

The Relationship Between Children's Age and Disclosures of Sexual Abuse During Forensic Interviews

Child Maltreatment
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Chelsea Leach¹, Martine B. Powell¹, Stefanie J. Sharman¹,
and Jeromy Anglim¹

Abstract

Children's disclosures of sexual abuse during forensic interviews are fundamental to the investigation of cases. Research examining the relationship between age and disclosure has shown mixed results; the aim of the current study was to clarify and extend our knowledge by modeling linear, quadratic, and interaction effects of age on disclosure. Child sexual abuse reports made by children, their caregivers, or mandated reporters over a 12-month period to police in one state of Australia were examined. Of the 527 children (age range 3–16 years) offered a forensic interview, 81% disclosed abuse during it. The other 19% did not disclose or refused the interview. Age had both linear and quadratic effects, whereby disclosure increased with age until 11 years, after which disclosure decreased with age to 16 years. The effect of age on disclosure was moderated by five variables: abuse severity, the child–suspect relationship, suspects' violence histories, delay of report to police, and children's previous disclosures. Particular groups of children had lower likelihoods of disclosing abuse in forensic interviews than others, such as adolescents who alleged abuse against suspects with histories of violent offending. By identifying these groups, targeted strategies may be developed to help increase their disclosure rates.

Keywords

child sexual abuse, case characteristics, disclosure, forensic interview, child age

Fewer than 20% of child sexual abuse reports to police result in conviction; the majority of cases are discontinued during the police investigation (Bunting, 2008; Fitzgerald, 2006; Wunderst, 2003). One reason for this discontinuation is that children do not disclose abuse during the forensic interview or assessment. Given that children's disclosures are often the only evidence in cases, it is very difficult for cases to proceed further if they do not disclose. Children's age may influence their willingness to disclose abuse during formal interviews (e.g., Hershkowitz, Horowitz, & Lamb, 2005; Lippert, Cross, Jones, & Walsh, 2009). Indeed, studies have revealed a number of different relationships between age and disclosure, including a linear relationship (Hershkowitz et al., 2005; Lippert et al., 2009) and interaction effects between age and case characteristics (such as child–suspect relationship; Pipe et al., 2007). The aim of the current study was to examine these effects in one model, along with case characteristics not previously examined, to enhance our understanding of the association between age and disclosure.

Some research has revealed a *linear relationship* between age and disclosure; in these studies, increases in age were associated with increases in disclosures (e.g., DiPietro, Runyan, & Fredrickson, 1997; Farrell, 1988; Hershkowitz et al., 2005; Keary & Fitzpatrick, 1994; Lippert et al., 2009).

For example, Hershkowitz et al. (2005) examined over 10,000 interviews with children alleging sexual and/or physical child abuse in Israel between 1998 and 2002. Of the children alleging sexual abuse, 71% disclosed during the forensic interview. Older children (7–14 years) were more likely to disclose than younger children (3–6 years). The other 29% did not disclose sexual abuse, which may have been because they were too scared or embarrassed, did not recognize the incident(s) as abusive, or were not actually abused (Hershkowitz et al., 2005). When reviewing such disclosure rates, it is important to consider the validity of cases (such as whether corroborative evidence was present) to limit false positives, which reduce observed disclosure rates (Lyon, 2007). In Hershkowitz et al.'s study, no judgments about the validity of children's disclosures were made. Lippert, Cross, Jones, and Walsh (2009) also found a linear relationship between age and disclosure. They examined child complainants' disclosures of sexual

¹ School of Psychology, Deakin University, Burwood, Victoria, Australia

Corresponding Author:

Martine B. Powell, School of Psychology, Deakin University, 221 Burwood Highway, Burwood, Victoria 3125, Australia.
Email: martine.powell@deakin.edu.au

abuse from Children's Advocacy Centres in four U.S. states and compared them with disclosures from communities that lacked these centers. The sample was restricted to cases that at least one party (e.g., medical personnel, police) believed that sexual abuse had, or may have, occurred. Children made full disclosures of abuse in 73% of cases; those who were older at the onset of the abuse (7 years and over) were more likely to disclose than those who were younger (0–6 years).

There are at least two possible reasons why children aged 0–6 years were less likely to disclose abuse than those aged 7 and over. First, younger children have a less well-developed cognitive ability to recognize behaviors as abusive, and in addition to this lower likelihood of recognition, they may not understand the purpose of the forensic interview (Hershkowitz et al., 2005). This explanation is supported by the finding that preschoolers are more likely to disclose abuse accidentally, whereas older children are more likely to disclose abuse purposefully (i.e., in response to direct questioning; Campis, Hebden-Curtis, & DeMaso, 1993; Fontanella, Harrington, & Zuravin, 2000). It is also possible that, compared to older children, younger children (under 5 years) were not actually abused but were more likely to have their ambiguous statements or behaviors interpreted as indicative of abuse by adults and reported to police or child protection workers (Keary & Fitzpatrick, 1994).

Two studies have found *no relationship* between age and disclosure during forensic interviews. Gries, Goh, and Cavanaugh (1996) examined the forensic assessment interviews of 3- to 17-year-old children in foster care; 45% had previously disclosed abuse and the rest were suspected of being abused (due to sexualised behavior, inappropriate comments, etc.). Sixty-four percent of children disclosed sexual abuse; this figure included 93% of the children who had previously disclosed and approximately 40% of children who had not previously disclosed. No independent measures of whether the disclosures were valid were available. Although no relationship was found between children's age and their disclosure of the abuse during the forensic interview, there was one finding that was consistent with this relationship: Younger children (mean age = 6 years) took longer to disclose and were more likely to require a second interview than older children (mean age = 9 years). In another study, Rush, Lyon, Ahern, and Quas (2014) examined 4- to 9-year-old children's disclosures in court-substantiated cases of physical and sexual abuse; substantiated cases were used to minimize the likelihood of false allegations. Age was not related to disclosures in any of the formal interviews. However, it is possible that no relationship was found due to the restricted age range of children in the study and the focus on court-substantiated cases. It is also possible that the different interview protocols used in the different studies may have affected disclosure rates.

Two studies have found *interaction effects* on disclosure (Leclerc & Wortley, 2015; Pipe et al., 2007). Pipe et al. (2007) examined 397 forensic interviews with suspected victims of child sexual abuse aged 4–13 years. In this study, approximately one third of disclosures were validated with

suspect confessions. Eighty-three percent of children disclosed the abuse. There was a significant interaction between age and relationship with the suspect on disclosure: Younger children (4–5 years) were less likely than older children (6–13 years) to disclose sexual abuse when the suspect was an immediate family member, but there were no age differences when the suspect was an extended family member, a person known to the child (but not a family member) or a stranger. Younger children may have been less likely to disclose intrafamilial abuse than older children because they did not recognize the behaviors as abusive, they feared the consequences of disclosing, and/or felt loyal to the suspect (Pipe et al., 2007).

In the other study that found interaction effects, Leclerc and Wortley (2015) interviewed 369 adult males who had been convicted of sexual offenses against a child. Offenders were asked whether the child disclosed the abuse. The results showed a linear effect of age on disclosure (older children were more likely to disclose than younger children) as well as an interaction between age and location of the child. As children got older, they were more likely to disclose when they were not living at home with the offender at the time of the abuse but less likely to disclose when they were living at home with the offender at the time of the abuse. These results fit with research showing that children who are abused by a family member or someone in the home are less likely to disclose than children who are abused by a person outside of the family (Goodman-Brown, Edelstein, Goodman, Jones, & Gordon, 2003; Kogan, 2004). Disclosing abuse by a family member or someone in the home may be accompanied by a greater sense of disruption and shame for the child; these disclosures may be less likely to be believed, which can exacerbate feelings of self-blame (Kogan, 2004).

Present Study

Given the different relationships that have been found between age and disclosure in forensic interviews, the aim of the current study was to examine the association between age and disclosure in conjunction with other variables likely to affect disclosure rates. This exploration may help us to better understand the different relationships that have been found to date. We examined linear effects of age on disclosure as well as interaction effects between age and other case characteristics on disclosure in a single model. These case characteristics included those previously examined in the literature, such as child–suspect relationship, as well as characteristics that have not been previously examined but may influence disclosure: suspects' histories of violence and sexual assault. Whether suspects had previous charges for violent offenses may influence children's disclosure because, as they get older, children have a greater fear of the negative consequences of disclosure, including threats of harm against themselves, parents, or relatives (Goodman-Brown et al., 2003; see also Malloy, Brubacher, & Lamb, 2011). Thus, older children may be less likely to disclose when suspects have histories of violence. Even if they do not know about the previous offenses per se,

these offenses may provide insight into suspects' behavior more generally, of which children should be aware. Whether suspects had previous charges for sexual offenses may also influence older children's disclosure as they may realize that suspects have been prosecuted previously. On the one hand, it may encourage older children to disclose as they may realize that the suspect has been previously punished. On the other hand, it may not encourage disclosure as children may realize that the suspect has been punished but is still offending.

We included not only the linear effects and interaction effects of age on disclosure but also the quadratic effect of age in the model, which suggests that disclosures increase with age from preschool to school age but decrease from school age to adolescence (London, Bruck, Ceci, & Shuman, 2007). In other words, there is an inverted U-shaped effect of age on disclosure. London et al. (2007) suggested that preschoolers were less likely to disclose than school-age children for the reasons described above. In addition, they suggested that adolescents should be less likely to disclose during forensic interviews than school-age children because adolescents have been shown to disclose abuse more often to their peers, whereas school-aged children were more likely to disclose to their primary caregivers (Lamb & Edgar-Smith, 1994; Tang, 2002). Adolescents may be more fearful of the negative consequences of disclosing abuse to people other than their peers, particularly intrafamilial abuse (Goodman-Brown et al., 2003), which should make them less likely to disclose to interviewers than school-age children.

Other research suggests that adolescents may view the abuse as "consensual," such as between an older boyfriend and a younger girlfriend or vice versa. Therefore, adolescents may be less willing to disclose the abuse because they do not want the suspect to get in trouble. Indeed, Bunting (2008) found that for sexual offenses against children recorded by police in Northern Ireland over a 5-year period, the proportion of cases in which children declined to prosecute increased with age. Furthermore, cases involving boyfriends and girlfriends had the highest proportion of children declining to prosecute (67%).

Professionals, researchers, and policy makers need a clear understanding of the relationship(s) between age and disclosure. For example, the difference between a linear and quadratic effect of age and disclosure is important, so that precise interventions can be tailored to support groups of children who are less likely to disclose during forensic interviews. If there is a linear effect, suggesting that preschool children and—to a lesser extent—school-aged children are less likely to disclose than adolescents, then resources should be tailored toward supporting these younger children. However, if there is a quadratic effect, both preschoolers and adolescents may be less likely to disclose than school-age children, then resources should be tailored toward supporting both the youngest and the oldest children.

To get a better understanding of the association between age and disclosure, we examined the linear, quadratic, and interaction effects of age in a single model predicting disclosure. Age was entered into the analyses as a continuous variable to avoid

any issues around categorization. Both linear and quadratic effects of age were modeled, along with interactions between age and suspect characteristics (whether the suspect was a juvenile at the time of the offense, history of violent offenses, history of sexual offenses) and age and offense characteristics (abuse severity, abuse frequency, child–suspect relationship, delay between offense and report, previous disclosure, and disclosure during forensic interview). Based on the many studies showing a linear relationship between age and disclosure, it was predicted that the same relationship would be found. It was also predicted that there would be at least one significant interaction between age and a case characteristic: Younger children should be less likely to disclose intrafamilial abuse than older children, whereas there should be no difference in their disclosure of extrafamilial abuse.

Method

Procedure

Data were gathered from a police case management database, which is used to electronically file all information about investigations and to record a chronological log of case notes. The database was searched for all cases that were reported in one jurisdiction of Australia over the 12 months of 2011 and involved at least one sexual offense against a child aged 3–16 years. Reports of abuse were made by members of the public to child protection services or police. Mandated reporters (i.e., doctors, nurses, midwives, teachers, police officers) also made reports if they reasonably believed that sexual abuse had occurred. Additional cases were identified through a specialist investigation unit that separately recorded mandatory reports of children with a sexually transmitted infection.

Each case was reviewed to ensure it met the study criteria. Cases were included when (a) the child was between 3 and 16 years at the time of the report, (b) the alleged suspect was 10 years or older, (c) the child was asked to participate in a video-recorded forensic interview or provide a written statement, and (d) the offense occurred within the study jurisdiction. Because allegations made by children aged 13 years and older were investigated by a sexual assault investigation unit (rather than the specialist child abuse unit that investigates allegations by children aged under 13 years), older children were more likely to be given an option of making a statement. Where there was more than one child or suspect in a single case, one child and suspect pair was randomly selected (Lippert et al., 2009).

All information available on each of these cases was read by the first author to elicit data for the variables of interest. During data extraction, a standardized process was followed, including giving precedence to the most recently entered information and to free-text information if it contradicted information provided in a check box. If there was any ambiguity about the information that was the most reliable, clarification was sought with police officers. During the extraction process, the first author performed regular reliability checks with another researcher by coding random samples of cases.

Sample

A total of 527 cases were included in the study; of these, 466 (88.4%) children had a forensic interview and 61 (11.6%) refused the interview. Forensic interviews were conducted by police and/or child protection officers trained in the use of a narrative-based protocol that was similar in structure to the National Institute of Child Health and Human Development protocol (see Lamb, Orbach, Hershowitz, Esplin, & Horowitz, 2007). Children's mean age was 10.93 years ($SD = 3.72$); 12.3% were preschoolers (3–5 years), 43.1% were school age (6–12 years), and 44.6% were adolescents (13–16 years). The majority of children (81.2%) were female. Most reports concerned an extrafamilial suspect (60.0%), involved a nonpenetrative offense (60.7%), and were single incidents (59.2%). Suspects' age ranged from 10 to 89 years ($M = 31.33$, $SD = 16.40$); 27.7% were juveniles (under 18 years). Few suspects had been previously been charged with a sexual (16.3%) or violent offense (22.6%). Most reports concerned incidents that had occurred within the past 12 months (83.1%). The majority of children had disclosed abuse prior to the forensic interview (90.7%).

Of the 527 cases, 348 (66.0%) had at least one form of corroborating evidence; these included medical evidence, corroborating witness(es), and forensic evidence (e.g., DNA match suspect, phone calls). Corroborative witnesses included eyewitnesses and individuals who made statements to police that corroborated children's accounts. Corroborating statements could include details of children's first disclosures or evidence that supported the details of the events provided by children. Of the 348 cases, 325 (93.4%) had corroborative witness evidence only, 3 (0.9%) had forensic evidence only, and 1 (0.3%) had medical evidence only. In 22 cases (6.3%), there were two types of evidence present; in one case, all three types of evidence were present. Thus, approximately two thirds of cases had at least one form of corroborating evidence that the abuse occurred.

Variables

Child demographics. Child characteristics included the child's age at which the report was made to police. For regression models, child age was centered at the mean (11 years). To capture quadratic age effects, $child\ age^2$ was calculated by squaring the child's age after centering. Centering reduced the correlation between the linear and quadratic effects. *Child gender* was coded 0 for *female* and 1 for *male*.

Suspect characteristics. *Suspect age* was coded 0 for juvenile (10–17 years) and 1 for older suspects (18 years and over). *Violence history* was coded 1 if suspects had a previous charge for a violent offense and 0 if they did not; *sexual history* was coded 1 if suspects had a previous charge for a sexual offense and 0 if they did not. *LogViolence* and *LogSexual* were the base 10 logarithm of one plus the count of the suspect's previous violence or sexual charges, respectively. These were included

in the model rather than the raw data that was positively skewed. Log transformations are a standard approach to modeling count data and have the effect of reducing the degree to which large counts are outliers.

Case characteristics. The *relationship* between children and suspects was coded 0 for intrafamilial and 1 for extrafamilial. Intrafamilial suspects were biologically related to the child or resided with the child (e.g., parents, stepparents, siblings, cousins). Extrafamilial suspects were not related to, or residing with, the child (e.g., neighbors, teachers, peers, strangers). *Abuse severity* was coded as 1 if at least one penetrative offense was suspected, otherwise it was coded 0. *Abuse frequency* was coded 1 for repeated abuse and 0 for a single incident. *Delay to police report* was coded 1 when the last incident occurred more than 12 months prior to the report to police, otherwise it was coded 0. *Prior Disclosure* was coded 1 when children had disclosed to at least one person previously and 0 when they had not. Children did not need to disclose for a report to be made to police; there may have been other evidence suggesting abuse, such as the presence of a sexually transmitted infection.

Forensic disclosure. A *forensic disclosure* was deemed to have occurred (coded 1) if police case notes indicated that the child made a verbal statement that revealed the sexual abuse behaviors that had occurred; this disclosure could occur during a video-recorded forensic interview or in a verbal statement. Children did not need to provide enough detail about the abuse to establish the elements of the offense. Forensic disclosure was coded 0 if children did not disclose abuse in the interview or if they refused to be interviewed.

Results

Overall, 81% of children disclosed at least one incident of child sexual abuse in the forensic interview. To examine the relationship between age and other case characteristics on forensic disclosure, a number of analyses were conducted. First, a logistic regression was conducted to predict forensic disclosure using the linear and quadratic age variables. Second, logistic regressions were conducted to examine the bivariate relationships between linear and quadratic age and the other case characteristics. Third, χ^2 tests of independence were used to test the association between the other case characteristics and disclosure. Fourth, logistic regressions were conducted to test for interactions between age and case characteristics in predicting forensic disclosure. Finally, to assess the robustness of the previously observed interactions, a logistic regression was performed that included all complainant, case, and suspect characteristics as well as their interactions with age in a multivariate model. The quadratic effect of age was included in the model as it is important to include known quadratic terms when interactions are estimated (Ganzach, 1997).

Table 1. Logistic Regression Models Predicting Case Characteristics From Complainant Age.

Variable and Model Details	Male Complainant	Penetrative Abuse	Repeated	Extrafamilial Abuse	Juvenile Suspect	Delay Over 12 Months	Previous Disclosure
	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)
Constant	-1.40* (0.16)	-0.86* (0.14)	-0.37* (0.13)	0.53* (0.13)	-0.88* (0.14)	-1.33* (0.17)	2.54* (0.24)
Complainant age	-0.14* (0.04)	0.19* (0.03)	0.04 (0.03)	0.15* (0.03)	-0.10* (0.03)	0.02 (0.04)	-0.05 (0.05)
Complainant age ²	-0.01 (0.01)	0.03* (0.01)	0.001 (0.007)	-0.007 (0.008)	-0.008 (0.008)	-0.02* (0.01)	-0.02 (0.01)
Model χ^2	15.62	39.22	2.32	46.83	10.02	7.67	2.31
Model p value	<.001	<.001	.314	<.001	.007	.022	.32
Cox & Snell R ²	.029	.072	.004	.085	.019	.014	.004
Nagelkerke R ²	.047	.097	.006	.115	.027	.024	.009

Note. Numbers in bold font indicate that complainant age or complainant age² significantly predicted a case characteristic.

* $p < .05$.

Age and Forensic Disclosure

The logistic regression predicting forensic disclosure using linear and quadratic age variables was significant, $\chi^2 = 20.60, p < .001$, Cox & Snell $R^2 = .038$, Nagelkerke $R^2 = .062$. In terms of predictors, the quadratic effect of age was significant, $B (SE) = -0.033 (0.009), p < .001$, but the linear effect was not, $B (SE) = -0.021 (0.036), p = .561$; Constant $B (SE) = 1.985 (0.183), p < .001$. The proportion of cases in which children disclosed increased from 3 up to 11 years, then decreased to 16 years.

Age and Other Case Characteristics

A series of logistic regression models was conducted to predict each binary case characteristic from linear and quadratic age. Age was a significant predictor for four case characteristics (see Table 1): child gender, abuse severity, relationship, and juvenile suspects. As age increased, the proportion of cases with extrafamilial suspects and with penetration increased; and the proportion of cases with male children and juvenile suspects decreased. There were quadratic effects of age on abuse severity and report delay. For abuse severity, younger (3–6 years) and older children (9–16 years) had higher rates of penetrative abuse than children aged 7–8 years, with the older children having the highest proportion. For report delay, reports made to police more than 12 months after the offense increased from 3 to 13 years, then plateaued to 15 years, and decreased to 16 years.

Other Case Characteristics and Disclosure

Two case characteristics were significantly associated with a forensic disclosure: delay to police report, $\chi^2(1) = 5.28, p = .022$, and prior disclosure, $\chi^2(1) = 8.96, p = .003$. For delay, when the abuse had occurred more than 12 months prior to the report, 89.9% of children disclosed in the forensic interview; only 79.5% of children disclosed when the abuse was reported within 12 months. For prior disclosure, of the children who had disclosed prior to the forensic interview, 82.8% disclosed during the interview. Of the children who had not disclosed prior, only 65.3% disclosed during the interview.

Interactions

Table 2 shows the results of logistic regressions conducted to examine interactions between age and each case characteristic in predicting forensic disclosure. Complainant age significantly interacted with three case characteristics to predict the proportion of cases with a forensic disclosure: severity, delay to police report, and prior disclosure (see Figure 1 that shows plots of all nine variables included in the full model below). One further interaction approached significance: age and extrafamilial suspect, $p = .057$. The interactions between complainant age² and each case characteristic were also examined; they did not significantly improve any of the models; thus, only linear age interactions are reported.

The Age \times Penetration plot shows that for younger children and those in middle childhood, penetration increased the likelihood of disclosure. For adolescents, it did not increase the likelihood of disclosure. The Age \times Delay plot shows that younger children had a higher likelihood of disclosing in cases that were reported within 12 months of the abuse ending; adolescents had a higher likelihood of disclosing in cases in which reporting was delayed. The Age \times Previous Disclosures plot shows that for younger children and those in middle childhood, previous disclosures increased the likelihood of disclosure during the forensic interview. For adolescents, previous disclosure did not increase the likelihood of disclosure. The Age \times Extrafamilial Suspect plot shows that younger children had a higher likelihood of disclosing in cases of extrafamilial abuse than cases of intrafamilial abuse. Older children had a higher likelihood of disclosing in cases with intrafamilial than extrafamilial abuse.

Multivariate Model

To assess the robustness of the previously observed interactions, a logistic regression was performed that included all child, case, and suspect characteristics, as well as their interactions with age (see Table 3 and Figure 1). The model with the interaction effects significantly improved prediction over a model that only included main effects, change in $\chi^2(9) = 37.06, p < .001$. A model including interactions between

Table 2. Logistic Regression Models Predicting Forensic Disclosure From Complainant Age and a Case Characteristic.

Variable and Model Details	Male Complainant		Penetrative Abuse		Repeated		Extrafamilial Abuse		Juvenile Suspect		Violence History (Log)		Sexual History (Log)		Delay Over 12 Months		Previous Disclosure		
	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	
Constant	2.00* (0.19)	1.86* (0.20)	1.96* (0.21)	2.21* (0.26)	2.14* (0.21)	1.97* (0.19)	1.98* (0.19)	1.87* (0.19)	1.20* (0.38)										
Age	-0.01 (0.04)	0.04 (0.05)	-0.04 (0.04)	0.06 (0.06)	-0.001 (0.04)	-0.03 (0.04)	-0.02 (0.04)	-0.05 (0.04)	0.22* (0.10)										
Characteristic	-0.14 (0.30)	0.59* (0.28)	0.09 (0.24)	-0.33 (0.27)	-0.47 (0.25)	-0.15 (0.31)	-0.01 (0.30)	-0.95* (0.47)	0.89* (0.38)										
Age × Characteristic	-0.06 (0.07)	-0.20* (0.07)	0.04 (0.06)	-0.12** (0.06)	-0.10 (0.06)	-0.12 (0.07)	-0.02 (0.08)	-0.32* (0.12)	-0.27* (0.10)										
Age ²	-0.03* (0.01)	-0.03* (0.01)	-0.03* (0.01)	-0.03* (0.01)	-0.04* (0.01)	-0.03* (0.01)	-0.03* (0.01)	-0.03* (0.01)	-0.03* (0.01)										
Model χ^2	21.40	35.07	21.26	25.25	26.01	23.63	20.64	33.85	35.96										
p Value	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001										
Cox & Snell R ²	.040	.064	.040	.047	.048	.044	.038	.062	.066										
Nagelkerke R ²	.064	.104	.064	.076	.078	.071	.062	.100	.106										

Note. Numbers in bold font indicate the significant interactions that predicted forensic disclosure. The column heading indicates the case characteristic that was used as the predictor of forensic disclosure. * $p < .05$. ** $p = .057$.

characteristics and age² was examined but did not significantly improve the model, so it is not reported.

Interactions between age and penetrative abuse, delay to police report, previous disclosure, and extrafamilial abuse were retained in the multivariate model. An additional interaction emerged in the final model that was not significant when the interactions were examined separately for each case characteristic: Age × Violence History (see Figure 1 in which a categorical variable, history of violence vs. no history, is displayed for clarity). This interaction was in the same direction in the initial model, suggesting that when the other case characteristics were controlled for, this interaction was amplified in the multivariate model sufficiently to become statistically significant. The Age × Violence plot shows that younger children had a higher likelihood of disclosure when suspects had histories of violence. Children in middle childhood and adolescents had a lower likelihood of disclosure when suspects had histories of violence. As with all interactions, this interaction should be interpreted within the broader context of the linear and quadratic effects of age.

Discussion

We found that age had significant relationships with children's disclosures during forensic interviews—both alone and in interactions with other case characteristics. When considering age alone, the multivariate model revealed significant linear and quadratic effects. For the linear effect, disclosures increased with age, which is consistent with past research (e.g., DiPietro et al., 1997; Hershkowitz et al., 2005; Lippert et al., 2009). For the quadratic effect, disclosures increased with age from 3 up to 11 years, then decreased to 16 years. This finding provides empirical support for London et al.'s (2007) proposal that adolescents may be less likely to disclose in forensic interviews than children in middle childhood. There are at least three possible explanations for this finding. First, adolescents may have been less willing to disclose than children in middle childhood because they were more embarrassed by the abuse (London et al., 2007). Second, adolescents may have been more aware of the negative consequences of their disclosure, including harm that may come to themselves and their families from the suspect (Goodman-Brown et al., 2003; Malloy et al., 2011). Third, adolescents may have considered themselves to be in loving relationships with older individuals and did not consider the sexual activity to be abuse (Bunting, 2008). Indeed, the proportion of our cases involving extrafamilial suspects increased as children's age increased, which suggests that the suspects may have been boyfriends or girlfriends.

We also found five interactions between age and other case characteristics on disclosure. The interaction between age and relationship suggested that when the abuse was intrafamilial, the youngest children had the lowest rate of disclosure; this rate of disclosure increased with age. Our finding is consistent with Pipe et al.'s (2007) finding that younger children (4–5 years) were less likely to disclose intrafamilial abuse than older

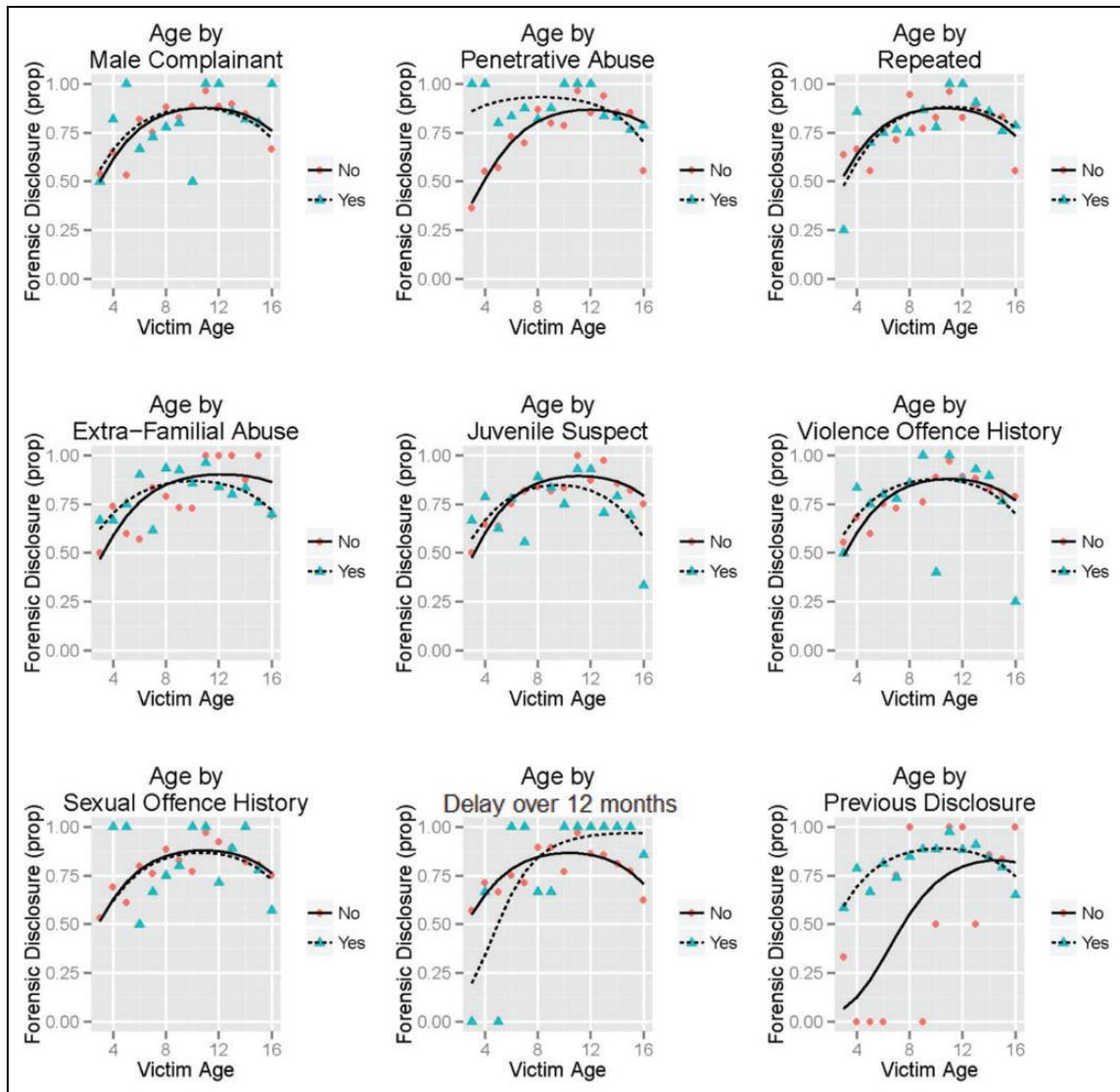


Figure 1. Relationships between nine case characteristics and victim age and on disclosure during forensic interviews.

children (9–13 years). It is possible that younger children were less likely to disclose intrafamilial abuse than older children because they did not recognize the behaviors as abusive, feared the consequences of disclosure, and/or felt loyal to the suspect (Pipe et al., 2007). When the abuse was extrafamilial, we found that younger children and adolescents had lower rates of disclosure than school-age children. It is possible that younger children were less likely to disclose because they did not recognize the behaviors as abusive (Hershkowitz et al., 2005); adolescents may have been less likely to disclose because they perceived the behaviors to be consensual between themselves and an older boyfriend or girlfriend (Bunting, 2008).

The interaction between age and prior disclosure indicated that for children who did not disclose before the forensic interview, disclosures increased with age. For children who had disclosed before the forensic interview, younger children and adolescents were less likely to disclose during the forensic interview than school-age children. This finding is consistent

with Pipe et al.'s (2007) finding that younger children who had previously disclosed were less likely to disclose again during the forensic interview compared to children in middle childhood. There are at least three possible explanations for this finding. First, younger children who previously disclosed may not have disclosed again during the forensic interview due to the formality of the setting; they may also have been less aware than older children about the consequences of their initial disclosures. Second, the interview situation may not have supported younger children's recall as much as older children's. Third, younger children may not have had anything to disclose; abuse may have been suspected due to adults' misinterpretations of what the children said or did (Keary & Fitzpatrick, 1994).

We also found that adolescents were less likely to disclose again during the forensic interview than school-age children, which extends Pipe et al.'s (2007) findings as they did not include children older than 13 years in their sample. There are

Table 3. Multivariate Model Predicting Forensic Disclosure.

Predictor	B (SE)	p Value	Odds Ratio (95% CI)
Constant	1.40 (0.49)	.005	4.06
Complainant age	0.40 (0.13)	.003	1.49 [1.14, 1.93]
Complainant age ²	-0.03 (0.01)	.008	0.97 [0.95, 0.99]
Male complainant	0.01 (0.32)	1.00	1.00 [0.53, 1.89]
Penetrative abuse	0.70 (0.31)	.023	2.01 [1.10, 3.68]
Repeated	-0.22 (0.28)	.428	0.80 [0.47, 1.38]
Extrafamilial abuse	-0.12 (0.32)	.699	0.88 [0.47, 1.65]
Juvenile suspect	-0.55 (0.29)	.054	0.57 [0.33, 1.01]
Log of number of previous violent offenses	-0.17 (0.35)	.629	0.84 [0.42, 1.69]
Log of number of previous sexual offenses	-0.10 (0.35)	.778	0.91 [0.46, 1.79]
Delay over 12 months	0.78 (0.52)	.130	2.19 [0.79, 6.03]
Previous disclosure	0.79 (0.39)	.043	2.19 [1.03, 4.70]
Age × Male	-0.09 (0.08)	.264	0.91 [0.78, 1.07]
Age × Penetration	-0.220 (0.08)	.004	0.80 [0.69, 0.93]
Age × Repeat	-0.01 (0.07)	.857	0.99 [0.86, 1.13]
Age × Extrafamilial	-0.17 (0.08)	.031	0.84 [0.72, 0.99]
Age × Juvenile	-0.07 (0.07)	.353	0.94 [0.82, 1.08]
Age × Violence	-0.18 (0.09)	.039	0.83 [0.70, 0.99]
Age × Sexual	0.04 (0.10)	.699	1.04 [0.86, 1.26]
Age × Delay Over 12 Months	0.29 (0.14)	.031	1.34 [1.03, 1.75]
Age × Previous Disclosure	-0.29 (0.11)	.006	0.75 [0.61, 0.92]
Model χ^2	75.73		
p Value	<.001		
Cox & Snell R ²	.134		
Nagelkerke R ²	.216		

Note. Numbers in bold font indicate significant predictors of forensic disclosure. CI = confidence interval.

a number of reasons why adolescents might not want to disclose again during the forensic interview. Research has shown that complainants who perceive negative responses (such as disbelief) to their initial disclosure are less willing to disclose to authorities than participants who perceive more positive responses (Lievore, 2005). Another explanation is that adolescents made their disclosures prior to the interview to seek support or protection (usually to peers; see Arata, 1998; Kogan, 2004); they may have been more reluctant to disclose during the forensic interview because they did not want the suspect to be prosecuted or have to go to court.

The interaction between age and abuse severity indicated that more severe abuse (i.e., penetration) increased the likelihood of disclosure for younger and school-age children but not adolescents. This finding is consistent with previous research that has found an effect of abuse severity on disclosure (e.g., Kogan, 2004; Lippert et al., 2009). It is possible that younger children were more likely to disclose when penetration occurred because, compared to nonpenetrative abuse, they should have been more likely to recognize the incident as abusive (Cederborg, Lamb, & Laurell, 2007). Consistent with this

explanation, it is possible that we did not find an effect of abuse severity for adolescents because they were more likely to realize—due to their better understanding of sexual behavior—that they had been victimized even when the abuse was nonpenetrative. Although we found an interaction between age and abuse severity on disclosure, a related factor—abuse frequency—was not associated with disclosure. This finding is consistent with Lippert et al. (2009) who found that frequency did not predict disclosure either alone or in a multivariate model.

The interaction between age and violence history indicated that when suspects had convictions for violent offenses, school-age children were most likely to disclose, followed by adolescents and younger children. However, the magnitude of the effect was small and should therefore be interpreted with caution. It is possible that adolescents were less likely to disclose than school-age children because, even if adolescents were not aware of a suspect's previous violence offenses, they should have been aware of the suspect's propensity toward violence. When suspects had a potential for violence, adolescents may have been more fearful of disclosing abuse to authorities compared to when suspects had no potential for violence. Indeed, Malloy et al. (2011) found that the older the victims, the more concerned they were that they would be physically harmed as a consequence of disclosing their abuse.

Finally, the interaction between age and delay showed that younger children had a lower likelihood of disclosing after a delay, whereas adolescents had a much higher likelihood. This finding is consistent with Goodman et al.'s (2003) finding that older children took longer to disclose than younger children. It is possible that because of their greater fear of negative consequences to themselves and people other than the suspect (such as family members), and their greater perceived responsibility for the abuse, adolescents delayed their disclosure longer than younger children (Goodman et al., 2003; Malloy et al., 2011). It is important to note that delay in our study was measured from the last abusive incident (rather than the first) if the abuse was repeated, as the last incident should be the easiest for police to prosecute. It is possible that if the abuse was repeated, it became more severe over time, which encouraged children to disclose. Therefore, the delay between the last incident to the police report may have been short, but the duration of the actual abuse was much longer. Future research could include children's age at the onset of abuse if it was repeated.

There were at least four limitations to the current study. First, the validity of children's disclosures was not known (see also Hershkowitz et al., 2005). However, in two thirds of our cases, there was corroborating evidence. The second limitation was that, due to confidentiality agreements, we were not able to investigate differences between cases reported by mandated reporters and other cases. The third limitation is that we were not able to analyze the quality of the forensic interviews in our study; it is possible that children are more likely to disclose in better quality interviews (see Teoh & Lamb, 2013, for results suggesting that interviewer supportiveness influences the amount of information reported).

The fourth limitation is that our sample consisted of reported cases; therefore, suspicion bias might have affected the disclosure rate (Lyon, 2007). The majority of children had previously disclosed abuse (or had other suggestive evidence), which increased suspicion that they had been abused. As a result of this suspicion, forensic interviews were held and most children disclosed. Our sample included few complainants who did not voluntarily disclose or show possible signs of abuse. This suspicion bias may limit the generalizability of our results to samples that consist largely of children suspected of being abused.

It is also important to note that our sample had similarities and differences to other samples that have been used to examine children's disclosures in forensic interviews. For example, our sample contained 81% females, which was the same as Lippert et al.'s (2009) sample (81%) and very similar to Pipe et al.'s (2007) sample (79%). However, only 39% of our cases involved penetration, which was slightly higher than Lippert et al.'s sample (33%) and much lower than Pipe et al.'s sample (89%). Our sample also contained a lower percentage of cases involving intrafamilial abuse (40%) than both Lippert et al. (55%) and Pipe et al. (72%). We do not know whether these differences affected the results; indeed, we found a very similar disclosure rate to Pipe et al. (83%) and also replicated their finding that younger children were less likely to disclose intrafamilial abuse than older children.

The results of the current study have several implications. Methodologically, the results indicate that it is important to examine interactions between case characteristics as well as the effects of the characteristics alone on disclosures of abuse. Case characteristics are intricately related to each other, and the effect of one case characteristic on disclosure rates should only be described where other case characteristics are held constant. For example, our results showed that age is associated with increased disclosure rates *only* when the abuse is intrafamilial or the suspect does not have a history of violence. Future research should explore reasons for these differences in disclosure rates among similar age-groups. In particular, the current results highlight the need for research to more closely examine the pattern of disclosure rates for adolescents and to identify strategies to improve these rates.

The current results may also be used to identify groups of children who may be particularly vulnerable to case attrition—whether it occurs through children recanting, refusing to cooperate, or investigators not proceeding—due to low disclosure rates. One such group was adolescents who were abused by a suspect with a history of violent offending; another group was young children who were abused by a family member. By identifying these groups, further strategies may be developed to increase disclosure rates (without increasing the risk of false allegations). For example, investigators may need to regularly review the suspect's history of violence prior to an investigative interview. Where there are prior charges of violence against a suspect, then this may indicate that investigators should spend more time-building rapport with adolescents and taking steps to ensuring their physical safety. Currently, the

research underpinning investigative interview training has predominantly focused on eliciting reliable narrative accounts from young children (Powell, 2008). While these strategies may be equally important for adolescents, older victims may choose not to provide a forensic disclosure—thus addressing their motivational barriers is critical. Further research is needed to determine the efficacy of strategies such as enhanced rapport building and emotional support during the interview for children who are reluctant to disclose (see, e.g., Hershkowitz, Lamb, & Katz, 2014).

In conclusion, the current study demonstrated many complex ways in which children's age was related to their disclosures during forensic interviews. The interactions suggest that children from particular age ranges may benefit from targeted interventions to support their disclosures in forensic interviews, depending on the specific circumstances of the suspected abuse. For example, this support may be particularly important for the older children who disclosed *before* the forensic interview to encourage them to disclose again in the more formal forensic interview situation. In addition, younger children who are suspected of being abused by an intrafamilial suspect, that is, someone biologically related to the child and/or living with the child, may require further support, as they are unlikely to disclose. Older children who are suspected of being abused by an extrafamilial suspect, such as a boyfriend or girlfriend, may also require further support, as they too are unlikely to disclose. Taken together, the results of the current study indicate that disclosures during forensic interviews are not only related to children's ages but also to other case characteristics, such as the relationship between the child and the suspect, the severity of the abuse, the length of delay between the offense and the report to police, whether the child had previously disclosed, and whether the suspect had a previous charge for a violent offense.

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