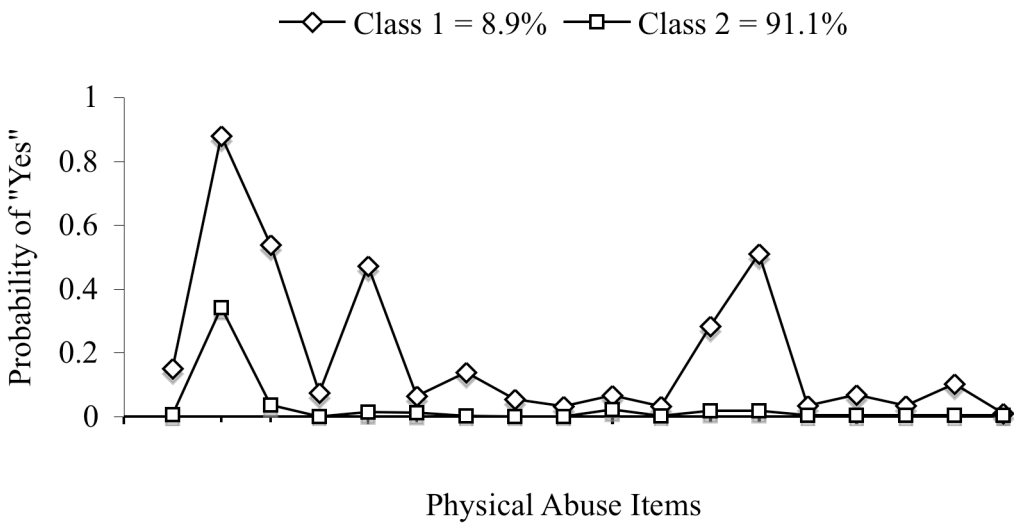

Figure 4: 2-Class Solution for Physical Abuse

In logistic regressions comparing item probabilities for class 1 (Physical Act With Injury) versus class 2 (Physical Act Without Injury), each of the five items represented by the highest proportion of affirmative responses for class 1 were significantly different for compared to class 2 at $p<0.01$. For all of the logistic regressions comparing the two classes, class 1 responded "no" significantly *less* often than class 2 (Table 9). The following items were also statistically significant at $p<0.01$: hit dangerous, burned, choked, bleed, injure eye. The following other items were significant at $p<0.01$: threaten shoot, actually shot, broken, and knock out. The classes did not significantly different with respect to being bitten, cut, stabbed, or wounded with a gun.

Physical Abuse - Evaluation of Control Variables

In order to determine if the two-class solution for physical abuse derived from LCA differed significantly according to gender, ethnicity, study site, or CPS report of physical abuse, individual chi-square tests of significance were conducted. The 2 classes did not significantly differ by the control variables: gender (Table 10), ethnicity (Table 11), study site (Table 12), or CPS report of physical abuse (Table 13). Study site and CPS report for sexual abuse were approaching significance with $p=0.018$ for each of these control variables. Individual logistic regressions of the classes with each of the control variables were also not significant for gender (Table 10), ethnicity (Table 11), study site (Table 12), and CPS report of physical abuse (Table 13).

Table 10: This table illustrates that classes do not significantly differ by gender for the 2-class physical abuse model – Male versus Female (Pearson Chi-Square = 0.001, p = 0.981).

Class	Male n (%)	Female n (%)	Odds Ratio
Physical Act With Injury	36 (4.4%)	37 (4.5%)	Ns
Physical Act Without Injury	369 (45.1%)	377 (46.0%)	reference
Grand Total	405 (49.5%)	414 (50.5%)	

ns = not significant

Table 11: This table illustrates that classes do not significantly differ by ethnicity for the 2-class physical abuse model – White versus Non-White (Pearson Chi-Square = 1.992, p = 0.158).

Class	White n (%)	Non-White n (%)	Odds Ratio
Physical Act With Injury	25 (3.1%)	48 (4.9%)	ns
Physical Act Without Injury	198 (24.2%)	548 (66.9%)	reference
Grand Total	223 (27.2%)	596 (72.8%)	

ns = not significant

Table 12: This table illustrates that classes do not significantly differ by study site for the 2-class physical abuse model – Baltimore/Chicago/North Carolina (At-Risk) versus San Diego/Seattle (Maltreated) (Pearson Chi-Square = 5.556, p = 0.018).

Class	SD/SE n (%)	BA/CH/NC n (%)	Row Total n (%)	Odds Ratio
Physical Act With Injury	44 (5.4%)	29 (3.5%)	73 (8.9%)	ns
Physical Act Without Injury	342 (41.8%)	404 (49.3%)	746 (91.1%)	reference
Grand Total	386 (47.1)	433 (52.9%)	819 (100%)	

ns = not significant

Table 13: This table illustrates that classes do significantly differ by CPS report of physical abuse for the 2-class physical abuse model – Yes versus No (Pearson Chi-Square = 5.584, p = 0.018).

Class	No PA n (%)	Yes PA n (%)	Row Total n (%)	Odds Ratio
Physical Act With Injury	39 (4.8%)	34 (4.2%)	73 (8.9%)	ns
Physical Act Without Injury	501 (61.2%)	245 (29.9%)	746 (91.1%)	reference
Grand Total	540 (65.9%)	279 (34.1%)	819 (100.0%)	

ns = not significant

Sexual Abuse Latent Class Analysis

Analyses of the 12 self-report items for sexual abuse (n=811) indicate that the 3-class model was the best fitting solution as determined through the following process. (The results presented in this paragraph are found in table 14.) The two-class solution was interpretable and had a lower AIC and SS Adjusted BIC than the one-class solution. The two-class solution has a Lo-Mendell-Rubin Likelihood Ratio significance level of $p<0.01$, indicating that the two-class solution is a better fitting model than the one-class solution. The three-class solution was interpretable and had a lower AIC and SS Adjusted BIC than the two-class solution. The three-class solution has Lo-Mendell-Rubin Likelihood Ratio significance level $p=0.0218$, indicating that the three-class

solution is better fit than the two-class solution. The fit of the four-class model was not interpretable and had a lower AIC but a higher SS Adjusted BIC than the three-class solution. The fit of the five-class model was not interpretable (i.e., class 1 had less than 1%; Table 14) and had a higher AIC and SS Adjusted BIC than the four-class model. Due to the lack of interpretability and comparatively poor overall statistical fit of the five-class, the Lo-Mendel-Rubin test was not conducted. Last, the entropy of the three-class model exceeded 0.9 a further indication of good fit.

Based upon the results from these exploratory LCA of the 12-item self-report sexual abuse measure, the three-class solution was selected as the most robust model and will be presented in subsequent follow-up analyses. Class 1 has 48 members, Class 2 has 741 members, and Class 3 has 22 members. 5.9% of the children belong to the first class, 91.4% of children belong to the second, and 2.7% belong to the third.

Table 14: This table contains the fit indices for the latent class models of 12-item sexual abuse measure (N = 811).

Model	AIC[a]	SS Adj BIC	Entropy[b]	LMR	Classes: n, %
1 Class	2909.21	2927.48	NA	NA	1: n = 811, 100%
2 Class	2152.60	2190.67	0.96	772.06*	1: n = 65, 8.0% 2: n = 746, 92.0%
3 Class	2114.57	2172.43	0.93	63.30*	1: n = 48, 5.9% 2: n = 741, 91.4% 3: n = 22, 2.7%
4 Class	2109.16	2186.82	0.93	31.05	1: n = 15, 1.9% 2: n = 742, 91.4% 3: n = 15, 1.9% 4: n = 39, 4.8%
5 Class	2112.75	2213.44	0.93	NA	1: n = 7, 0.8% 2: n = 15, 1.9% 3: n = 736, 90.7% 4: n = 25, 3.1% 5: n= 28, 3.5%

* $p < 0.05$
a = lower AIC, BIC and SS Adj. BIC values indicate better fit
b = entropy should be greater than 0.7. Values closer to 1 are better.

Sexual Abuse - Characterization of Classes for Three-Class Solution

The classes that comprise the 3-class solution for sexual abuse were characterized based upon the proportion of affirmative (i.e., "yes") responses for each of the 12 items. (For specific item response probabilities refer to table 15). Twenty to fifty percent of the children in class 1 (n = 48, 4.9%) responded affirmatively to the following five items: look at sexual picture, tried to look at private parts, touched you, tried to touch you, and tried to put something in your private parts (Table 15 and Figure 5). Less than twenty percent of the children in class 1 responded affirmatively to the remaining seven sexual abuse items. Based on this pattern of response, class 1 is termed *Low Sexual Contact*.

Children in class 2 (n=741, 91.4%) are characterized as responding negatively to all of the sexual abuse items (Table 15 and Figure 5). More than 98 percent of the children in class 2 responded "no" to all of the sexual abuse items. Based upon this pattern of response, class 2 is termed *No Sexual Abuse Self-Report.*

Children in class 3 (n=22, 2.7%) are characterized as responding affirmatively more than twenty percent of the time to all 12 of the sexual abuse items (Table 15 and Figure 5). More than sixty percent of the children in class 3 respond affirmatively to the following five sexual abuse items: look at sexual picture, look at your private parts, touched you, you touch them, and put mouth on your private parts. Forty-one to sixty percent of children in class 3 responded affirmatively to the following two items: put something in your private parts, and tried to put something in your private parts. Between twenty and forty percent of children responded affirmatively to the remaining

five sexual abuse items. Based upon this pattern of response, class 3 is termed *High Sexual Contact*.

Table 15: This table contains the 3-class solution for the sexual abuse model (N=811).

Item	Class 1 (5.9%)	Class 2 (91.4%)	Class 3 (2.7%)	Odds Ratio 1 vs. 2	Odds Ratio 1 vs. 3	Odds Ratio 2 vs. 3
sara1 = look at picture	0.731 0.269	0.988 0.160	0.240 0.760	0.025*	6.800*	276.533*
sara5 = look at you	0.870 0.130	0.992 0.008	0.277 0.723	0.041*	13.333*	326.667*
sara9 = tried to look	0.764 0.236	0.996 0.004	0.733 0.267	0.015*	NS	69.094*
sara13 = touched you	0.501 0.499	0.985 0.015	0.000 1.000	0.015*	NS	NS
sara17 = tried to touch	0.703 0.297	0.991 0.009	0.607 0.303	0.022*	NS	63.433*
sara21 = you touch them	0.876 0.124	0.999 0.001	0.091 0.909	NS	50.000*	NS
sara25 = tried you touch	0.893 0.107	0.996 0.004	0.732 0.268	0.028*	NS	92.250*
sara29 = put them in you	0.833 0.167	0.997 0.003	0.520 0.480	0.018*	4.333*	246.000*
sara33 = tried to put in	0.798 0.202	1.000 0.000	0.555 0.445	NS	NS	NS
sara37 = put mouth on	0.840 0.160	0.996 0.004	0.303 0.697	0.018*	11.566*	656.000*
sara41 = tried mouth on	0.906 0.094	0.999 0.001	0.603 0.397	0.012*	5.954*	512.308*
Sara45 = other sexual	0.938 0.062	0.991 0.009	0.650 0.350	0.090*	6.286*	70.000*

*p<0.01

Logistic regression analyses comparing individual item differences for the 3-class solution revealed the following. Class 1 (Low Sexual Contact) significantly differed from class 2 (No Sexual Abuse Self-Report) for ten of the twelve items (Table 15 and Figure 5). For the 10 statistically significant items, children in class 1 were *less* likely to respond *no* to these sexual abuse items than children in class 2 at $p < 0.01$. Class 3 (High Sexual Contact) significantly differed from class 2 (No Sexual Abuse Self-Report) for

nine of the twelve items (Table 15). For the nine statistically significant items, children in class 2 were significantly *more* likely to respond *no* to these sexual abuse items than children in class 3 $p < 0.01$. Class 1 (Low Sexual Contact) significantly differed from class 3 (High Sexual Contact) for seven of the twelve items (Table 15). For the 7 statistically significant items, children in class 1 were significantly *more* likely to respond *no* to these sexual abuse items than children in class 3.

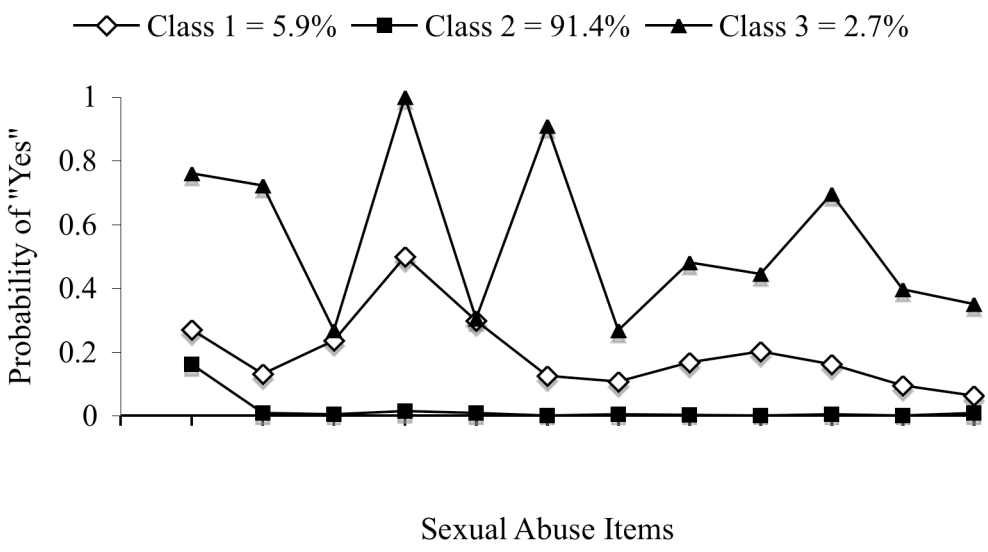

Figure 5: 3-Class Solution for Sexual Abuse

Sexual Abuse - Evaluation of Control Variables

To determine if the three-class solution of sexual abuse derived from LCA differed significantly according to gender, ethnicity, study site, or CPS report of physical abuse, chi-square tests of significance were conducted. The classes did not significantly differ by gender, ethnicity, or study site (Tables 16, 17, & 18). The classes significantly

differed by CPS report of sexual abuse (yes vs. no; Person Chi-Square = 26.292, p<0.01; Table 19). The odds of *not* having a CPS report is 3.320 times greater (p < 0.01) for children in Class 2 (No Sexual Abuse Self-Report) versus Class 1 (Low Sexual Contact) and is 4.569 times greater (p < 0.01) for children in Class 2 (No Sexual Abuse Self-Report) versus Class 3 (High Sexual Contact). There was not a significant difference in the odds of *not* having a CPS report for Class 1 (Low Contact) versus Class 3 (High Contact).

Table 16: This table illustrates that classes do not significantly differ by gender for the 3-class sexual abuse model – Male versus Female (Pearson Chi-Square = 2.773, p = 0.250).

Class	Male n (%)	Female n (%)	Odds Ratio	Odds Ratio
Low Contact	24 (2.95%)	24 (2.95%)	ns	reference
None	369 (45.5%)	372 (49.9%)	ns	ns
High Contact	7 (0.9%)	15 (1.8%)	reference	ns
Grand Total	400 (49.25%)	411 (50.65%)		

ns = not significant

Table 17: This table illustrates that classes do not significantly differ by ethnicity for the 3-class sexual abuse model – White versus Non-White (Pearson Chi-Square = 5.818, p = 0.055).

Class	White n (%)	Non-White n (%)	Odds Ratio	Odds Ratio
Low Contact	6 (0.7%)	42 (5.2%)	ns	reference
None	209 (25.8%)	532 (65.5%)	ns	ns
High Contact	7 (0.9%)	15 (1.8%)	reference	ns
Grand Total	222 (27.4%)	589 (72.6%)		

ns = not significant

Table 18: This table illustrates that classes do not significantly differ by study site for the 3-class sexual abuse model **–** Baltimore/Chicago/North Carolina (At-Risk) versus San Diego/Seattle (Maltreated) (Pearson Chi-Square = 3.305, p = 0.192).

Class	BA/CH/NC n (%)	SD/SE n (%)	Odds Ratio	Odds Ratio
Low Contact	21 (2.6%)	27 (3.3%)	ns	reference
None	401 (49.4%)	340 (41.9%)	ns	ns
High Contact	9 (1.1%)	13 (1.6%)	reference	ns
Grand Total	431 (53.1%)	380 (46.9%)		

ns = not significant

Table 19: This table illustrates that classes do significantly differ by CPS report of sexual abuse for the 3-class sexual abuse model – Yes versus No (Pearson Chi-Square = 26.292, p <.001).

Class	Yes SA n (%)	No SA n (%)	Odds Ratio	Odds Ratio
Low Contact	16 (2.0%)	32 (3.9%)	reference	0.301*
None	97 (12.0%)	644 (79.4%)	3.320*	reference
High Contact	9 (1.1%)	13 (1.6%)	ns	0.218*
Grand Total	122 (15.0%)	689 (85.0%)	811 (100%)	

*p<0.01

ns = not significant

Combined Physical Abuse & Sexual Abuse Latent Class Analysis

Analysis of the 18 physical abuse items and 12 sexual abuse items concurrently (n=795) indicate that the 4-class model was the best fitting solution as determined through the following process. (The results presented in this paragraph are found in table 20). The two-class solution was interpretable and had a lower AIC and SS Adjusted BIC than the one-class solution. The two-class solution has a Lo-Mendell-Rubin Likelihood Ratio significance level of p<0.01, indicating that the two-class solution is a superior fit

compared to the one class solution. The three-class solution was interpretable and had lower AIC and SS Adjusted BIC than the two-class solution (Table 20). According to the Lo-Mendell-Rubin Likelihood Ratio significance level, p=0.01, the three-class solution fits significantly better than the two-class solution. The four-class solution was interpretable and had lower AIC and SS Adjusted BIC than the three-class solution. The Lo-Mendell-Rubin Likelihood Ratio comparing the four-class solution to the three-class solution was significant, p=0.04, indicating that the four-class solution is a superior fit than the three-class solution. The fit of the five-class model was interpretable and had a lower AIC but a higher SS Adjusted BIC than the four-class solution. According to the Lo-Mendell-Rubin Likelihood Ratio significance level p=0.1, there was not a significant difference in the fit of the five-class model versus the four-class model. The fit of the six-class model was interpretable and had a higher AIC and SS Adjusted BIC than the five-class model. Lo-Mendel-Rubin could not be conducted to compare the six-class model to the five-class model since the fit of the five-class model was determined to be poorer than the four-class model. Lo-Mendel-Rubin can only compare models that differ by one class; therefore, the four-class model could not be compared to the six-class model.

Therefore, based upon these results from these exploratory latent class analyses of combined physical abuse and sexual abuse, the four-class solution was selected as the most robust model and will be presented in subsequent follow-up analyses. Class 1 has 677 members, Class 2 has 49 members, Class 3 has 46 members, and Class 4 has 23

members. 85.1% of the children belong to the first class, 6.2% of children belong to the second, 5.8% belong to the third, and 2.9% belong to the fourth.

Table 20: This table contains the fit indices for the latent class models of the 18-item physical and 12-item sexual abuse measures (N = 795).

Model[a]	AIC[a]	SS Adj BIC	Entropy[b]	LMR	Classes: n, %
1 Class	6839.72	6880.07	NA	NA	1: n = 795, 100%
2 Class	5815.57	5907.24	0.93	1077.19*	1: n = 98, 12.3% 2: n = 697, 87.7%
3 Class	5695.11	5797.37	0.94	58.21*	1: n = 59, 7.4% 2: n = 49, 6.2% 3: n = 687, 86.4%
4 Class	5611.63	5796.47	0.94	108.88*	1: n = 677, 85.1% 2: n = 49, 6.2% 3: n = 46, 5.8% 4: n = 23, 2.9%
5 Class	5609.12	5840.55	0.92	64.33	1: n = 24, 3.0% 2: n = 23, 2.9% 3: n = 31, 3.9% 4: n = 49, 6.2% 5: n = 668, 84.0%
6 Class	5631.81	5905.83	0.91	NA	1: n = 23, 2.9% 2: n = 17, 2.1% 3: n = 29, 3.7% 4: n = 24, 3.0% 5: n = 58, 7.3% 6: n = 644, 81.0%

* $p < 0.05$
a = lower AIC and SS Adj. BIC values indicate better fit
b = entropy should be greater than 0.7. Values closer to 1 are better.

Physical & Sexual Abuse - Identification of Classes for Four-Class Solution

The classes that comprise the four-class solution for physical and sexual abuse were characterized based upon the proportion of affirmative responses for each of the 30 items (18 physical abuse and 12 sexual abuse). (For specific item response probabilities

refer to table 21). Thirty-one percent of children in class 1 (n=677, 85.1%) are characterized by responding affirmatively to one item, being hit with less dangerous object (Table 21 and Figure 6). More than 96 percent of children in class 1 responded "no" to the other physical abuse items; and more than 99 percent of children in class 1 responded "no" to all of the sexual abuse items (Table 21). Based on the pattern of response, class 1 is termed *Physical Act Without Injury*.

More than fifty percent of children in class 2 (n=49, 6.2%) are characterized as responding affirmatively to the following five items: hit less danger, kicked, pushed, physically hurt, and bruised (Table 21 and Figure 7). Over 90 percent of children in class 2 responded "no" to the other physical abuse items and to eleven of the twelve sexual abuse items. Eighty-two percent of children in class 2 responded "no" to the sexual abuse item that asked if someone touched you. Based upon this pattern of response, class 2 is termed *Physical Act With Injury*.

Sixty-six percent of children in class 3 (n=46, 5.8%) are characterized as responding affirmatively to one physical abuse item (hit with less dangerous object). Over 90 percent of children in class 3 responded "no" to the other 17 physical abuse items (Table 21 and Figure 8). Forty-seven percent of children in class 3 responded affirmatively to the item asking if someone touched you and 36 percent responded affirmatively to the item asking if someone tried to touch you (Table 21). Twenty-six percent of children responded affirmatively to the following two items: look at sexual picture, and tried to look at your private parts. Twenty-two percent of children responded

affirmatively to: tried to put something in your private parts and put mouth on your private parts. Ten to twenty percent of children responded affirmatively to the following five items: had you touch them, tried to have you touch them, put something in your private parts, tried to put mouth on your private parts, and did something else sexual. Nine percent of children responded affirmatively to the item that asked about looking at your private parts. Based upon this pattern of response, class 3 is termed *Physical Act Without Injury & Low Sexual Contact*.

Seventy-five percent of children in class 4 (n=23, 2.9%) responded affirmatively to being hit with a less dangerous object (Table 21 and Figure 9). Twenty-five to fifty percent of children in class 4 responded affirmatively to the following physical abuse items: kicked, pushed, physically hurt, and bruised. Thirteen percent of children in class 4 responded affirmatively to the following items: choked, and cut. More than 91 percent of children in class 4 responded "no" to the remaining 11 physical abuse items. In class 4, more than 25 percent of the children responded affirmatively to all of the sexual abuse items; specific item response rates are as follows (Table 21). More than 75 percent of children in class 4 responded affirmatively to the following sexual abuse items: look at sexual picture, look at your private parts, touched you, and had you touch them. Sixty-nine percent of children responded affirmatively to the item that asked about someone putting their mouth on your private parts. Between twenty-five to forty-three percent of children responded affirmatively to the following seven sexual abuse items: tried to look at your private parts, tried to touch you, tried to have you touch them, put something in your private parts, tried to put something in your private parts, tried to put their mouth

on your private parts, and did something else sexual. Based upon this pattern of response children in class 4 was termed *Physical Act With Injury & High Sexual Contact*.

In logistic regressions comparing item response probabilities by class, children in class 2 (Physical Act With Injury) and class 4 (Physical Act With Injury & High Sexual Contact) were *less* likely to respond "no" to physical abuse items compared to class 1 (Physical Act Without Injury) and class 3 (Physical Act Without Injury & Low Sexual Contact) (Table 22 and Figure 10). Children in class 2 and class 4 significantly differed on only 1 physical abuse item, being bruised. For this item, children in class 2 were significantly *less* likely than to respond "no" to being bruised than children in class 4. Children in class 1 and class 3 differed on six physical abuse items: hit with dangerous object, hit with a less dangerous object, physically hurt, bruised, knocked out, and wounded with a gun. For each of these items, children in class 1 were *more* likely to respond "no" than children in class 3.

Children in class 3 (Physical Act Without Injury & Low Sexual Contact) and class 4 (Physical Act With Injury & High Sexual Contact) were *less* likely to respond "no" to sexual abuse items compared to class 1 (Physical Act Without Injury) and class 2 (Physical Act With Injury) (Table 22 and Figure 10). Children in class 3 and class 4 significantly differed on 5 sexual abuse items: look at sexual picture, look at you, you touch them, tried to put mouth on you. For each of these items, children in class 3 (Physical Act Without Injury & Low Sexual Contact) were *more* likely to respond "no" than children in class 4 (Physical Act With Injury & High Sexual Contact). Children in

class 1 and class 2 significantly differed on 3 sexual abuse items. For each of these items, children in class 1 (Physical Act Without Injury) were significantly *more* likely to respond “No” than children in class 2 (Physical Act With Injury).

Table 21: Part 1 - This table contains the physical abuse items of 4-class solution for the combined model (N = 795).

Item	Class 1 85.1%	Class 2 6.2%	Class 3 5.7%	Class 4 2.9%
Phya1 = hit dangerous	0.996 0.004	0.895 0.105	0.916 0.084	0.917 0.083
Phya5 = hit less dangerous	0.682 0.318	0.101 0.899	0.345 0.655	0.246 0.754
Phya9 = kicked	0.967 0.033	0.455 0.554	0.899 0.111	0.514 0.486
Phya13 = bitten	1.000 0.000	0.948 0.052	0.961 0.039	0.913 0.087
Phya17 = pushed	0.983 0.017	0.458 0.542	0.950 0.050	0.660 0.340
Phya21 = burned	0.988 0.012	0.936 0.064	0.978 0.022	0.917 0.083
Phya25 = choked	0.999 0.001	0.844 0.156	1.000 0.000	0.870 0.130
Phya29 = cut	1.000 0.000	0.965 0.035	1.000 0.000	0.870 0.130
Phya33 = stabbed	1.000 0.000	0.983 0.017	1.000 0.000	0.957 0.043
Phya37 = threaten shoot	0.977 0.023	0.936 0.064	0.938 0.062	1.000 0.000
Phya41 = shot but missed	1.000 0.000	1.000 0.000	0.922 0.078	1.000 0.000
Phya45 = physically hurt	0.984 0.016	0.386 0.614	0.918 0.082	0.656 0.344
Phya49 = bruised	0.984 0.016	0.386 0.614	0.869 0.131	0.725 0.254
Phya53 = broken	0.994 0.006	0.963 0.037	1.000 0.000	1.000 0.000
Phya57 = bleed	0.998 0.002	0.924 0.076	1.000 0.000	0.957 0.043
Phya61 = knock out	0.999 0.001	1.000 0.000	0.922 0.078	0.913 0.087
Phya65 = injure eye	0.994 0.006	0.908 0.092	1.000 0.000	0.913 0.087
Phya69 = gunshot wound	0.997 0.003	1.000 0.000	0.961 0.039	1.000 0.000

Table 21: Part 2 - This table contains the sexual abuse items of 4-class solution for the combined model (N = 795).

Item	Class 1 85.1%	Class 2 6.2%	Class 3 5.7%	Class 4 2.9%
Sara1 = look @ picture	0.991 0.009	0.907 0.093	0.732 0.268	0.232 0.768
Sara5 = look @ you	0.993 0.007	0.953 0.047	0.908 0.092	0.232 0.768
Sara9 = tried look	0.994 0.006	1.000 0.000	0.640 0.260	0.747 0.253
sara13 = touch you	0.992 0.008	0.817 0.183	0.528 0.472	0.000 1.000
Sara17 = tried touch	0.990 0.010	1.000 0.000	0.644 0.356	0.652 0.348
sara21 = you touch them	0.999 0.001	1.000 0.000	0.879 0.121	0.080 0.920
sara25 = tried you touch them	0.997 0.003	1.000 0.000	0.863 0.137	0.737 0.263
sara29 = put in you	0.996 0.004	0.977 0.023	0.827 0.173	0.567 0.433
Sara33 = tried put in you	1.000 0.000	0.984 0.016	0.772 0.228	0.595 0.405
Sara37 = mouth on you	0.998 0.002	1.000 0.000	0.792 0.218	0.315 0.685
sara41 = tried put mouth on you	1.000 0.000	0.984 0.016	0.892 0.108	0.630 0.370
Sara45 = other sexual	0.992 0.008	1.000 0.000	0.886 0.114	0.699 0.301

Table 22: Part 1 - This table contains the odds ratios for physical abuse of 4-class solution (N = 795).

Item	OR 1 vs 2	OR 1 vs 3	OR 1 vs 4	OR 2 vs 3	OR 2 vs 4	OR 3 vs 4
Phya1 = hit dangerous	31.349*	21.397*	21.39*	NS	NS	NS
Phya5 = hit less dangerous	23.213*	4.264*	5.846*	0.184*	NS	NS
Phya9 = kicked	41.179*	NS	23.907*	0.077*	NS	7.517*
Phya13 = bitten	NS	NS	NS	NS	NS	NS
Phya17 = pushed	68.668*	NS	25.257*	0.021*	NS	11.733*
Phya21 = burned	7.433*	NS	NS	NS	NS	NS
Phya25 = choked	152.100*	NS	101.400*	NS	NS	NS
Phya29 = cut	NS	NS	NS	NS	NS	NS
Phya33 = stabbed	NS	NS	NS	NS	NS	NS
Phya37 = threaten shoot	NS	NS	NS	NS	NS	NS
Phya41 = shot but missed	NS	NS	NS	NS	NS	NS
Phya45 = physically hurt	26.711*	5.766*	32.291*	NS	NS	NS
Phya49 = bruised	115.774*	7.662*	18.127*	0.066*	0.156*	NS
Phya53 = broken	NS	NS	NS	NS	NS	NS
Phya57 = bleed	30.000*	NS	NS	NS	NS	NS
Phya61 = knock out	NS	64.381*	64.381*	NS	NS	NS
Phya65 = injure eye	19.119*	NS	16.024*	NS	NS	NS
Phya69 = gunshot wound	NS	15.341*	NS	NS	NS	NS

*p<0.01

Table 22: Part 2 - This table contains the odds ratios for sexual abuse of 4-class solution (N = 795).

Item	OR 1 vs 2	OR 1 vs 3	OR 1 vs 4	OR 2 vs 3	OR 2 vs 4	OR 3 vs 4
sara1 = look @ picture	15.605*	44.056*	316.861*	NS	20.306*	7.192*
sara5 = look @ you	8.765*	12.800*	483.840*	NS	55.200*	37.800*
sara9 = tried look	NS	66.280*	59.382*	NS	NS	NS
sara13 = touch you	28.675*	122.000*	NS	4.255*	NS	NS
sara17 = tried touch	NS	61.531*	51.048*	NS	NS	NS
sara21 = you touch them	NS	101.400*	7097.997*	NS	NS	70.000*
sara25 = tried you touch	NS	60.577*	119.118*	NS	NS	NS
sara29 = put in you	NS	54.649*	172.821*	NS	36.923*	NS
sara33 = tried put in you	NS	NS	NS	16.941*	30.857*	NS
sara37 = mouth on you	NS	212.457*	1545.143*	NS	NS	NS
sara41 = tried put mouth	NS	NS	NS	NS	30.857*	5.271*
Sara45 = other sexual	NS	20.160*	58.800*	NS	NS	NS

*p<0.01

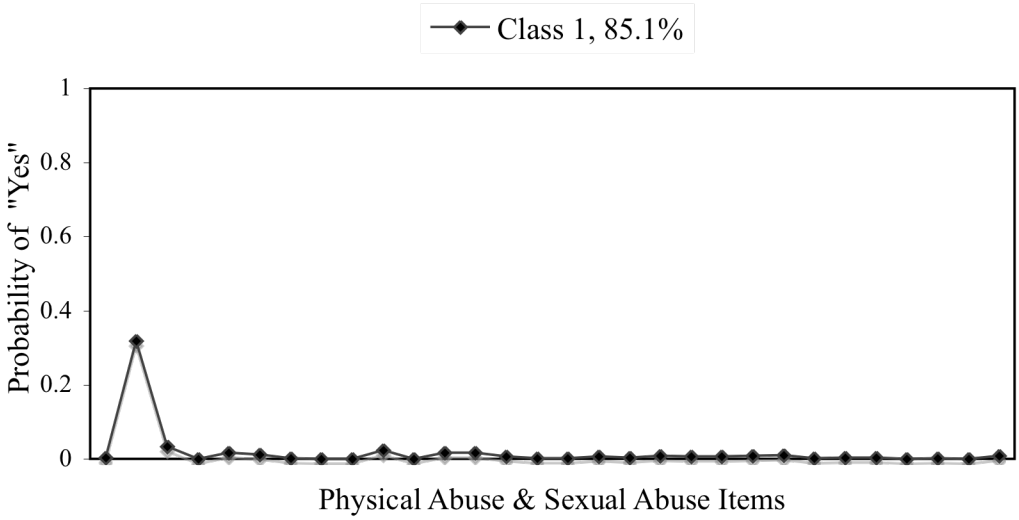

Figure 6: Class 1 - Physical Contact with Inury from 4-Class Combined Physical and Sexual Abuse Solution

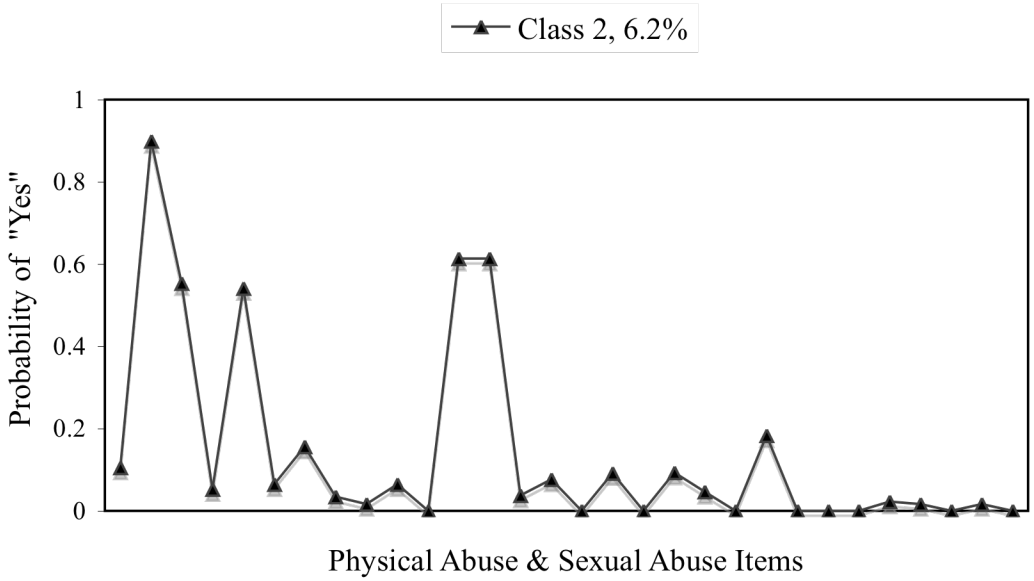

Figure 7: Class 2 - Physical Contact with Inury from 4-Class Combined Physical and Sexual Abuse Solution

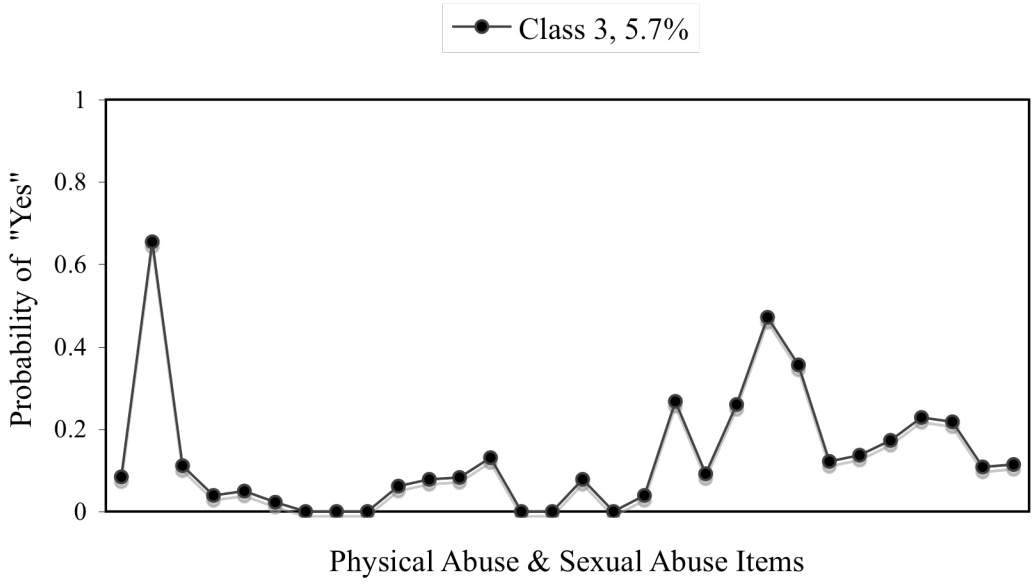

Figure 8: Class 3 - Physical Contact without Inury and Sexual Contact from 4-Class Combined Physical and Sexual Abuse Solution

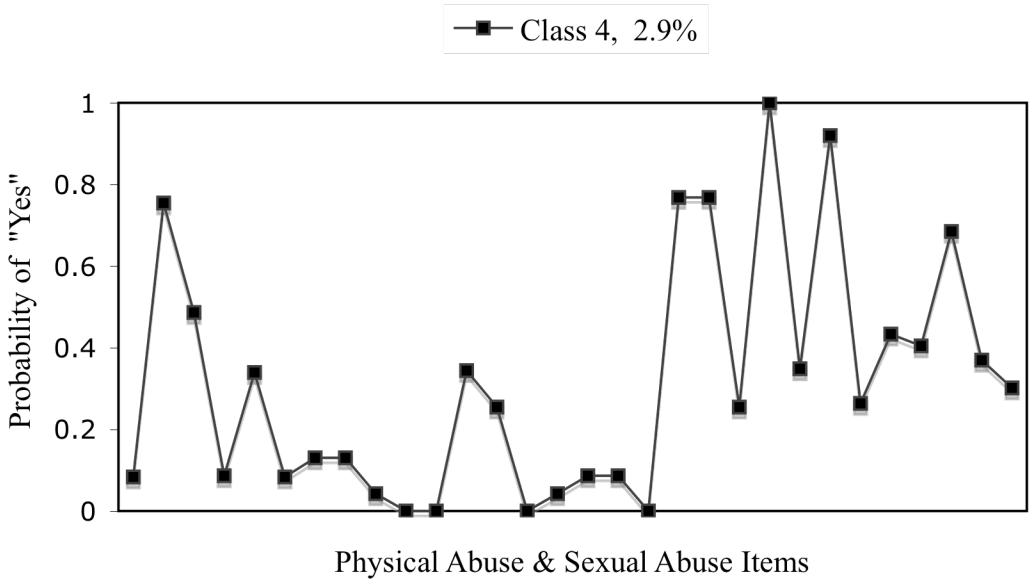

Figure 9: Class 4 - Physical Contact with Inury and Sexual Contact from 4-Class Combined Physical and Sexual Abuse Solution

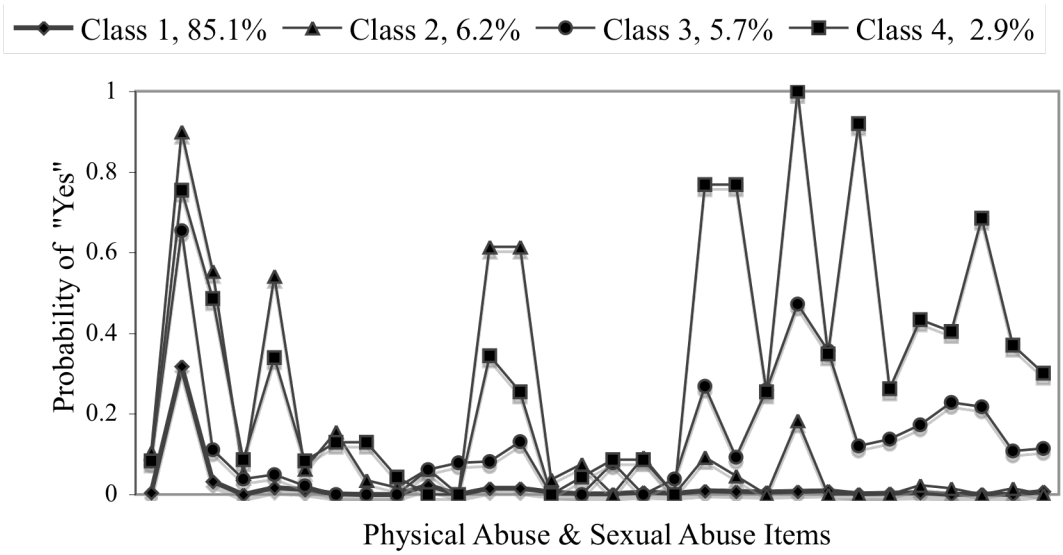

Figure 10: All of the classes from 4-Class Combined Physical and Sexual Abuse Solution

Combined Physical Abuse & Sexual Abuse - Evaluation of Control Variables

To determine if the three class solution of sexual abuse derived from LCA differed significantly according to gender, ethnicity, study site, or CPS report of physical abuse, chi-square tests of significance were conducted. The classes did not significantly differ by gender, ethnicity, or study site (Tables 23, 24, & 25). The classes significantly differed by CPS report of physical and/or sexual abuse (Pearson Chi-Square = 27.500, $p<0.01$; Table 26). The odds of having a *not* CPS report is 2.207 times less likely ($p<0.01$) for class 2 (Physical Act With Injury) versus class 1 (Physical Act Without Injury) ($p=0.015$), 2.558 times less likely ($p<0.01$) for class 3 (Physical Act Without Injury & Low Sexual Contact) versus class 1, and 5.102 times less likely for class 4

(Physical Act With Injury & High Sexual Contact) versus class 1 (Table 26). Classes 2, 3, and 4 did not significantly differ according to CPS report of physical and/or sexual abuse.

Table 23: This table illustrates that classes do not significantly differ by gender for the 4-class combined model – Male versus Female (Pearson Chi-Square = 6.636, p = 0.084).

Class	Male n (%)	Female n (%)	Odds Ratio	Odds Ratio	Odds Ratio
Physical Act Without Injury	333 (41.9%)	344 (43.3%)	reference	ns	ns
Physical Act With Injury	28 (3.5%)	21 (2.6%)	ns	reference	ns
PA W/out Injury & Sexual Contact	25 (3.1%)	21 (2.6%)	ns	ns	reference
PA With Injury & Sexual Contact	6 (0.8%)	17 (2.1%)	ns	ns	ns
Grand Total	392 (49.3%)	403 (50.7%)			

ns = not significant

Table 24: This table illustrates that classes do not significantly differ by ethnicity for the 4-class combined model – White versus Non-White (Pearson Chi-Square = 6.722, p = 0.081).

Class	White n (%)	Non-White n (%)	Odds Ratio	Odds Ratio	Odds Ratio
Physical Act Without Injury	188 (23.6%)	489 (61.5%)	reference	ns	ns
Physical Act With Injury	17 (2.1%)	32 (4.0%)	ns	reference	ns
PA W/out Injury & Sexual Contact	6 (0.8%)	40 (5.0%)	ns	ns	reference
PA With Injury & Sexual Contact	8 (1.0%)	15 (1.9%)	ns	ns	ns
Grand Total	219 (27.5%)	576 (72.5%)			

ns = not significant

Table 25: This table illustrates that classes do not significantly differ by study site for the 4-class combined model – Baltimore/Chicago/North Carolina (At-Risk) versus San Diego/Seattle (Maltreated) (Pearson Chi-Square = 9.465, p = 0.024).

Class	SD/SE n (%)	BA/CH/NC n (%)	Odds Ratio	Odds Ratio	Odds Ratio
Physical Act Without Injury	305 (38.4%)	372 (46.8%)	reference	ns	ns
Physical Act With Injury	31 (3.9%)	18 (2.3%)	ns	reference	ns
PA W/out Injury & Sexual Contact	23 (2.9%)	23 (2.9%)	ns	ns	reference
PA With Injury & Sexual Contact	15 (1.9%)	8 (1.0%)	ns	ns	ns
Grand Total	374 (47.0%)	421 (53.0%)			

ns = not significant

Table 26: This table illustrates that classes do not significantly differ by CPS report for physical abuse and/or sexual abuse for the 4-class combined model – Yes versus No (Pearson Chi-Square = 27.500 $p < 0.01$).

Class	No n %	Yes n %	Odds Ratio	Odds Ratio	Odds Ratio
Physical Act Without Injury	435 (54.7%)	242 (30.4%)	reference	2.206*	2.554*
Physical Act With Injury	22 (2.8%)	27 (3.4%)	0.453*	reference	ns
PA W/out Injury & Sexual Contact	19 (2.4%)	27 (3.4%)	0.391*	ns	reference
PA With Injury & Sexual Contact	6 (0.8%)	17 (2.1%)	0.196*	ns	ns
Grand Total	482 (60.6%)	313 (39.4%)			

*p<0.01

ns = not significant

CHAPTER 4

DISCUSSION

The present investigation identified groups of 12-year-old children according to their responses to self-report measures of physical and sexual abuse. Groups of children were derived for physical and sexual abuse individually and in combination for 845 children participating in the Longitudinal Studies in Child Abuse and Neglect. Results supported a two-class model for physical abuse, a three-class model for sexual abuse, and a four-class model for combined physical and sexual abuse. The model that combined physical and sexual abuse replicated the findings from the models in which physical abuse and sexual abuse were analyzed separately. The finding of discrete classes suggests that a child's self-report of physical and sexual abuse can be used to identify distinct groups of children. The classes reflect that children are able to self-report abuse in a graded manner as the classes characterize children who report no abuse, report moderate abuse, and severe abuse.

Four control variables were assessed for each of the models: gender, ethnicity, study site, and CPS report. For the two-class physical abuse model, children did not significantly differ according to the control variables. For the three-class sexual abuse model, children who self-reported sexual abuse were significantly more likely to have a CPS report for sexual abuse; children did not differ on the other control variables. Similarly, for the four-class combined physical and sexual abuse model, children who self-reported physical

and/or sexual abuse were more likely to have CPS report for these types of abuse; differences were not found for the other control variables.

Physical Abuse

Results of the LCAs for the 18 physical abuse items revealed a 2-class solution (Figure 4). The two classes did not significantly differ by gender, ethnicity, study site, or CPS report of physical abuse. Class 1, termed *Physical Act With Injury*, represented children who responded affirmatively to being "hit with a less dangerous object, kicked, pushed, physically hurt, and bruised." 8.9% percent of children fell into this class of children who reported experiencing moderate physical abuse from a parent or caregiver. More than 95 percent of children in this class indicated that they had not experienced more severe physical injury items that included asking about being "cut, stabbed, shot, or knocked out." Thus, children were able to discriminate among types of physical abuse and that even among children who report physical injury, certain forms of physical abuse are uncommon.

Rates of certain forms of physical abuse may be low for children in class 1, *Physical Act With Injury,* for several reasons. First, even among the maltreated and at-risk youth who comprise the present sample, severe forms of physical abuse, such as stabbing, seldom occur. Second, due to the low frequency of occurrence, it is possible that the 2-class solution, which was the most robust in this analysis, did not reflect the infrequent response pattern for children who endorse more severe abuse. A distinct class that characterizes the responses of children who experience more severe forms of physical

abuse could be meaningful for relating the abuse experiences of those children to outcomes. However, due to the low frequency of response for the severe items, children who endorse these items in the two-class solution were subsumed in class 1. Third, children may fail to self-report severe physical abuse due to memory limitations (e.g., the abuse occurred at a young age), for fear of potential repercussions (e.g., CPS involvement), or a host of other individual factors. Last, it is possible that those who experienced the most severe forms of abuse were also those who were missing at age 12 and therefore their responses are not present in the analysis.

Class 2, termed *Physical Act Without Injury*, represented children who responded affirmatively to "being hit with a less dangerous object," such as a belt or a hand, and responded "no" to all other physical abuse items. 90.1% percent of children fell into this class. One-third of children in class 2 report that they were hit with a "less dangerous' object and two-thirds do not report any physical acts (i.e., "no" to all physical abuse items). Class 2 demonstrates that children do not characterize all physical acts as resulting in injury. It is possible children not reporting injury, as a proxy for physical abuse because they have forgotten about the injury, even when presented with specific questions about injury. However, it is also possible that fear of repercussions influence self-report of children in class 2, much in the same way they could for children in class 1.

Overall, fourteen of the eighteen physical abuse items differentiated class 1 and class 2. The item regarding being "hit with a less dangerous object," which was endorsed by both classes, was also one of the items that differentiated the classes. Specifically,

significantly more children in Class 1 responded affirmatively to being "hit with a less dangerous object" than those in class 2 (88% and 34% respectively). While being hit with a less dangerous object, is not in and of itself indicative of physical abuse, higher rates of are found for children in class 1, *Physical Act With Injury,* compared to children in class 2, *Physical Act Without Injury*. For all of the items that differentiated the two classes, children in class 1 (Physical Act With Injury) were significantly *more* likely to respond "yes" to physical abuse items that children in class 2 (Physical Act Without Injury.)

The rate of 8.9 percent for youth self-report of physical abuse in the present investigation is at the low end of the range of values reported by other national surveys, who report 6% to 28% for participants ages 9 to 24 (Bensley et al., 1999; Costello et al., 1996; Fisher et al., 1997; Kilpatrick et al., 2000; MacMillan et al., 1997; Nelson et al., 1994a). The samples for these investigations were school or community based whereas the Longscan sample was comprised of children who were determined to be at risk or to have CPS involvement prior to study enrollment. Given the difference in sample characteristics, one might expect self-report of physical abuse in the Longscan sample to be at the high end of what was found in community-based samples. However, it is possible that the children in the Longscan sample underreport physical abuse for fear of potential CPS involvement. It is also possible that children who have been maltreated or are at greater risk for maltreatment have a higher threshold for what they consider physical abuse, even when they are presented with specific questions, which contributes to lower rates of physical abuse reports compared to community samples.

Methodological differences in measure configuration and administration as well as sample characteristics impacted rates of response for physical abuse. The studies with community samples used from 1 to 7 screening questions for physical abuse; however, the Longscan study utilized 18 screener questions. In addition, the Longscan self-report measure was administered in an audio computer assisted self-interview (A-CASI) (Black & Ponirakis, 2000). This format was selected to maximize confidentiality during administration. The A-CASI format also facilitated comprehension for children who may have difficulty reading, in that all questions and responses were read by an automated voice that the child listened to through headphones. In the aforementioned community-based studies, format of administration varied and included: self-administration of a paper and pencil measure, face-to-face interview, and telephone interview. The face-to-face and telephone formats are more likely to yield socially desirable responses than the A-CASI format because subjects must reveal their responses to the interviewer. The Longscan consortium maximized comprehension and confidentiality in designing the self-report measures for physical abuse with 18 specific screening items and an A-CASI format. Therefore, although the results of the present investigation differ from other studies, they are considered a reliable indicator of youth self-report.

Overall, it seems as though children are self-reporting less physical abuse than CPS reports indicate. 8.9 percent of the children self-report physical abuse, while 34.1 percent have CPS reports from birth to age 12. Thirty percent of the sample have a CPS report of physical abuse from birth to age 12 but report only being “hit with a less dangerous object”; whereas 4.8 percent report experiencing physical acts with injury but

do not have a CPS report for physical abuse. Of the children in class 1 (physical act with injury), 53% did not have a CPS report. Therefore, more than half of the children in this class report being physically abused but have not had CPS involvement for physical abuse. Of the children in the class 2 (physical act without injury), 33% had a CPS report. Although children in this class are not self-reporting physical abuse beyond being "hit with a less dangerous object," 1 in 3 children have had CPS allegation for physical abuse. These differences could be related to the timing, secrecy and fear associated with physical abuse. It is likely that children who experienced physical abuse earlier in life are less likely to recall this abuse and therefore may indicate that they did not experience physical abuse when they self-report. In addition, physical abuse often occurs behind closed doors and some children may not report physical abuse because they are afraid of repercussions from abusive caregivers. Last, youth self-report and CPS report tap different aspects of physical abuse as CPS reports are based on state mandated definitions and youth self-report is based on individual perception. Therefore, it is understandable that some children would report abuse that is beyond the scope of what CPS can detect and commendable that less that 5 percent appears to be overlooked. And, it points to using both sources as indicators of physical abuse.

Sexual Abuse

Results of the latent class analyses for the 12 physical abuse items revealed a 3-class solution as the best fitting model (Figure 5). 5.9 percent of children were grouped into class 1, termed *Low Sexual Contact*. Children in class 1 had the highest affirmative responses to items that involved: looking at sexual pictures, tried to look at, touch, or put

something in your private parts, or actually touched your private parts. These items primarily involve non-contact sexual abuse. However, one item, touched your private parts, involved sexual contact that does not involve penetration. Overall, children in class 1 did not endorse items that involved sexual abuse with penetration. The responses in this class suggest that, similar to class 1 in the physical abuse solution, children are able to provided nuanced responses to questions about sexual abuse without "kitchen sinking" (i.e., responding yes to all items).

Over 91 percent of children were grouped into class 2, termed *No Sexual Abuse Self-Report*. The children in this class responded, "no" to all of the sexual abuse items more than 99 percent of the time. Therefore, the majority of children responding to the sexual abuse measure reported that they have never experienced any form of sexual abuse. Class 2 appears to be the most stable, cohesive class to result from the latent class modeling. Children in this class are indicating that according to their own self-report the children in this class have not experienced sexual abuse. Given that the best fitting model has 3 classes, it is likely that children who indicted that they experienced some abuse would have been grouped in class 1 and not subsumed under class 2. However, as mentioned previously, it is possible that some children are not endorsing sexual abuse items for a variety of individual reasons, which were discussed in the physical abuse section (e.g., memory limitations, fear of repercussions, or dissociation of experiences).

Approximately 3 percent of children were placed in class 3, labeled *High Sexual Contact*. Children in this class responded affirmatively to all of the sexual abuse items at

a rate of 27% to 100%. At the low end of this range, 1 in 4 children in class 3 said that an adult tried to look at their private parts versus 1 in 250 children in class 1 (Low Sexual Contact). At the high end of the range, every child in class 3 said that an adult touched their private parts versus 1 of 100 children in class 1. The items that were endorsed at least by 1 in 2 children in class 3 involved "looking at sexual pictures or at your private parts; touching your private parts; having you touch their private parts; putting something in your private parts; putting their mouth on your private parts." Several of the items for which more than 40 percent of children in class 3 responded affirmatively, involved sexual contact that included penetration. Children in class 3 were significantly more likely to respond, "yes" to items that involve penetration than children in class 1.

In sum, the 3-class solution for sexual abuse suggests that children are able to report sexual abuse information in a graded manner. Of the children who report experiencing sexual abuse (i.e., class 1 and class 3), two-thirds report low sexual contact and one-third report high sexual contact. Children in class 2 (No Self-Reported Sexual Abuse) was significantly more likely to respond "no" to sexual abuse items than children in class 1 (Low Sexual Contact) or children in class 3 (High Sexual Contact). In comparing the two sexual abuse classes, children in class 1 (Low Sexual Contact) were significantly more likely to respond "no" to sexual abuse items than children in class 3 (High Sexual Contact).

For the 3-class model, 8.6% of 12-year-old children reported experiencing some form of sexual abuse in their lifetime. 8.3 percent of males and 9.4 percent of females

self-reported sexual abuse; reporting rates did not differ significantly by gender. Self-report rates also did not differ significantly by ethnicity or study site. Children in class 1 (Low Sexual Contact) were 3.3 times more likely to have a CPS report for sexual abuse than children in class 2 (No Self-Report of Sexual Abuse). Children in class 3 (High Sexual Contact) were 5.6 times more likely to have a CPS report for sexual abuse than children in class 2. Class 1 and class 3 did not significantly differ in CPS reports for sexual abuse. Therefore, children in class 1 and class 3 had significantly more CPS reports than children in class 1. This is congruent with the self-report since children in class 1 and class 3 indicate that sexual abuse had occurred and children in class 3 indicate that it had not occurred.

The rate of 8.6 percent for youth self-report of sexual abuse is in the middle to upper end of the range of values reported by other national surveys that report 5 to 11% for participants age 10 to 24 (Bensley et al., 1999; Costello et al., 1996; Finkelhor & Dziuba-Leatherman, 1994; Fisher et al., 1997; Kilpatrick et al., 2000; Nelson et al., 1994b). The rate for males in the present investigation, 8.6%, is somewhat higher than other studies, which report 2% to 6% for males (Bensley et al., 1999; Finkelhor & Dziuba-Leatherman, 1994; Fisher et al., 1997; Nelson et al., 1994b). For females, the rate of 9.4% in the present investigation falls somewhat lower than other studies, which report from 10-11% for females (Bensley et al., 1999; Finkelhor & Dziuba-Leatherman, 1994; Fisher et al., 1997; Nelson et al., 1994b). As mentioned previously for physical abuse, these differences could be related to the school or community samples in the other studies versus the at-risk/maltreated sample in the present investigation. This difference could

also be related to the same methodological differences detailed in the physical abuse section between the Longscan study and the comparison studies (e.g., number of items, format of administration, sample characteristics).

Differences in the specificity and quantity of screening items are likely to impact response patterns. As mentioned previously, Amaya-Jackson (2000) noted in a review of youth self-report of abuse that more screening items seemed to result in greater endorsement. Presenting children with specified acts may help them accurately identify past experiences of sexual abuse whereas global items may result in more children being unsure if abuse occurred. Item specificity could be particularly salient for the present finding regarding males; boys in the present investigation reported being sexually abuse more often than community samples. However, the present findings for sexual abuse did not support the impact of screening items across gender. Rates of self-reported sexual abuse for males was higher than that found in previous youth self-report studies, which is congruent with more screening items yielding higher rates of self-report. However, rates of self-reported sexual abuse were the equivalent for females in the present investigation compared to previous studies. It is possible that the Longscan sample has more males self-reporting sexual abuse because it is an at-risk/CPS involved sample; however, it is also possible that the targeted screening items used in the Longscan measure were advantageous for detecting sexual abuse in males. Males may be less likely to endorse general questions about being "sexually abused" but will endorse items that act about specific sexual acts. Conversely, females may be more likely to endorse sexual abuse items when they are presented with global items about sexual abuse rather than items that

ask specifically about sexual acts, as in the Longscan measure. The present findings could also mean that the number of screening items does not influence response rates for females. However, further work is required before a determination can be made regarding the impact of the specificity and quantity of screener items on response rates for males and females.

Children in class 1 and class 3 had significantly greater odds of having a CPS report for sexual abuse compared to class 2. Class 1 and class 3 did not significantly differ in rates of CPS report. Overall, there was approximately 83 percent agreement between CPS reports for sexual abuse and self-report; however that value was driven by 80 percent of children having no CPS report and no self-report for sexual abuse (i.e. class 2). Of the remaining 3 percent that did have a CPS report for sexual abuse and self-reported sexual abuse, one-third is in class 3 and two-thirds are in class 1. Of the proportion that was not in agreement, 12 percent did not report experiencing sexual abuse (i.e., Class 2) but had a CPS report of sexual abuse; and 5 percent reported that sexual contact occurred but there was no corresponding CPS report. These results are encouraging in that they indicate that according to child self-report, a relatively small percentage (5%) of children who self-report sexual abuse do not have a CPS report for sexual abuse, which is notable given the secrecy inherent to this type of abuse.

Physical and Sexual Abuse

Results of the LCAs for the combined physical abuse and sexual abuse items (30 items total) revealed a 4-class solution. Approximately 85% of children were grouped

into class 1 termed *Physical Act Without Injury*. Children in class 1 responded "no" more than 96% of the time to the physical and sexual abuse items with the exception of the physical abuse item that asks about being "hit with a less dangerous object." For this item, 32% of children indicated that they had been hit during their lifetime. Therefore, the children in class 1, indicated that they did not experience sexual or physical abuse at any point during their lives, with the exception of being hit.

6.2% of children were in class 2 termed *Physical Act With Injury*. Children in class 2 responded to physical abuse items at the highest rate of the classes in this solution. Specifically, peaks were noted at 5 items that involved, "hit with a less dangerous object, kicked, pushed, physically hurt, and bruised." These five items were the same items that received the highest response for the class 1 (i.e., Physical Injury) for the LCA of physical abuse. Both the rate and pattern of peaks was the same for the Physical Injury classes in the combined LCA and the physical abuse LCA (Figures 4 and 6). Children in class 2 did not respond affirmatively to any of the sexual abuse items. There was a small peak for the sexual abuse item regarding "touched you." However, in follow-up analyses of this item there was not a significant difference between class 1 (99.2% responded "no") and class 2 (81.7% responded "no"). Therefore, children in class 2 are indicating that they experienced physical abuse at some point in their lives but not sexual abuse.

5.7% of children were grouped in class 3 termed *Physical Act Without Injury and Low Sexual Contact*. Peaks in response were noted for the item regarding being "hit with a less dangerous object" and for sexual abuse items which asked about, looking at sexual

pictures, tried to look at, touch, or put something in your private parts, or actually touched your private parts (Figure 8). For all of the other physical and sexual abuse items children in Class 3 responded "no" greater than 80% of the time for 6 items and greater than 90% of the time for 17 items. These items did not significantly differ from class 1 (Physical Act Without Injury). For the being hit with a less dangerous object item, two-thirds of children in class 3 endorsed that they had been hit at some point from birth to present. The six sexual abuse items that represented peaks for class 3 in the combined LCA were the same items that were peaks for class 2 (Low Sexual Contact) in the sexual abuse LCA. The rate and pattern of peaks was the same for both Low Sexual Contact classes in the combined LCA and sexual abuse LCA (Figures 5 and 8). In sum, children in Class 3 are reporting that they experienced sexual abuse and being hit at some point in their lives. However, they do not tend to report experiencing sexual contact involving penetration or physical injury.

2.9% of children were grouped in class 4 termed *Physical Act With Injury and High Sexual Contact*. Peaks in response were noted for five physical abuse items that asked about being "hit with a less dangerous object, kicked, pushed, physically hurt, and bruised." Peaks were also noted for all 12 of the sexual abuse items (Figure 9). For the physical abuse items, children in class 4 had the same peaks as children in class 2 (Physical Act With Injury). Although the proportion of children responding "yes" to these five peak items was less for class 4 than class 2, these classes were not found to significantly differ on these or any physical abuse items. As mentioned previously for class 2, children in class 4 for the combined LCA had the same pattern of peaks as

children in class 1 for the physical abuse LCA. For the sexual abuse items, children in class 4 of the combined LCA had the same pattern of response as children in class 3 of the sexual abuse LCA. Specifically, in both classes, all sexual abuse items were elevated with peaks at items involving, "looking at sexual pictures, looking at you, touching you, you touching them, put in you, tried to put in you, and put mouth on you." Children in class 4 differed from those in class 3 in that they reported experiencing sexual abuse that involved penetration. In addition, children in class 4 tended to report experiencing injury from physically abusive acts while those in class 3 reported physical acts only

In sum, the classes for the combined LCA represent: physical act without injury, physical act with injury, physical act without injury and low sexual contact, and physical act with injury and low sexual contact (Figure 10). These findings replicate the findings of both the physical abuse LCA and the sexual abuse LCA in one analysis. All of the sexual abuse items and fourteen of eighteen physical abuse items significantly differentiated between the classes. Class 1 (physical act without injury) in the combined LCA replicates class 2 (physical act without injury) from the physical abuse LCA and class 2 from the sexual abuse LCA (no self-report of sexual abuse). Class 2 (physical act with injury) in the combined LCA replicates class 1 (physical act with injury) from the physical abuse LCA and class 2 from the sexual abuse LCA. However, combining physical abuse and sexual abuse into one analysis further reveals the heterogeneous maltreatment experiences. Children with similar physical abuse experiences were shown to have different sexual abuse experiences; the converse was also found to be true. For children who indicate that they have not been sexually abuse, 93.3% of these children

have not experienced physical abuse (i.e., are grouped in class 1 in the combined analysis) and 6.7% have experienced physical abuse (i.e., class 2). For children who report experiencing physical acts without injury, 93.6% of these children have not experienced sexual abuse (i.e., class 1) and 6.4% have experienced low sexual contact (i.e., class 3). Last, when children report that they have experienced physical injury, 68% have not experienced sexual abuse (i.e., class 3) and 32% have experienced high sexual contact (i.e., class 4). Given that one third of children who experience physical injury also experience high sexual contact, the presence of physical injury should be considered as a salient indicator of sexual abuse.

The combined analysis reveals that to most accurately relate children's maltreatment experiences to outcomes researchers should not look at individual types of abuse in isolation. Grouping children based upon a single type of maltreatment is an over simplification because, as this analysis demonstrates children who report similar experiences for a particular type of abuse may report different experiences for another type of abuse. For example, when physical abuse and sexual abuse were combined, children fell into two classes: those experiencing primarily physical injury and those experiencing physical injury and high sexual contact. It is likely that this heterogeneity drives outcomes rather than similarity of a single type of maltreatment.

For the 4-class combined solution, 39.5 percent of children experienced either physical abuse or sexual abuse from birth to 12 years of age. More than three quarters of the children with CPS reports were in the *Physical Act Without Injury* class. Thus, for the

entire sample, 30 percent of children are stating that abuse did not occur, when some form of abuse occurred. This value for the combined LCA is the same as the value for the physical abuse LCA, indicating that discrepancies in agreement are likely driven by physical abuse. Children are probably failing to self-report abuse because of memory limitations and fear of repercussions, as discussed in the individual physical abuse section. Of the children whom did not have a CPS report of physical or sexual abuse, approximately ten percent self-reported experiencing physical abuse or sexual abuse. Similar to the individual physical and sexual abuse findings, this represents 6 percent of the entire sample that report experiencing these types of abuse but are undetected by CPS. Therefore, the combined analysis has a rate of 64 percent agreement for youth self-report of physical and sexual abuse and CPS reports for these types of abuse from birth to age 12. Children from the CPS referred sites (i.e., San Diego and Seattle) experienced maltreatment early in life but may not have experienced later in life; it makes sense that some of these children do not remember early abusive experiences. Therefore, the rate of agreement of 64 percent found in the present investigation reflects the accuracy of youth self-report and the capacity of CPS to detect physical and sexual abuse.

Limitations

This investigation has several limitations, one of which is the generalizability of the findings to children in the community. All of the youth in the present investigation were at-risk or maltreated. The external validity of the results to non-maltreated children is weakened given the composition of the Longscan sample. Due to the paucity of studies that ask at-risk/maltreated children about abuse experiences, findings in the present study

were compared to other self-report investigations that were made up of non-at-risk and non-maltreated community samples. However, this comparison was not central to the present investigation. Since the goal was not to compare the Longscan self-report measure to other self-report measures but to empirically integrate the Longscan measures into an existing ecological-developmental model of maltreatment sequellae, generalizability to other populations is of limited utility. The present investigation met its goal of establishing a class structure of youth perceptions of abuse. This structure should serve as a foundation for integration of youth perceptions into longitudinal models of Longscan data that include health, mental health, and social outcomes. If researchers became interested in extending the present results to children in the community, a new investigation would be required to examine the class structure of the physical and sexual abuse measures in a non-maltreated sample.

A second limitation of the current investigation was the sole reliance on youth self-report data to form the classes. Youth were asked to report physical and sexual abuse experiences that may have occurred from birth to present (age 12). Given that two of the five sites represented in the sample (i.e., San Diego and Seattle) were recruited because of early CPS involvement, youths may have been recalling abuse experiences that occurred several years in the past. In addition, it is likely that youths were unable to recall abuse that occurred at a young age. While youth self-report is likely to capture a more complete picture of children's perceptions of their abuse experiences than CPS records, the accuracy and veracity of youth memory should be considered. There are two primary difficulties with using youth self-report as the sole source for classifying abuse: 1) youth

self-report is subject to memory limitations, such that a child may be unable to recall abuse (e.g., being a young age when the abuse occurred or dissociating abuse experiences), and 2) children may choose not to report current abuse for a variety of reasons including fear of repercussions from caregivers or CPS involvement. Alternatively, research has demonstrated that pre-adolescent children do not fabricate abuse experiences, particularly given the audio-computer assisted administration of the Longscan physical and sexual abuse measures (Ceci & Bruck, 1996). In fact, in studies aimed at testing suggestibility, pre-adolescent children were found to be resilient to suggestion in the same manner as adults (Ackil & Zaragoza, 1995). Therefore, despite the aforementioned difficulties, previous work with maltreated children suggests that the youths in the present investigation were accurately reporting their physical and sexual abuse experiences. However, follow-up analysis could evaluate the timing of abuse for discrepant data in which CPS reports were present but children did not self-report (which represented the majority of discrepant data in each analysis) to see if timing (i.e., early occurrence) of abuse impacts self-report.

Another limitation is that children who were part of the original Longscan sample but did not complete the age 12 interview could not be included in the present investigation. It is possible that those missing children would have impacted the present classification, had their responses been available. Children did not complete the age 12 interview for a variety of reasons including, but not limited to: 1) parental withdrawal, 2) youth choosing not to complete part or all of the interview, and 3) youth having outdated contact information. We are unable to determine if the missing youth have similar

patterns of self-report as those present in the investigation. However, analyses of missing Longscan subjects in previous investigations (Anderberg, 2003, Knight et al., 2000) have revealed that missing subjects did not differ on CPS records of maltreatment or on internalizing and externalizing behaviors assessed in previous interviews. Still, it is possible that other factors related to the missing subjects could impact classification using self-report. Although not examined in this investigation, the impact of missing subjects on classification is an important question, which requires further exploration.

Future Directions

The purpose of this study was to establish a topology of the Longscan youth self-report measures of physical and sexual abuse from which children's perceptions of these abuse experiences could be meaningfully integrated into present models of child maltreatment and subsequent outcomes. Therefore, the future directions are many. Suggestions of some of these future projects are as follows.

It was noted that the 2-class solution for physical abuse might have been an oversimplification of the underlying class structure. Although the 2-class solution was the most robust choice for the present analysis, the 4-class solution also emerged as a promising model. It was unclear why the fit of the 3-class solution was poor, precluding use of the 4-class solution in the present exploratory analysis. However, the 4-class solution merits further investigation in that this solution distinguishes children in the following manner: 1) No Report of Physical Abuse, 2) Corporal Punishment, 3) Moderate Physical Injury, 5) High Physical Injury. Previous Longscan research has demonstrated

that severity of maltreatment was a consistent predictor of outcomes (English et al., 2005; Litrownik et al., 2005). Therefore, the 4-class solution, which contains gradations of severity (e.g., Moderate Physical Injury and High Physical Injury), might be of greater predictive value than the 2-class model in relating child report of maltreatment to outcomes. Thus, a confirmatory study of the 4-class model and its relationship to outcomes is a promising future direction.

Another future direction involves conducting a latent class analysis with all of the types of maltreatment assessed by youth self-report in the age 12 interview: physical abuse, sexual abuse, emotional abuse, and neglect. Capturing the heterogeneity associated with child maltreatment is central to understanding trajectories of risk and resilience across development. The present study represents an important step in that it empirically classifies the types of maltreatment that are associated with acts of commission. However, children often experience multiple types of maltreatment and the most common type of maltreatment is neglect (English et al., 2005; Litrownik et al., 2005). Therefore, a valuable future direction would be to see the class structure that results from all of the youth self-report measures of maltreatment.

A future direction that could be applied to the present study as well as the aforementioned studies entails using the class structure derived from LCA to predict outcomes. This future direction will have implications for prevention and intervention research. Specifically, children's perceptions of maltreatment and the related longitudinal outcomes should inform the ways in which targeted programs address children's needs.

An advantage of the Longscan investigation is that children are followed longitudinally, such that researchers will be able to appraise the impact of child perceptions of maltreatment at age 12 on mental health, physical health, social and educational outcomes at age 14, age 16, and age 18. Hopefully, the empirical classification of youth reported maltreatment experiences at age 12 in the present study coupled with the wealth of information on the same participants throughout adolescence will inform interventions such that the scale will be tipped from risk to resilience.

Conclusion

A child's perception of the maltreatment he or she has experienced is a vital contributor to the diverse factors that confer damaging outcomes for some children and favorable outcomes for others. The utility of creating a topology of youth self-report with latent class analysis is to preserve the heterogeneity of children's experiences while establishing a foundation from which researchers can empirically evaluate outcomes. The present investigation represents an imperative direction in child maltreatment research in which advanced analytic techniques are utilized to unravel the complex developmental trajectories of maltreated children. Advances such as these are promising for illuminating the pathways that contribute to risk and resilience across development, with the ultimate goal of informing prevention and intervention strategies.

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