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Trajectories of Maltreatment Re-Reports from Ages 4 to 12: Evidence for Persistent Risk after Early Exposure

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Abstract

This study identified trajectories of maltreatment re-reports between ages 4 and 12 for children first referred to Child Protective Services (CPS) prior to age 4 and either removed from the home or assessed by a CPS intake worker as moderately or highly likely to be abused/neglected in the future, absent intervention. Participants ($n = 501$) were children from the Southwest and Northwest sites of the Consortium for Longitudinal Studies of Child Abuse and Neglect (LONGSCAN). During the 8-year follow-up period, 67% of children were re-reported. Growth mixture modeling identified four trajectory classes: No re-report (33%), Continuous re-reports (10%), Intermittent re-reports (37%), and Early re-reports (20%). Membership in classes with relatively more re-reports was predicted by several factors assessed at age 4, including physical abuse; living with a biological/step-parent; caregiver alcohol abuse, depression, and lack of social support; receipt of Aid to Families with Dependent Children (AFDC); and number of children in the home. For a subpopulation of high-risk children first reported in early childhood, risk for maltreatment re-reporting may persist longer than previously documented, continuing 8 to 12 years after the first report.

Studying children who experience repeated reports to Child Protective Services (CPS) for suspected maltreatment is important for several reasons. Re-reports may indicate that the system has failed to ensure a child's safety (Fluke, Shusterman, Hollinshead, & Yuan, 2005), and can lead to multiple out-of-home placements, disrupting children's relationships and increasing their risk of behavior problems (Aarons, et al., 2010; Proctor, Skriner, Roesch, & Litrownik, 2010). There is strong evidence that the multiple victimizations and

adversities reflected by re-reports exert a cumulative influence on children's short- and long-term health and behavior (Chapman, Dube, & Anda, 2007; Dube, Felitti, Dong, Giles, & Anda, 2003; English, Graham, Litrownik, Everson, & Bangdiwala, 2005; Turner, Finkelhor, & Ormrod, 2010; Whitfield, Anda, Dube, & Felitti, 2003), especially if they persist across developmental periods (English, et al., 2005; Jaffee & Maikovich-Fong, 2011). Repeated re-reports also place a tremendous burden on CPS resources. It has been estimated that cases with multiple referrals cost CPS seven times that of other cases (Loman & Siegel, 2004), and CPS populations are increasingly comprised of relatively higher-risk cases, due to the national trend to divert lower-risk cases to alternative or differential response (Child Welfare Information Gateway, 2008). For these reasons, studying children who are at high risk for repeated re-reports is critical for promoting child safety, permanency, and well-being and has important implications for effective, sustainable practice and policy.

Research on CPS re-reporting has typically aimed to answer three primary questions: What proportion of children reported to CPS for suspected maltreatment go on to experience a re-report, when is the risk of re-report greatest, and what factors increase the risk of a re-report? This research has provided strong evidence that a sizeable proportion of children experience one or more maltreatment re-reports, supporting the urgency of addressing the problem of repeated maltreatment reports. According to Federal statistics, the proportion of reported children who are repeat victims has been steady over the past decade at approximately 25% annually (U.S. Department of Health and Human Services, 2010). Among all children with child welfare involvement, more than one-third are re-reported to CPS for suspected maltreatment again within five years (Fluke, et al., 2005), and the greatest risk for re-reporting appears to be within the first 6 months after the index report (Bae, Solomon, & Gelles, 2009; Fluke, et al., 2005; Fluke, Shusterman, Hollinshead, & Yuan, 2008; Jonson-Reid, Emery, Drake, & Stahlschmidt, 2010). Young child age has emerged as a key risk factor. Compared to other age groups, children under the age of five have the highest rates of maltreatment reports (U.S. Department of Health and Human Services, 2010), are at the highest risk for re-reports (Bae, et al., 2009; Connell, et al., 2009; Fluke, 2008; Fluke, et al., 2005; Fluke, Yuan, & Edwards, 1999; Marshall & English, 1999), and are the subject of the largest number of multiple re-reports over time (Fluke, et al., 2005).

Because most studies of re-reporting have tended to sample a wide range of ages and follow participants for 6 to 18 months, we know very little regarding the longer-term developmental course of maltreatment re-reports for children first reported in early childhood. A third of all maltreatment victims are under age 4 (U.S. Department of Health and Human Services, 2010), yet long-term research following these children is rare. Identifying longer-term patterns of maltreatment for this high-risk group is critical both for assessing current policy and service approaches and for understanding the risk factors and consequences of children's heterogeneous maltreatment experiences.

Previous authors have identified the need for "multivariate approaches that would help to isolate clusters of children that share common [re-reporting] trajectories" (Fluke, et al., 2005). Our unique sample of high-risk children permitted a novel and informative analysis to model heterogeneity in the 8-year course of maltreatment re-reports for children first reported in early childhood. Children were from two study sites of the Consortium for Longitudinal Studies of Child Abuse and Neglect (LONGSCAN). All children were reported prior to age 4 and either removed from the home or designated as experiencing moderate to high risk of future maltreatment based on a CPS risk assessment. We expected that the overall rate and trajectory of re-reporting for this high-risk sample of children with early CPS involvement would resemble those of prior studies (i.e., more than half experiencing at least one re-report, with the risk of re-report declining with the passage of time). However, we also hypothesized that subgroups of children would experience distinct

trajectory patterns of re-reports, and that these trajectories could be distinguished by characteristics of the caregiver and the home at age 4.

We know, based on findings from research on the developmental timing of maltreatment, that some children experience chronic child abuse and neglect, and that distinct subgroups of children can be identified based on the timing of reports (English, et al., 2005; Jonson-Reid, Emery, et al., 2010). Prior research with LONGSCAN data has examined heterogeneity in patterns of maltreatment chronicity from birth through age 8 based on CPS reports. Findings suggest that subgroups of children experience differences in the developmental course of CPS reports, with roughly 40% of children reported only during a single period, and the remaining children re-reported either continuously (across adjacent periods) or episodically (across non-adjacent periods; English, et al., 2005).

Analyses of administrative data have identified a number of risk factors that contribute to re-reporting. In addition to younger child age, there is evidence that characteristics of the early maltreatment, the child's caregiver, and the home environment increase the risk of a re-report. Neglect (Connell, et al., 2009; Forrester, 2007), physical abuse (Connell, Bergeron, Katz, Saunders, & Tebes, 2007), and presence of sexual or physical abuse (Thompson & Wiley, 2009) have all been linked to subsequent risk of re-report. While some studies have reported a link between substantiation status and subsequent re-reports (Fluke, et al., 2008; Way, Chung, Jonson-Reid, & Drake, 2001), others have found that the risk conferred by substantiated and unsubstantiated reports is comparable (Drake, Jonson-Reid, Way, & Chung, 2003; Hussey, et al., 2005; Kohl, Jonson-Reid, & Drake, 2009). The caregiver characteristic that appears most predictive of re-reporting is substance abuse (Connell, et al., 2007; Fluke, 2008; Fluke, et al., 2005; Forrester, 2007; Jonson-Reid, Chung, Way, & Jolley, 2010; Wolock, Sherman, Feldman, & Metzger, 2001), with alcohol abuse being supported as a unique risk factor when it is examined separately from drug abuse (Fluke, 2008; Fluke, et al., 2005; Forrester, 2007; Jonson-Reid, Chung, et al., 2010). Caregiver depression and lack of social support may also play a role (English, Marshall, & Orme, 1999; Jonson-Reid, Chung, et al., 2010; Jonson-Reid, Emery, et al., 2010). At the level of the home environment, studies have consistently reported increased risk for families experiencing poverty (Connell, et al., 2007; Kahn & Schwalbe, 2010; Wolock, et al., 2001), and possibly for families with single mothers or with more children (Bae, et al., 2009; Wolock, et al., 2001).

Research on maltreatment re-reports has typically been conducted with children who live with their biological family (e.g., Jonson-Reid, Emery, et al., 2010). Although it makes intuitive sense that caregivers who have been reported to CPS pose the greatest risk for subsequent maltreatment, this hypothesis has not been tested empirically by long-term prospective research. We included children in all placement types in our analyses, in order to examine the relationship between age 4 placement and subsequent re-reporting trajectories. In our data, roughly half of children were living with a biological or step-parent at age 4, and most children remained with the same caregiver between ages 4 and 8.

The present study used growth mixture modeling (GMM; Muthén, 2004; Nagin, 2005) to identify distinct trajectories of re-reports during the 8-year period between ages 4 and 12 among children first referred to CPS prior to age 4 and either removed from the home or assessed by a CPS intake worker as moderately or highly likely to be abused or neglected in the future, absent intervention. A dichotomous re-report variable was created for each two-year period (4–6, 6–8, 8–10, 10–12). We hypothesized that heterogeneous trajectory classes would be identified (i.e., subgroups of children with differing patterns of CPS re-reports over time). In order to validate the derived trajectories, we used multinomial logistic regression analyses to test whether characteristics of early maltreatment and of the caregiver

and home environment at age 4 predicted subsequent trajectory class membership. Specific predictors included children's living arrangement at age 4 (i.e., with biological/step-parent, adopted, or placed in kinship or non-kin foster care); characteristics of maltreatment based on coded CPS reports between birth and age 4 (whether physical, sexual, neglect, and/or drug/alcohol use was alleged, and whether any maltreatment was substantiated); and age 4 assessments of the child's caregiver (depression, substance use, lack of social support) and home environment (poverty/receipt of Aid to Families with Dependent Children [AFDC], spouse/partner in the home, number of children in home). We hypothesized that living with biological/step-parents; presence of a drug/alcohol allegation; caregiver depression, substance use, lack of social support; AFDC receipt; spouse/partner in the home; and number of children in the home at age 4 would predict trajectories reflecting a higher risk of re-reports spanning a longer period of time.

Method

Sample

Participants ($n = 501$; 48% male) were children from the Southwest and Northwest sites of LONGSCAN (Runyan, et al., 1998), a five-site prospective study of the antecedents and consequences of child maltreatment. All LONGSCAN sites share common data collection protocols and procedures, but each site sampled a distinct population of children in order to create a multi-site sample representing a continuum of risk for child abuse and neglect. The SW and NW sites were selected for the present study because they are the highest-risk LONGSCAN samples. All children at the SW site entered the child welfare system by the age of three and a half years as a result of a substantiated report of maltreatment during an 18-month period (May 1990 through October 1991), and remained in out-of-home foster care for at least five months. All children at the NW site were referred to CPS prior to age 4 with an allegation of maltreatment and assessed as moderately or highly likely to be re-referred to CPS absent intervention. The NW site assessment of likely future maltreatment was based on guidelines developed in the Washington Risk Assessment Model, which included screening criteria, guidelines for assigning risk at intake (for response prioritization), and a 32-item ecological risk model for assessing risk after investigation. Participants from the other three LONGSCAN sites were excluded because they were more diverse with regard to both CPS involvement and early reported maltreatment.

For the two study sites, analyses were limited to cases with data for at least 3 of 5 possible time points in order to maximize the stability of the GMM trajectory class solution and to permit the exploration of nonlinear trajectories; 32 cases were excluded due to inadequate data. Comparison models with the full two-site sample did not differ from those presented in the present study, and excluded and non-excluded cases did not differ with regard to key demographic variables (i.e., gender, ethnicity, family income, or age at first referral).

For the present sample, the median age at first referral was 8.4 months (range birth-3.98 years), and the mean number of allegations prior to age 4 was 5.9 ($SD = 5.5$). Sixty-three percent of the children had been reported for just one type of maltreatment between birth and age 4, and the remaining 37% had been reported for more than one type. With regard to different types of maltreatment reported prior to age 4, the most common combinations were neglect only (50%), both physical abuse and neglect (25%), sexual abuse plus another form of maltreatment (13%), and physical only (9%). The sample is ethnically diverse (30% African American, 36% Caucasian, 11% Hispanic, 23% mixed or other). At the age 4 assessment, 54% of children were living with a biological or step-parent, 9% had been adopted, and 37% were in foster care (19% in kinship care, 18% in non-kin care); 84% of the sample remained with their age 4 caregiver during follow-up assessments at ages 6 and 8. Ninety-three percent of caregivers interviewed were female.

Procedure

The present study examined data obtained via face-to-face interviews with the child's primary caregiver at age 4. Additionally, CPS maltreatment reports were reviewed and coded at baseline for birth through age 4, and on an ongoing basis from ages 4 through age 12. The study was conducted with approval from each site's institutional review board. Informed consent was obtained from caregivers, and assent was obtained from the child participants beginning at age 8. Caregivers were paid a fixed, nominal amount for the interview.

Measures

Early maltreatment and subsequent re-reports—Children's CPS records were reviewed on an ongoing basis by each study site. CPS reports from birth to age 12 alleging maltreatment were coded using the Modified Maltreatment Classification System (Barnett, Manly, & Cicchetti, 1993; English & LONGSCAN Investigators, 1997), which allows for the coding of multiple types of maltreatment. LONGSCAN coders across sites were trained to 90% agreement with a gold standard coder, and a subsequent reliability assessment utilizing a sample of reports from all the sites indicated good overall agreement on the coding of type (all kappas $>.7$). To characterize early maltreatment characteristics, five dichotomous predictor variables were created based on coded reports that occurred prior to age 4: physical abuse, sexual abuse, neglect, whether drug/alcohol use was alleged, and whether maltreatment was substantiated. Maltreatment re-reports were operationalized as any CPS maltreatment allegation between the ages of 4–6, 6–8, 8–10, or 10–12.

Individual and family demographics—Caregiver interviews included questions about caregiver relationship to child (biological/step-parent, adopted, kinship, or non-kin); caregiver ethnicity, age, and education level; family poverty (AFDC receipt), presence of caregiver's partner in the home; number of children in the home; and child gender (Hunter, et al., 2003).

Caregiver alcohol abuse—Alcohol abuse was assessed using the CAGE Alcohol Abuse Screening Measure (Ewing, 1984). The CAGE consists of four questions ($\alpha = .80$) assessing perceived need to cut down on drinking, guilt about drinking, criticism by others about drinking, and drinking first thing in the morning. The CAGE has been well validated (King, 1986) and is one of the most widely used screening measures for alcohol abuse. For these analyses, this scale was dichotomized; given that 93% of caregiver respondents were female, scores of 1 or greater were used to indicate presence of alcohol abuse, based on the finding by Bradley and colleagues (1998) that lowering the cutoff from 2 to 1 increases the sensitivity of the measure without compromising specificity.

Caregiver depression—The 20-item Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) was used to assess caregivers' depressive symptoms during the past week. Responses are on a 4-point scale ranging from 0 (*rarely or none of the time*) to 3 (*most or all of the time*). This measure has been well validated (Knight, Williams, McGee, & Olaman, 1997; Roberts, Vernon, & Rhoades, 1989). Continuous total scores were used ($\alpha = .90$).

Caregiver social support—Caregivers' perceived social support was assessed using a 10-item version of the Duke-UNC Functional Social Support Questionnaire (Broadhead et al., 1988) that assesses confidant support, affective support, and instrumental support. Responses are on a 5-point scale ranging from 1 (*much less than I would like*) to 5 (*as much as I would like*). There is ample evidence for the reliability and validity of this measure

(Broadhead et al., 1988; Hunter et al., 2003). All items were summed to produce an overall index of caregiver social support ($\alpha = .87$).

Data Analysis

Conceptual and operational overview of Growth Mixture Modeling (GMM)—

Building on the conceptual underpinnings of latent growth curve modeling and latent class analysis, growth mixture modeling (Muthén, 2004; Nagin, 2005) identifies heterogeneous groups or “classes” of individuals who share a common growth trajectory over time for a target variable (e.g., maltreatment report). This approach is similar to latent growth curve modeling because individual values for a target variable are modeled longitudinally (i.e., each individual has his/her own trajectory); it is also similar to latent class analysis in that a categorical latent variable is created representing individuals with a common growth trajectory (and thus assigned to the same class) but differ from those assigned to other classes (i.e., those with different growth trajectories).

Two key assumptions of GMM are that unobserved, heterogeneous subpopulations exist within the general population, and that the researchers have specified the correct growth shape in each group (Nagin & Odgers, 2010; Ram & Grimm, 2009; Wang & Bodner, 2007). For each two-year time period (ages 4–6, 6–8, 8–10, and 10–12), children were categorized as re-reported if they received one or more reports during that time. Preliminary data exploration suggested that re-reporting followed a negative linear growth curve, with adequate heterogeneity for conducting GMM. Because exploratory analyses also supported the linearity of the GMM trajectories, all models constrained growth across time to be linear.

In order to determine the optimal number of trajectory classes, multiple class solutions (1-class, 2-class, 3-class, etc.) are specified and tested in succession. From these models, the designation of the “best-fitting” model is determined using several statistical indicators. Evaluation of the best fitting models was accomplished using both statistical and theoretical criteria. Statistically, key considerations included the Akaike Information Criterion (AIC), the sample-size adjusted Bayesian Information Criterion (SSAdj BIC), the Lo-Mendell-Rubin likelihood ratio test (LMR), and entropy. For the AIC and SSAdj. BIC, lower values signify a better fitting model. For the LMR, a low p -value ($p < .05$) indicates that the k trajectory model is a better fit to the data compared to the $k-1$ trajectory model. Entropy is a measure of classification accuracy with values closer to 1 indexing greater precision (range 0–1). Theoretical criteria included adequate class size and interpretability of classes. We defined adequate class size as at least 5% of the sample, a value typically considered the threshold for a meaningful class (Hipp & Bauer, 2006).

Study analyses—GMM trajectory classes were evaluated using the Mplus Version 5.1 program (Muthén & Muthén, 2006). Models were estimated using dichotomous data for maltreatment allegation for four two-year time periods (ages 4–6, 6–8, 8–10, and 10–12). Full-information maximum-likelihood (FIML) estimation was used to account for missing data (Bauer, 2007; Muthén, 2004). A series of models with progressively greater numbers of trajectory classes were estimated. Once the optimal number of classes was determined, and the classes were substantively interpreted, multinomial logistic regression was used to predict trajectory class membership from age 4 placement type, early maltreatment characteristics, caregiver characteristics, home environment, and control variables (study site, child gender and race) entered as predictor variables simultaneously.

Following class specification, predictors and covariates were examined in separate multinomial logistic regression analyses conducted in SPSS Version 19. Although covariates are ideally included during the GMM procedure when feasible (Muthén, 2002), given our sample size and the number of parameters that would need to be estimated in such a model

with our covariates of interest, it was judged more prudent to establish the classes and conduct separate predictive analyses.

Results

Descriptive statistics are presented in Table 1. Prior to conducting GMM, rates of maltreatment re-reports at each time point, based on the percentage of children with at least one report during the indicated periods, and cumulative re-reporting rates at each age, based on percent of children with at least one re-report by that age, were examined. For the overall sample, the percentage of children experiencing a re-report in each two-year period declined over time (39.5% between ages 4 and 6; 31.5% between 6 and 8, 27.7% between 8 and 10, and 27.3% between ages 10 and 12). The cumulative re-reporting rates at each age were 39.5% at 6, 52.7% at 8, 61.1% at 10, and 67.1% at 12.

Trajectory Classes

As shown in Table 2, the AIC, entropy, and LMR values indicated that a four-class model fit the data better than the 3- and 5-class solutions. Although the four-class solution had a slightly higher SSaj BIC value than the three-class model, the four-class model had adequate class sizes and was more interpretable than the three-class model. The 5-class solution contained what is known as a fictitious group, containing no members (Nagin & Odgers, 2010); consistent with this criterion, the AIC, SSAdj. BIC, and LMR statistics also supported the 4-class over the 5-class solution. The four classes identified (Figure 1) were (1) No re-report (33%), those with no subsequent re-reports between ages 4 and 12; (2) Continuous re-reports (10%), whose members were re-reported continuously across at least 3 of the 4 two-year periods; (3) Intermittent re-reports (37%), whose individual members alternated between high and low risk from one period to the next; and (4) Early re-reports (20%), whose members experienced a sharp decrease in risk beginning at age 6. None of the slopes differed significantly from zero. Although the mean proportion of Intermittent re-reports class members experiencing a report appears steady with a slight increase, exploration of data for individual children revealed a pattern in which many members experience a report every other period, or in a single period only. GMM analyses conducted separately for each site produced comparable trajectory class solutions with no substantial differences between the sites.

Predicting Trajectory Class Membership

Prior to conducting multinomial logistic regression analyses, group differences were explored using Chi-square tests of independence with regard to age 4 placement, in order to inform coding of this variable for the regression model. Class membership varied by Age 4 placement (coded as biological or step-parents, adopted, kinship care, nonkin foster care), $\chi^2(9, N = 489) = 45.07, p = .000$. A post-hoc 2×4 comparison indicated that relative to children in out-of-home placements (adopted, kinship, non-kin), children living with a biological or step-parent at age 4 were under-represented in the No re-report class and over-represented in the three classes with re-reporting, $\chi^2(3, N = 489) = 38.89, p = .000$. Among children living with a biological or step-parent at age 4, 22% were in the No re-report class, 15% in Continuous, 38% in Intermittent, and 24% in Early. Among children living in out-of-home placements (adopted, kinship, non-kin), 45% were in the No re-report class, 5% in Continuous, 35% in Intermittent, and 14% in Early. A post-hoc 3×4 comparison found no class differences among the three out-of-home placement types (adopted, kinship, non-kin), $\chi^2(6, N = 227) = 5.92, p = .433$. Therefore, age 4 placement type was coded as living with a biological/step-parent vs. not in subsequent logistic regression analyses.

Results of multinomial logistic regression analyses are presented in Table 3. Predictors were entered simultaneously into one model predicting maltreatment report trajectory class. In order to test the validity of our classes, we were interested in examining all possible class comparisons. Thus, the model was tested with the No re-report class as the reference group and with re-parameterization of classes to investigate differences among all classes. The overall model significantly predicted trajectory class membership, $\chi^2(51) = 151.84$, $p < 0.001$, Nagelkerke $R^2 = 0.297$.

No re-report as reference—Membership in the Continuous re-reports group vs. the No re-report group was predicted by living with a biological/step-parent at age 4, having a physical abuse allegation prior to age 4, older caregiver age, caregiver alcohol abuse, caregiver's lack of social support, household AFDC receipt, more children in the home, and child race (white). Intermittent vs. No re-report was predicted by alcohol abuse and AFDC receipt. Early re-reports vs. No re-report was predicted by living with a biological/step-parent, caregiver depression, AFDC receipt, caregiver's partner in the home, and more children in the home.

Continuous re-reports as reference—The pattern of results for the Intermittent vs. Continuous re-reports group was very similar to that of the Continuous vs. No re-report comparison, except that AFDC Receipt was not significant. Early vs. Continuous re-reports was predicted by not having a physical abuse allegation prior to age 4 and absence of caregiver alcohol abuse.

Intermittent re-reports as reference—Membership in the Early vs. Intermittent re-reports group was predicted by presence of the caregiver's partner in the home at age 4.

Discussion

The present study is the first we know of to identify long-term trajectories of CPS maltreatment re-reports following a report in early childhood. As hypothesized, children in our high-risk sample, who were reported to CPS for suspected maltreatment prior to age 4 and either removed from the home or judged by CPS to be at moderate or high risk of future abuse/neglect, experienced considerable heterogeneity in their trajectories of maltreatment re-reports between the ages of 4 and 12. Only a third of the sample experienced no subsequent re-reports during the 8-year follow-up period. More than a third experienced intermittent re-reports over time – they received sporadic reports in a pattern that suggested sustained (i.e., non-declining) risk over time. A small (10%) but clinically important high-risk subgroup received re-reports continuously across at least 3 of the 4 two-year periods. The remaining 20% experienced re-reports during the first four years of follow-up, but none after age 8.

Although methodological differences make comparisons difficult, our overall re-reporting rate of 67% for the 8-year study period appears to be consistent with prior research examining re-reports over a comparable period of time. Drake and colleagues (2006) reported that 62% of their sample received a re-report over a 7.5-year period. And in another study, 69% of families with a maltreatment report experienced one or more re-reports over periods of up to 14 years (Wolock, et al., 2001). However, children in the Drake et al. (2006) sample ranged in age from newborn to 11 years old, and children in the Wolock et al. (2001) sample were followed for varying periods of time.

Prior research suggests that children's risk of re-report declines over time (Bae, et al., 2009; Fluke, et al., 2008), but that some subgroups of children are chronically reported for maltreatment from birth to age 8 (English, et al., 2005). The present results are consistent

with these findings, and also provide new information about the ongoing long-term risk of re-report faced by high-risk children who have received early CPS reports. Children in the Intermittent and Continuous re-reports groups continued to experience an elevated risk of re-report between the ages of 10 and 12, while children in the Early re-reports group remained at risk of re-report until age 8. These findings suggest that despite overall declines in re-reports, a substantial proportion of children with early child welfare involvement may face ongoing and continued risk of maltreatment re-reports even 8 to 12 years after their first report.

Also as hypothesized, trajectories of maltreatment re-reports were predicted from variables at multiple levels of the child's early environment. Although long-term trajectories of re-reports have not been previously studied, there is some evidence, based on longitudinal administrative data, that factors that predict initial re-reports may differ from those associated with chronic re-reporting (Jonson-Reid, Emery, et al., 2010). Our results are consistent with those findings. Trajectories reflecting persistent re-reporting were distinguished not only from trajectories reflecting no re-reports, but also from trajectories reflecting re-reporting only in the short-term. Physical abuse and caregiver alcohol abuse distinguished the Continuous re-reports group from the Early re-reports group, but did not distinguish between the No re-report and Early re-reports groups, suggesting that these variables are linked to a more chronic pattern of maltreatment re-reporting. Conversely, AFDC receipt predicted membership in any of the risk trajectories compared to the No re-report group, but did not distinguish between the Continuous re-reports and Early re-reports groups, suggesting that it does not differentially predict short-term versus chronic re-reporting. Interestingly, the Early class was distinguished both from the Intermittent class and the No re-report class by the presence of the caregiver's partner in the home at age 4. While our analyses did not include an examination of perpetrator identity, this finding raises the intriguing possibility that the partner in the home at age 4 acted as a proximal risk factor that may not have been present at subsequent ages.

An important limitation of the present study is that, because our primary interest was in characterizing heterogeneous developmental trajectories of re-reports for children who were reported at a young age, we did not examine the impact of predictors that fluctuate over time in this sample. We chose instead to predict re-report patterns from data collected during children's age 4 assessments, in order to test their utility in predicting the subsequent course of re-reports and validate the classes derived. While this approach generated useful information regarding early predictors of heterogeneous re-report trajectories, it did not provide information regarding the proximal prediction of re-reports at each age, nor the potential reciprocal relationships between predictors and re-reporting. Specifically, our ability to examine time-varying placement effects was limited in part by the fact that only 16% of our sample changed caregiver during the age 4–8 period. However, we see our inclusion of children living both in and out of the home as an important strength. First, the replication of the class solution across both study sites supports the validity of the trajectory classes for high-risk children referred for maltreatment in early childhood regardless of whether or not they were placed in out-of-home care. And second, regression analyses supported the importance of caregiver and home characteristics above and beyond the effects of placement type. Research with a longer follow-up period and higher rates of placement changes could examine the time-varying role of placement changes and type in predicting subsequent re-reports. The predictors of continuity and discontinuity of re-reporting risk are likely complex and involve multiple time-varying processes related to type of placement, caregiver drug use and mental health, family environment and stressors, and age of child.

Some additional limitations of our study should be noted. First, while we examined type of maltreatment as predictors, we did not examine trajectories separately by type of maltreatment. There is evidence that different types of maltreatment reports (i.e., physical and sexual abuse and neglect) vary in their developmental course, with neglect being more commonly reported in infancy than other periods, and physical and sexual abuse being more commonly reported during adolescence (Wulczyn, 2009). Because previous research has not examined trajectories of re-reports, we chose to examine trajectories of re-reports for any maltreatment type. Additionally, children in the present sample, like those described in other studies (Jonson-Reid, Drake, Chung, & Way, 2003; Jonson-Reid, Emery, et al., 2010), experienced multiple types of maltreatment reports, both within and across time. In many cases, individual children were reported across time for different types of maltreatment, making it difficult to derive trajectories for specific maltreatment types. However, depending on the research question, future research on longitudinal re-report patterns would benefit from distinguishing among types of maltreatment. Second, because our trajectories stopped at age 12, we do not have a sense of whether the more modest changes in re-reporting over time (i.e., the slight increase in the Intermittent re-reports group and the slight decrease in the Continuous re-reports group) will continue course as the youth enter adolescence. Longer-term work is needed to characterize and understand lifetime trajectories of child welfare involvement for this highly vulnerable population. Finally, the use of two local samples of children from West Coast cities who were reported for maltreatment during early childhood and who were at particularly high risk for re-referral, rather than a larger state or national dataset, raises issues of generalizability. While we consider this to be a reasonable trade-off – large administrative datasets offer more representative samples, but typically do not include detailed face-to-face assessments of caregiver- and family-level variables – it is important to note that our samples are not representative of the “general” CPS population, but rather a particular subpopulation of children who are reported in early childhood and are at high risk for re-referral. Additionally, there is evidence that re-reporting is remarkably similar from state to state (Fluke, 2008), and that CPS populations are increasingly comprised of relatively higher-risk cases, due to the national trend to divert lower-risk cases to alternative or differential response (Child Welfare Information Gateway, 2008).

Despite these limitations, the present study provides the first long-term analysis of developmental trajectories of re-reporting among children who were reported for maltreatment in early childhood. Our study is characterized by a number of features that distinguish it from prior research: the use of growth mixture modeling to characterize the heterogeneity in children’s long-term re-report patterns; the focus on children who were reported prior to age 4, which permitted an examination of the developmental course of re-reports; the combined use of coded CPS reports as well as data collected from caregivers in face-to-face assessments; a diverse sample with regard to placement; the examination of re-reports longitudinally over an 8-year period from early childhood to preadolescence; and the integration of a person-centered approach, which models heterogeneity in trajectories, with a variable-centered approach, which permits the prediction of trajectory class membership from salient risk and protective factors.

Policy and Practice Implications

Understanding and predicting developmental trajectories of maltreatment re-reports is particularly urgent for children whose first report occurred at a young age, as they face the greatest risk both of re-report and of developmental problems. The fundamental usefulness of GMM and other techniques for modeling heterogeneity is to identify unobserved subpopulations whose existence has important implications for practice and policy. In this case, the identification of subpopulations of children who experience the persistence of re-

reports over a period of 8 years provides critical information regarding the types of long-term maltreatment patterns that are occurring among CPS-involved families. The results of our GMM analysis suggest that the overall rates of re-reporting, which decline with time from the index report, mask the existence of subgroups of children who experience persistent re-reports. Future research with children who experience trajectories indicating more persistent re-reporting risk can inform and improve efforts to promote their safety and well-being.

With regard to potential targets of intervention, the present results support a relationship between modifiable characteristics of the caregiving environment (e.g., caregiver alcohol abuse, depression, and lack of social support) and subsequent risk of maltreatment re-reports. Policy and interventions that target these factors may decrease children's risk of future re-reports. The present findings also extend the results of prior research on re-reporting of reunified children. While living with a biological/step-parent increased the risk of re-reports, children in other placement types (i.e., adoption, kinship care, and non-kin foster care) were also at risk. Prior research has provided some evidence that home-based services may reduce re-reporting risk even for the most chronic cases (Chaffin, Bard, Hecht, & Silovsky, 2011; Jonson-Reid, Chung, et al., 2010). Our findings suggest that for children first reported in early childhood, re-reporting may continue 8 to 12 years after the first report. This suggests that further work is needed to effectively intervene with families at high risk of persistent reports of suspected maltreatment. Designing and delivering effective services with children and families at high risk for chronic re-reporting is critical for addressing the financial and human costs incurred by early-onset, persistent maltreatment. A better understanding of early risks and potential developmental pathways faced by these children can help to identify and implement strategies to minimize adverse outcomes as a result of early maltreatment.

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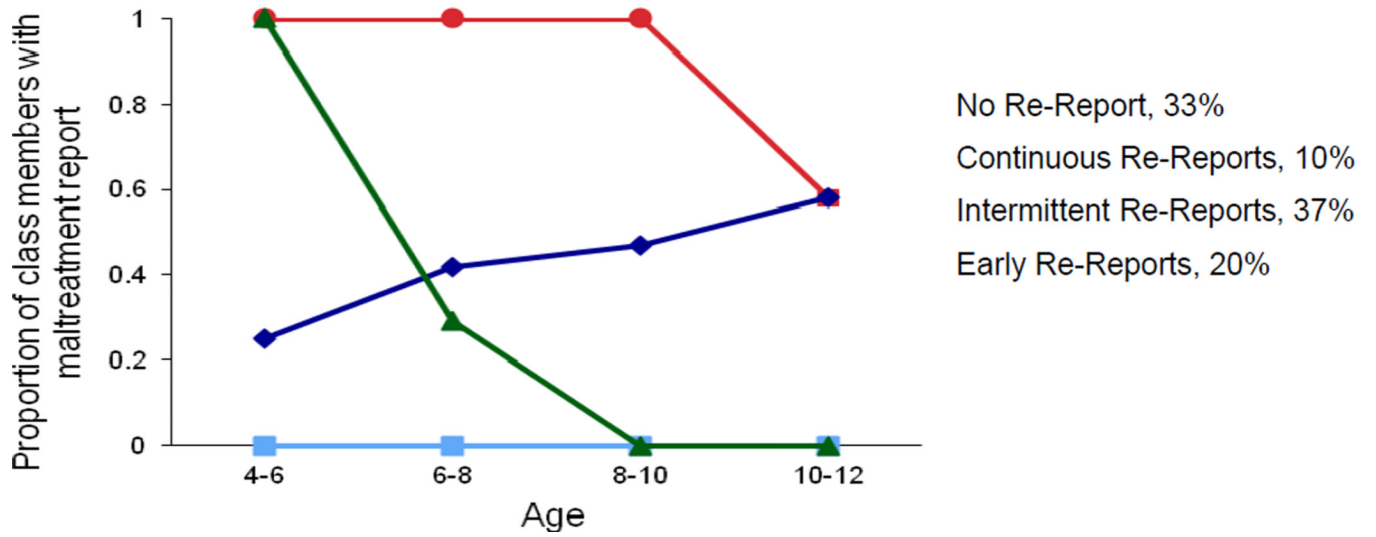


Figure 1. Latent growth mixture model trajectories of maltreatment re-reports for children with an initial CPS report prior to age 4

Table 1

Descriptive statistics

Variable	% or M (SD)
Age 4 Placement (%)	
Living with Biological/Step-Parent	53.6
Adopted	9.2
Kinship Care	18.8
Non-Kin Foster Care	18.4
Characteristics of maltreatment reports prior to age 4 (%)	
Physical abuse *	40.1
Sexual abuse *	14.6
Neglect *	84.6
Drug/Alcohol Alleged	51.3
Substantiated	73.3
Caregiver Characteristics	
Age (M, SD)	38.1 (11.6)
Education (M, SD)	12.0 (2.4)
Alcohol Abuse (%)	33.3
Depression (M, SD)	10.8 (10.3)
Social Support (M, SD)	38.7 (8.7)
Home Environment Characteristics	
Poverty /AFDC receipt (%)	56.6
Caregiver's partner in the home (%)	53.3
Number of children in the home (M, SD)	3.0 (1.7)
Control Variables (%)	
Study Site (Southwest)	58.1
Child Race (Non-White)	64.3
Child Gender (Female)	51.5

* Note: Victimization by more than one type of maltreatment is common and explains why the column percentages exceed 100%.

Table 2

Fit Indices for Growth Models, $n = 501$

# of Classes	% of sample (n) for each class	AIC	SSAdj BIC	Entropy	LMR-LRT
1	Class 1 100.0 (501)	2483.38	2485.47		
2	Class 1 28.7 (144) Class 2 71.3 (357)	2373.12	2378.33	0.57	116.26 ^b
3	Class 1 40.3 (202) Class 2 12.6 (63) Class 3 47.1 (236)	2360.31	2368.65	0.53	18.81 ^a
4	Class 1 32.9 (165) Class 2 10.4 (52) Class 3 36.7 (184) Class 4 20.0 (100)	2359.43	2370.90	0.62	6.88 ^a
5	Class 1 5.9 (30) Class 2 10.2 (51) Class 3 36.7 (184) Class 4 47.1 (236) Class 5 00.0 (0)	2365.21	2379.81	0.69	1.38

Note: AIC = Akaike Information Criterion; SSAdj BIC = Sample-size adjusted Bayesian Information Criterion; LMR-LRT = Lo-Mendell-Rubin likelihood ratio test.

^a $p < .01$.

^b $p < .001$.

Table 3

Predictors of Trajectory Classes: Multinomial Logit Models

	No Re-report as Reference:				Continuous as Reference:				Early as Reference:			
	Continuous re-reports vs. No Re-report		Intermittent re-reports vs. No Re-report		Early re-reports vs. No Re-report		Intermittent re-reports vs. Continuous		Early re-reports vs. Continuous		Intermittent re-reports vs. Early	
	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI
Living with Biological/Step-parent at Age 4	13.11 ^c	3.58–48.06	1.84	0.88–3.81	4.33 ^c	1.75–10.76	0.14 ^b	0.04–0.48	0.33	0.09–1.25	0.42	0.18–1.01
Early maltreatment (birth to age 4)												
Physical abuse	2.98 ^b	1.34–6.59	1.33	0.80–2.21	1.10	0.60–1.99	0.45 ^a	0.21–0.94	0.37 ^b	0.17–0.82	1.21	0.69–2.14
Sexual abuse	1.27	0.45–3.59	0.91	0.45–1.83	1.31	0.59–2.90	0.72	0.27–1.90	1.03	0.37–2.89	0.69	0.33–1.47
Neglect	0.82	0.29–2.31	1.28	0.63–2.59	0.74	0.35–1.56	1.56	0.57–4.26	0.90	0.33–2.50	1.73	0.83–3.61
Drug/Alcohol	1.13	0.51–2.49	0.92	0.56–1.52	0.77	0.43–1.39	0.82	0.39–1.74	0.69	0.31–1.53	1.20	0.69–2.10
Substantiated	0.94	0.40–2.22	0.99	0.58–1.72	0.59	0.32–1.08	1.05	0.47–2.35	0.62	0.27–1.43	1.70	0.96–3.01
Caregiver Characteristics												
Age	1.08 ^b	1.03–1.14	1.01	0.98–1.04	1.03	1.00–1.07	0.93 ^b	0.89–0.98	0.95	0.91–1.00	0.98	0.94–1.01
Education Level	0.93	0.79–1.10	0.97	0.87–1.07	1.04	0.92–1.19	1.04	0.89–1.21	1.12	0.95–1.32	0.92	0.82–1.04
Alcohol Abuse	4.86 ^c	2.16–10.95	1.75 ^a	1.01–3.01	1.41	0.74–2.69	0.36 ^b	0.17–0.76	0.29 ^b	0.13–0.65	1.24	0.69–2.22
Depression	1.01	0.97–1.05	1.02	0.99–1.05	1.04 ^b	1.01–1.07	1.00	0.97–1.04	1.03	0.99–1.07	0.98	0.95–1.01
Social Support	0.95 ^a	0.91–0.99	1.00	0.97–1.04	0.97	0.94–1.01	1.06 ^b	1.01–1.10	1.02	0.98–1.07	1.03	1.00–1.07
Home Environment												
Characteristics												
AFDC Receipt	5.19 ^c	2.02–13.38	2.95 ^c	1.71–5.09	2.36 ^b	1.24–4.47	0.57	0.23–1.43	0.45	0.17–1.19	1.25	0.68–2.33
Caregiver's partner in the home	2.06	0.91–4.63	1.09	0.65–1.83	2.02 ^a	1.08–3.77	0.53	0.25–1.13	0.98	0.43–2.22	0.54 ^a	0.30–0.97
Number of children in the home	1.44 ^c	1.15–1.81	1.15	0.99–1.33	1.20 ^a	1.00–1.42	0.80 ^a	0.65–0.98	0.83	0.66–1.04	0.96	0.82–1.14
Control Variables												
Study Site (Southwest)	1.73	0.77–3.90	1.41	0.81–2.45	1.46	0.76–2.80	0.81	0.39–1.72	0.84	0.38–1.88	0.97	0.53–1.75
Child Gender (male)	1.36	0.64–2.88	1.02	0.64–1.64	1.05	0.60–1.85	0.75	0.37–1.52	0.77	0.36–1.65	0.97	0.57–1.66
Child race (non-white)	0.34 ^a	0.14–0.83	0.86	0.51–1.43	0.63	0.35–1.17	2.52 ^a	1.08–5.87	1.86	0.75–4.58	1.35	0.75–2.43

Note: OR = odds ratio; CI = 95% confidence interval

^a $p < .05$.

^b $p < .01$.

^c $p < .001$.