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## CLINICAL PSYCHOLOGY & NEUROPSYCHOLOGY | RESEARCH ARTICLE

# Effects of the sex of the perpetrator on victims' subsequent sexual behaviors and adulthood sexual orientations

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**Abstract:** Data from 2,828 female and 1,556 male adult participants from a general population convenience sample were used to measure the effect of the sex of the perpetrator on the adult sexual orientation of the victims of child sexual abuse (CSA) by adult male or female perpetrators and early incest with parents or early incest with siblings. Sexual behaviors with female perpetrators tended to promote an orientation toward sex with females and analogous behaviors with male perpetrators tended to promote an orientation toward sex with males in victims of both sexes. Many forms of incest or CSA increased the likelihood the victims would subsequently engage in behaviors with other partners or begin masturbating using adult male or female images. The subsequent early behaviors with other partners and masturbating using images of both male and female adults significantly enhanced or attenuated the conditioning resulting from interacting with the initial perpetrator. The victims' adult sexual orientations could be statistically predicted using regression equations that took into account the sexual behaviors with both adult and underage partners and whether or not the participant had masturbated using images of male or female adults. The results were consistent with conditioning and counter-conditioning theories.

### ABOUT THE AUTHORS

The eleven authors are all collaborating researchers in an interdisciplinary multi-institutional collaborative study involving six different West Virginia campuses (an area somewhat inland near the eastern coast of the USA, usually referred to as "the mid-Atlantic region") which resulted in collection of data from the 4,384 participants in the interval between 2002 and 2018.

### PUBLIC INTEREST STATEMENT

The effects of the sex of sexual perpetrators on the adult sexual orientations of the victims were investigated using data anonymously provided by 4,384 adult participants. The results were consistent with the theory that the adult sexual orientations of the participants were influenced early in life by interaction with the perpetrator. However, the adult orientations were also modulated by the victims' other early sexual experiences with male or female partners and sex-specific images that they had used when they masturbated. The results from our study were consistent with the theory that sexual orientations become fixed relatively early in life because they became established while the brain was still developing and malleable, a process known as critical period learning. Our results were consistent with the idea that a person's sexual orientation should not be used as the basis for discrimination because the sexual orientations of adults cannot be changed.

**Subjects: General Psychology; Cognitive Psychology; Counseling Psychology; Developmental Psychology**

**Keywords: sexual orientation; incest; child sexual abuse; classical conditioning; operant conditioning; counter conditioning**

The potentially life-altering effect of child sexual abuse (CSA) on the adult sexual orientations of the CSA victims has been overlooked in some scientific publications showing a high incidence of adult same-sex orientations in victims of CSA by same-sex perpetrators (e.g., Finkelhor, 1984; Mendel, 1995; Rosencrans, 1997). For example, among the 93 victims of mother-daughter incest (MDI) in Rosencrans' (1997) study, 36% self-identified as lesbian and another 10% self-identified as bisexual, yet the author stated there was no clear reason why people become heterosexual, lesbian, or bisexual (Rosencrans, 1997, p. 132). Finkelhor (1984, p. 195) and Mendel (1995, p. 169) both found significantly higher rates of adult same-sex behaviors or orientations in men who had been sexually abused by men, but both authors stated that their data were only correlational and insufficient to prove cause and effect. The alternative explanations provided by Finkelhor (1984) and Mendel (1995) for their findings amounted to blaming the victims for being attracted to, being attractive to, or being vulnerable to the perpetrators.

However, others have reported significant effects of same-sex incest and same-sex CSA by adults on the adult orientations of the young victims (e.g., Alhamad, 2013; Beard et al., 2013; Goodwin & DiVasto, 1979, 1989; Johnson & Shrier, 1985; Kelly, Wood, Gonzalez, MacDonald, & Waterman, 2002, p. 431; O'Keefe et al., 2014; Stroebe et al., 2013b). The theories of Beard et al. (2015) would explain effects of the sex of the perpetrator on the adult sexual orientation of the victims. Beard et al. (2015) expanded upon similar theories of Kinsey, Reichert, Cauldwell, and Mozes (1955), Van Wyk and Geist (1984), and Storms (1980, 1981). The effect of CSA on the adult sexual orientations of the CSA victims can be predicted by the theory that adult sexual orientations are the result of conditioning from early overt and covert behaviors (such as masturbating using same-sex or opposite-sex images) interacting with early romantic attachment, critical period learning, and sexual imprinting (Beard et al., 2015; for reviews of conditioning studies in humans and animals, see; Hoffmann, 2012; Pfaus et al., 2012, respectively; for reviews of romantic attachment see Simpson & Rholes, 1998; for critical period learning see Desmarais, Roeber, Smith, & Pollak, 2012; Fox, Levitt, & Nelson, 2010; Fox & Rutter, 2010; Griffee et al., 2014a, 2014b; Uylings, 2006; for sexual imprinting see Bereczkei, Gyuris, & Weisfeld, 2004; Bereczkei, Hegedus, & Hajnal, 2009; Griffee et al., 2017; Irwin & Price, 1999; Seki, Ihara, & Aoki, 2012; Vukovic, Boothroyd, Meins, & Burt, 2015).

Another concept incorporated into Beard et al.'s (2015) theories about the origin of adult sexual orientations was the idea that same-sex and opposite-sex sexual orientations were orthogonal variables that could co-exist to varying degrees within a single individual (Beard et al., 2015; Bickham et al., 2007; Klein, 1990; Whalen, Geary, & Johnson, 1990). According to this theory (Beard et al., 2015), the adult sexual orientations of victims of same-sex perpetrators would have a tendency to have a same-sex component that had either been reinforced by subsequent same-sex conditioning and romantic attachment or attenuated by subsequent opposite-sex conditioning and romantic attachment during the critical period for development of adult sexual orientations.

A major reason for much of the scientific literature ignoring what should have been the obvious effect of CSA on the adult sexual orientations of CSA victims has been misunderstanding. The misunderstanding was created in response to the idea that society would be more accepting of same-sex orientations if people believed that sexual orientations were the result of genetics rather than learned as a result of early experiences (as enunciated by Greenberg & Bailey, 1993; see Brookey, 2001, 2002 for a historical perspective on this movement). As explained by Beard et al. (2015) in great detail, the twin studies purporting to show that sexual orientation was genetically

determined could be interpreted as supporting the genetic hypothesis only because those studies ignored the already-known high incidence of sibling incest among identical twins (Simari & Baskin, 1984) that had also been reported in a paper by King and McDonald (1992). In the anonymous computerized study of Beard et al. (2013), only eight of 469 participants with a brother (1.7%) reported having sex with a brother. In contrast seven out of 23 lesbian or gay same-sex twins (21.3%, King & McDonald, 1992) reported having sex with their twin ( $X^2[1,502] = 34.02, p < .001$ ). In an earlier study, an even higher rate of brother-brother incest was reported by 25 gay men with twin brothers (32%, Simari & Baskin, 1984). A strong correlative relationship between early brother-brother incest and a same-sex orientation in adulthood was also reported by Mendel (1995).

Internal evidence that the authors of the twin studies were aware of the paper by King and McDonald (1992) was provided by the fact that the paper was cited in many of the twin study papers only as a negative twin study without mention of the high incidence of sibling incest among twins, which was the main point of the article. Furthermore, the study of King and McDonald (1992) had found no difference in the concordance rate between identical and fraternal twins, a finding also at odds with interpreting concordance in sexual orientation as being caused by genetics rather than conditioning. The findings of the twin studies can just as easily be attributed to the conditioning effect of same sex incest as they can be attributed to a genetics cause because of the strong effect of same-sex incest among siblings on their adult sexual orientations irrespective of whether or not they are twins (See Beard et al., 2015, for further details).

Griffee et al. (2016) found that sharing a bed for sleeping and sharing tub baths with a sibling were both risk factors for sibling-incest, implying that the incidence of sibling incest would be increased in populations (such as twins) with increased incidences of sharing beds for sleeping or sharing tub baths. Computerized searches of internet posts and literature available through Medline in April, 2018 found that incidental data showing a high rate of twins sharing beds and tub baths were available in studies and internet posts having nothing to do with sexual orientation or incest. In a study from the UK and Australia, twins were significantly more likely than singleton-siblings to share (e.g., sharing a bed, sharing a room, etc., Thorpe, Rutter, & Greenwood, 2003). In a Cleveland, Ohio, US study, more than 65% of twins were cotedded at 4 weeks (Damato, Brubaker, & Burant, 2012). At 6 weeks, 52% of New Zealand twins cotedded with their twin all or part of the time, predominantly in a side-by-side arrangement (Hutchison, Stewart, & Mitchell, 2010). A randomized prospective study in Halifax, Nova Scotia, Canada that assigned 117 sets of young twins (234 twins) to sleep either in a single cot (cotedded) or in separate cots showed that co-bedding promoted self-regulation of affect and sleep and that it decreased crying without apparent increased risk (Hayward, Johnson, Campbell-Yeo, Price, Houk, Whyter, White, & Caddell, 2015).

We also analyzed the data obtained during April, 2018 Google searches from an open-ended informal chat-room questionnaire posted on the internet regarding whether “your twins are sleeping together or separately.” The entries were based on 43 sets of twins between 4 months and 10 years of age and the posts had all been entered in 2010 or 2011 (Maricel, Shannon, & Heather, 2010). Of the 43 posts, 48.8% of the twins were sleeping together when their parents responded. In 44.2% of the 43 families, the decision on sleeping arrangements had been made by the parents. Of the 24 families in which the twins had been allowed to choose between sleeping together or separately by being provided separate beds, the twins opted to sleep together all or some of the time in 58.3% of the families. The sexes of the twins were provided in 48.8% of the posts. Twins were co-sleeping in 50% of the 14 same-sex pairs and 63.6% of the 22 pairs where the sexes were not mentioned but in none of the 7 cases where girl/boy twins were identified. The Fisher’s exact test showed that opposite-sex twins were significantly less likely to sleep together (2-sided  $p$ -value = .047 in the 21 sets of twins in which the sexes had been provided). Nevertheless, it is clear from similar sources that opposite-sex siblings are also sometimes allowed by their parents to co-sleep or share rooms. For example, data on co-sleeping and room sharing were available for 14 pairs of non-twin siblings from the state of Texas in the US from a chatroom

responding to the question: “How Long Is It Ok for Siblings to Sleep in the Same Room?” (M.M., L. W., J.S., B.K., S.D., M.S., ... L.P, 2008). The 14 sibling-pairs differed in age by one to six years. Sexes of ten opposite-sex sibling-pairs and three same-sex sibling-pairs were reported, but the sexes were not reported for one sibling-pair. Six opposite-sex sibling-pairs shared beds until the oldest reached about 12 years of age and another six opposite-sex sibling-pairs shared rooms until the oldest reached about 19 years of age. Two same-sex sibling-pairs shared beds until the oldest reached about 20 years of age.

Twins are also more likely to be bathed together than non-twin siblings. Experts who posted internet tips on bathing twins indicated that twins should be bathed together in the same tub after they can sit up to save time and this became even easier and more efficient as the twins grew older (e.g., Twiniversity, 2016; Your twins’ bath time, 2015). Internet posts also indicated that both opposite-sex and same-sex non-twin siblings often bathed together. From the posted comments, it appeared that, in practice, same-sex siblings were allowed by parents to bathe together to later ages than they allowed opposite-sex siblings. A major determining factor was the children demonstrating interest in the genitals of the opposite sex (e.g., Cheyenne8311, Risatofu, JunnyJai, Shanmom2883, Burgdoffs, Inkedmom94, ...Trainwreck07, 2016; Chilali, Carolyn, Butterflyjuju, CathyJean, KyMom, Laineysmum, ...Littlemissperfect, 2011; Ruddy, 2018; Talanroo0807, PDMcKay, Natalie5, Waitking ForMyRuca, Moma2aj&ej, ...Everleighh, 2009).

High incidences of these two risk factors (sharing beds for sleeping and sharing tub baths) in twins reared together would explain the observed high incidence of incest among same-sex twins (e.g., King & McDonald, 1992; Simari & Baskin, 1984) and concordance in the sexual orientation of the same-sex incestuous twin-pairs without relying on any genetics-based hypothesis (Beard et al., 2015). To our knowledge our own group’s growing database has provided the only published systematic data on sibling co-sleeping and co-bathing in the literature that can be related to sibling-sibling incest, sexual experimentation, or subsequent adult sexual orientation within the database (e.g., Beard et al., 2017, 2015; O’Keefe et al., 2014; Stroebe et al., 2012, 2013a, 2013b).

The incidence of same-sex orientations was far higher in incestuous same-sex siblings (who were not twins) than it was in identical twins (Beard et al., 2013; Stroebe et al., 2013b). The incidence of self-identified same-sex or bisexual orientations in 19 victims of brother-brother incest (BBI) was 36.8% (Beard et al., 2013). One third of 24 sister-sister incest (SSI) victims’ self-identified same-sex or bisexual orientations (Stroebe et al., 2013b). In contrast, in the data published by Bailey, Dunne, and Martin (2000) on twins obtained from an Australian twin registry, 91.8% of 1,683 male twins were exclusively heterosexual, and 91.9% of 2,704 female twins were exclusively heterosexual.

The initial report of a “gay gene” on the X chromosome (Hamer, Hu, Magnuson, Hu, & Pattatucci, 1993) could not be repeated (Rice, Anderson, Risch, & Ebers, 1999) for approximately 20 years. Sanders et al. (2015), using a much larger sample and genome wide scan, again found evidence of weak linkage to chromosome Xq28 and the pericentromeric region of chromosome 8. According to Sanders et al. (2015), the small size of the genetic effects precluded use for a genetic test for homosexuality prenatally. Also, according to Sanders et al. (2015), the genetic contributions were far from determinant, and the genetic effect represented only part of the causal chain for the multifactorial trait, with the rest being attributable to environmental causes.

Beard et al. (2015) provided an example of how both genetic effects and conditioning based effects could both co-exist by confirming earlier findings that puberty occurred significantly earlier in men who self-identified as gay or bisexual than in men who self-identified as heterosexual. However, statistical analysis of the data by Beard et al. (2015) showed that the effect of age at first orgasm was statistically explained by the study-participant’s early sexual behaviors with same-sex partners. If age at first orgasm were assumed to be influenced by genetic differences between gay and heterosexual males, the age-of-puberty findings of Beard et al. (2015) provide an example of

how a genetics cause could act indirectly by influencing behavior that ultimately lead to a conditioned sexual preference (e.g. by early puberty increasing interest in sex at an age so early that same sex partners were the only ones sociologically available, Beard et al., 2015).

The other source of the misunderstanding was the idea that refractoriness of adult sexual orientations to change by attempts to counter-condition adults (Zucker, 2003) was evidence that the original adult orientation was not developed in childhood by conditioning. However, that idea failed to take into account the power of critical period learning and sexual imprinting to create adult sexual orientations that were refractory to change in adulthood (Beard et al., 2015).

There is overwhelming evidence that there are critical periods in human development after which deprived individuals are not able to completely catch up to the abilities of those who learned specific abilities before expiration of the critical period (Desmarais et al., 2012; Fox et al., 2010; Fox & Rutter, 2010; Griffee et al., 2014a, 2014b; Uylings, 2006). Griffee et al. (2014a, 2014b) revealed that adult's interest in sex was higher in study participants who had begun masturbating before the age of 18 or who had some form of partnered sexual experience before 18 years of age. Study participants who began these behaviors before 13 years of age had the highest interest in sex as adults as measured by their adult masturbation frequency and their frequency of partnered sex (Griffee et al., 2014a) or as measured by a hypersexuality scale (Griffee et al., 2014b). Thus, in the human, the critical period for human sexual development appears to include most of childhood and adolescence.

Risky sexual behaviors increase in men and women who have early experience with partner sex (Griffee et al., 2014b, 2012). Beard et al. (2015) showed that development of adult sexual orientations was also highly subject to critical period learning. Early same-sex crushes, a powerful predictor of an adult same-sex orientation (Beard et al., 2015; Robinett, 2012) were more likely when a child's parents did not model good heterosexual partners: when they fought where their child could see or where they took the child's part against the other parent instead of working together to provide guidance to their child (Beard et al., 2015). Statistical analyses based on four different continuously distributed measures of sexual orientation and also a self-identified sexual orientation variable provided evidence that the participant's adult sexual orientations were determined by conditioning from behaviors that occurred in childhood and adolescence (Beard et al., 2015). As long as people believe that adult sexual orientations are refractory to change, they should be equally accepting of minority sexual orientations whether the original cause is genetic or a combination of conditioning, critical period learning, and sexual imprinting with or without a genetic component (Beard et al., 2015).

Based on the theories of Beard et al. (2013, 2015), Kinsey et al. (1955), O'Keefe et al. (2014), Storms (1981), Stroebe et al. (2013b), Van Wyk and Geist (1984), and Yates (1982), we designed this study to determine the following current research objectives.

- (1) The effects of early incest or CSA by partners of either sex on the adult sexual orientations of the victims as measured by an ANOVA.
- (2) The effects of early incest or CSA by partners of either sex on the adult sexual orientations of the victims as measured by an ANCOVA as well as the effects of early partnered-sex with underage partners of either sex and the effects of early masturbation using images of either sex entered as covariates.
- (3) The effects of early incest or CSA by partners of either sex on early sexual behaviors with other partners under the age of 18 and on early masturbation using images of adults of either sex.
- (4) The effects of early incest or CSA by partners of either sex on the partnered and masturbatory sexual behaviors in which the victims engaged prior to reaching 18 years of age, taking



into account the order in which the behaviors occurred to establish those in which the early incest or CSA by partners of either sex could (and could not) have been causally related to the outcome measure as determined by whether or not antecedence was established.

## 1. Method

### 1.1. Procedure

The study described in this paper was part of a much larger research project entitled: “Effects of Recalled Family Attitudes and Childhood Sexual Experiences on Adult Sexual Attitudes and Adjustment.” Institutional review boards at Charleston Area Medical Center/West Virginia University, Concord University, Marshall University, West Virginia State University, and West Virginia University in Morgantown reviewed and approved all aspects of this study including the contents of the computerized questionnaire, the protections to the anonymity of the study participants, the way in which study participants were recruited, and the wording of the informed consent form. The (unsigned) anonymous consent forms contained the following warning about risks of study participation. “Some individuals may become quite upset when recalling childhood sexual experiences. If you feel at any time before (or during) the study that this will happen to you or that participation is or will be too painful for you, please do not participate or stop participating in the study. Your participation in the study indicates that you have voluntarily accepted the risks in an attempt to help others. You may quit the study at any time with a click of the mouse on the ‘Quit Study’ button.”

Informed consent was obtained using forms approved by the local institutional review boards of six moderate-sized mid-Atlantic colleges. At all six campuses we used bulletin board announcements, and professors made announcements to their own classes to promote the study as a “cradle to the grave study of human sexuality”. We also increased diversity by recruiting faculty and adults in the general population near the campuses. We also recruited adults at “Pride” parades and picnics and institutions selectively frequented by gay and lesbian individuals. In addition, we did “snowball” recruiting by inviting potential participants to bring their adult friends and acquaintances as participants. Participants were not paid, but many students did receive extra credit. All volunteers over 18 years of age were accepted as participants in the study. After a 15-minute period during which the participants were oriented to the computer-assisted self-interview (CASI) program, the three levels of behavioral screening items, and the protections for the anonymity of the data provided, participants entered their own data into computers in the large participating university computer laboratories. The following anonymity protections were securely in place. The computers were not aware of the identity of the participants. No identifiers or data that could be used to sort out identifiable minorities were collected. The compiled CASI program was installed directly on the computer the participant was using to minimize computer delay and to allow the extensive code used to tailor future questions to prior responses.

The data collection was designed to support multiple natural, quasi-experimental (Shadish, Cook, & Campbell, 2002, pp. 13–17), pseudoprospective designs (Douglas, Otto, & Borum, 2003) while taking advantage of data collection practices usually only found in truly prospective studies (Douglas et al., 2003): For example, all data necessary for the present research were collected directly from the participants using an instrument and items specifically designed to support the planned research. Also, the order of data collection was designed to minimize criterion contamination. Furthermore, to prevent criterion contamination based on seeing later items, the computer program did not permit participants to return to earlier items to change prior inputs.

The previously mentioned three levels of screening items within the sexual behavior screen sped the participants through a total of 388 sexual behavior items (numbered 1–388, see appendix A) by presenting only the subsets of behavior items that they could have logically engaged-in, based on their responses to the screening items. The program allowed participants to take breaks by issuing a nine-digit randomly generated password number, saving the encrypted data in a special location



known only to the compiled program, exiting the program, and then returning using the password number to ensure that there was no mix-up between participants. This allowed participants to meet class or other obligations and return to study participation later in the day or on a subsequent day. Participants were seated at computers positioned so that others could not see their screens. On average, based on an internal clock that recorded only the time that the program was running, data entry took two hours of steady work. No data were permanently filed until the questionnaire had been completed.

All data were encrypted before being randomly filed into a random access file filled with fake data hidden on an undisclosed remote server, and multiple additional fake lines were created and filed simultaneously. Decoding the data was performed en masse at a remote time and location using a program only available to the database manager. The program allowed the database manager to prospectively add or suppress statement items (with agree/disagree responses) or preference items (with multiple choice responses) over the course of the study without interfering with the functioning of the database.

### **1.2. Participants**

There were 4,384 participants in the study: 3.8% had only a high school education, 72.2% had some college education but no degree, 15.8% had a bachelor's degree, 5.0% had a master's degree, and 2.0% had a doctoral-level degree. The religious beliefs entered by the participants were as follows: protestant Christian, 48.7%, Roman Catholic, 9.8%, Jewish, 0.7%, agnostic 23.0%, and atheist, 17.8%. Of the 4,384 participants, 2,828 were female and 1,556 were male. Because no unique identifiers or racial or other identifiers were collected that would allow participant identification by data sorting to protect the anonymity of the participants, we have no data on the racial or ethnic make-up of the participants. Similarly, we have no data allowing identification of the site of participation or the mode of recruitment. Based on the demographics of the campuses where data were collected, we can state that there were approximately 11% racial minority students, approximately 5% international students, and approximately 19% out of state students. The predominantly white student population reflected the racial composition of the region where the data were collected.

### **1.3. Measures**

Items from the CASI program S-SAPE1©S-SAPE, LLC reproduced by permission of S-SAPE, LLC, 2002, P.O. Box 11081, Charleston, WV 25,339 appear within this paper in quotation marks. To reuse items, permission must be obtained from the rights holder. Data from 3,443 of this study's 4,384 participants were included in a paper on a different, but related topic, by Beard et al. (2015). A list of the items and measures used in this study appears in Appendix A.

#### **1.3.1. The adult sexual orientation scales**

The female sexual orientation scale (FSOS) and the male sexual orientation scale (MSOS) are both covert scales which provided measures of adult sexual orientation. The FSOS and MSOS scales were designed to provide orthogonal measures of sexual orientation, meaning that the orientations toward sex with opposite-sex partners and same-sex partners were analyzed as independent variables that could be represented graphically on orthogonal coordinates. Both scales and their validation are described in Beard et al. (2015) and in Appendix A. They are covert scales because the scale items described overt or covert behaviors rather than a self-identified sexual orientation and because the fact that the seemingly randomly scattered items were parts of scales were neither announced nor apparent to the participant. Each of the two scales was calculated as the sum of twelve component behavior-based items scored either zero or 1 to which the participants provided answers during the course of their study participation. A list of the components for the FSOS and the MSOS used for measuring the adult sexual orientations of the participants and the frequency of answers among the participants appears in Appendix B along with the results of the separate reliability analyses for each scale in both females and males.

### 1.3.2. *Self-identified sexual orientation*

We recoded item P94 to produce the self-identified sexual orientation variable.

“The best way to describe how open and honest I am about my sexual preference is: (1) All my friends and family know that I am straight, and that is what I am. (2) All my friends and family know that I am gay, lesbian, bisexual, or transgendered, and that is what I am. (3) Some of my friends or family still think that I am straight, but actually I know that I am really gay, lesbian, bisexual, or transgendered. (4) My friends and family mostly think that I am straight, but I am really mixed up about whether I am straight or gay, lesbian, bisexual, or transgendered. (5) I have no sexual preference, and I have never engaged in any sort of sex with a partner.”

The data from participants who selected choices “2” or “3” were recoded to “1.” All other answers were recoded to “0”. P94 was added to the survey program after the first 235 male participants and the first 432 female participants had filed their data.

### 1.3.3. *Crush items*

We recoded items P87 and P89 to produce the crush variables.

P87: “The best way to describe the genders of the individuals outside my family that I had crushes on (or was in love with) before I hit puberty is: (1) only boys or adult men before I hit puberty (2) only girls or adult women before I hit puberty (3) mostly boys or adult men but some girls or adult women before I hit puberty (4) mostly girls or adult women but some boys or adult men before I hit puberty (5) I never had crushes on anybody outside my family before I hit puberty.”

P89 was the same as P87 except that the phrase “before puberty” was replaced with “after puberty”. For P87 and P89, the numbers in parentheses represent the initial coding. Both P87 and P89 were recoded as follows to produce a total of four binary variables (two for the female participants and two for the male participants). For the first two binary variables, one and three were recoded to one; all other entries were recoded to zero to code for “mostly males.” For the second two binary variables, two and four were recoded to one; all other entries were recoded to zero to code for “mostly females.” P87 and P89 were added to the survey program after the first 125 male participants and the first 236 female participants had filed their data.

### 1.3.4. *Selection of study participants for the study*

We selected the 1,556 male and 2,828 female participants in the study from a file containing data from a total of 4,505 individuals based on two criteria: The first criterion was that transsexual individuals were excluded because at the time the early incest or CSA by an adult occurred, their birth sex was opposite from their gender at study participation. This sex reversal would have made group assignment for the ANOVA and ANCOVA ambiguous, misleading, and confounding for the effects we intended to measure. The second criterion was that individuals who had genital anomalies or other problems that interfered with their ability to engage in sex with a partner were excluded because genital dysfunction related to the genital anomalies or other problems that interfered with partner sex would have confounded the MSOS and FSOS variables that constituted the main dependent variables of the study because those scales included sexual behaviors with partners.

We then assigned each of the 2,828 female participants to one of the seven groups making up the female ANOVA variable defined in Table 1, and we assigned the 1,556 male participants to one of the seven groups making up the male ANOVA variable defined in Table 2 using a hierarchical approach based on their answers to specific items in the S-SAPE1 computerized survey.

The first priority to group assignments for the ANOVA variables was given to victims of parental incest. The second priority of group assignments was given to victims of sibling incest (those not already assigned to one of the two groups of parental incest victims). The third priority of group

**Table 1. Effects of incest and CSA on adult sexual orientations of female victims**

Groups	n	n <sup>3</sup>	%e <sup>4</sup>	MSOS (N = 2,828, adj. r <sup>2</sup> = .020 <sup>1</sup> )			FSOS (N = 2,828, adj. r <sup>2</sup> = .045 <sup>1</sup> )		
				M ± SD	MDN	p <sup>1,2</sup>	M ± SD	MDN	p <sup>1,2</sup>
1 FDI (Father-daughter incest)	64	25	24.0	6.9 ± 2.8	7	ns	2.2 ± 2.9	1	<.001
2 MDI (Mother-daughter incest)	7	1	100.0	6.9 ± 2.9	6	ns	4.0 ± 2.4	5	.001
3 BSI (Brother-sister incest)	53			6.8 ± 2.9	8	ns	2.6 ± 3.2	1	<.001
4 SSI (Sister-sister incest)	35			6.9 ± 2.7	7	ns	2.9 ± 3.3	1	<.001
5 CSA-AM (CSA by an adult male)	398	292	46.9	7.5 ± 2.0	8	<.001	1.2 ± 2.0	0	.006
6 CSA-AF (CSA by an adult female)	23	15	26.7	3.3 ± 3.6	1	<.001	5.5 ± 3.7	6	<.001
7 Controls	2,248			6.7 ± 2.4	7	Control	1.0 ± 2.0	0	Control

<sup>1</sup>Calculated on the rank-transformed data. <sup>2</sup>Calculated on the rank-transformed data and corrected for multiple comparisons to a single control using Dunnett's Tables. <sup>3</sup> and <sup>4</sup>Number of cases in which both events happened and the percent of cases in the row in which the earliest sexual behavior with the adult followed the earliest sexual behavior with an under-age individual of same sex as the sex of the indicated perpetrator in the 133 such cases among male victims of FDI or MDI or CSA-AM or CSA-AF. The 133 above cases were 27% of the 492 total cases of FDI, MDI, CSA-AM or CSA-AF.

**Table 2. Effects of incest and CSA on adult sexual orientations of male victims**

Groups	n	n <sup>3</sup>	% <sup>4</sup>	MSOS (N = 1452, adj. r <sup>2</sup> = .129 <sup>1</sup> )			FSOS (N = 1452, adj. r <sup>2</sup> = .054 <sup>1</sup> )		
				M ± SD	MDN	p <sup>1,2</sup>	M ± SD	MDN	p <sup>1,2</sup>
FSI (Father-son incest)	5	4	75	4.4 ± 5.6	1	<.029	7.2 ± 5.3	10	ns
MSI (Mother-son incest)	3	1	100	0.0 ± 0.0	0	ns	9.3 ± 1.2	10	ns
BBI (Brother-brother incest)	28			3.2 ± 4.4	1.0	<.001	7.7 ± 4.3	10	ns
SBI (Sister-brother incest)	28			2.1 ± 3.8	0	.001	8.6 ± 4.3	10	ns
CSA-AM (CSA by an adult male)	34	27	55.6	6.9 ± 4.4	9	<.001	4.1 ± 4.1	2	<.001
CSA-AF (CSA by an adult female)	146	3	66.7	0.2 ± 0.9	0	ns	9.6 ± 1.4	10	<.001
Controls	1,312			0.8 ± 2.4	0	Control	8.4 ± 2.8	9	Control

<sup>1</sup>Calculated on the rank-transformed data. <sup>2</sup>Calculated on the rank-transformed data and corrected for multiple comparisons to a single control using Dunnett's Tables. <sup>3</sup> and <sup>4</sup>Number of cases in which both events happened and the percent of cases in the row in which the earliest sexual behavior with the adult followed the earliest sexual behavior with an under-age individual of same sex as the sex of the indicated perpetrator in the 35 such cases among male victims of FSI or MSI or CSA-AM or CSA-AF. The 35 above cases were 18% of the 197 total cases of FSI, MSI, CSA-AM or CSA-AF.

assignments was given to victims of CSA by an adult female (CSA-AF) or CSA by an adult Male (CSA-AM) who were not parents of the victims (those not assigned to parental or sibling incest victim groups). All remaining study participants were assigned to the control group.

The four types of parental incest were father-daughter incest (FDI), mother-daughter incest (MDI), father-son incest (FSI), and mother-son incest (MSI). Overlaps in potential group assignment were resolved by assigning a victim to the most appropriate group based on which event happened first chronologically. When both events had happened within the same year, the participant was assigned to the group with the smaller total number of participants. For example, the items used for the selecting FDI victims consisted of sexual behavior sub-item (f) from items B183 and B216, or S93 and P40 from the Appendix. Having endorsed S93 “I was sexually abused by my father or father figure” and also selecting answer (2) or (3) from P40 was sufficient to be included in the FDI group. P40 is reproduced below.

“The best way to describe my family of origin’s experience with child sexual abuse at the hands of my parents is as follows: (1) There were never any parental behaviors which could be described as child sexual abuse. (2) Whatever child sexual abuse that did occur was never brought to the attention of the authorities in any way. (3) Child sexual abuse of me or my siblings did occur, and it was brought to the attention of the authorities.”

Our purpose for requiring participants who had endorsed S93 to have also selected consistent answers for P40 was to protect the participant-selection process from acquiescence response bias (“yea-saying”) to which S93 was vulnerable. Because P40 was included as a study screening item, it was preceded by a pop-up warning to read it very carefully. Two additional advantages of including P40 were (first) that P40 was a multiple choice item with a very different format from S93. Second, participants who selected the first choice (the one most likely to be selected randomly or by acquiescence bias) would be eliminated from the potential pool of FDI cases identified by S93, which tended to correct for acquiescence bias in responding to S93. Selecting sub-item (f) from B183 or B216 was also sufficient to be included in the FDI group. Applying the same procedures to the male participants identified the FSI group. Substituting S149, “I was sexually abused by my mother or mother figure” for S93 and sub-item (f) from B167 or B201 for sub-item (f) from B183 or B216 resulted in identification of the MDI and MSI groups, respectively.

Brother-sister incest (BSI), sister-sister incest (SSI), brother-brother incest (BBI), and sister brother incest (SBI) were assigned to groups using sub-item “g” of multiple items similar to items B183 and B216 expanded mathematically to include participants of both sexes and all four age-differential categories (a total of 16 different items).

Victims of CSA perpetrated by adult male partners were assigned to the CSA-AM group using sub-item (a) from B183 or B216. Victims of CSA perpetrated by adult female partners were assigned to the CSA-AF group using sub-item (a) from B167 or B201. Overlaps in before-age-18 partnered-behaviors between those with adults and those who were under the age of 18 were adjusted for in the covariance analyses described in the results section.

## 2. Results

### 2.1. Research objective 1) determination of “the effects of early incest or CSA by partners of either sex on the adult sexual orientations of the victims as measured by an ANOVA”

#### 2.1.1. Female participants

The quasi-experimental independent ANOVA variable (Shadish et al., 2002) defining the six groups of perpetrators and the controls is defined in Table 1. The results of the one-way ANOVA analyzing the effects of CSA or incest by six groups of perpetrators on the adult sexual orientations of the female victims as measured by the MSOS and the FSOS are also shown in

Table 1. The controls were the 2,248 female participants who were not victims of one of the six categories of perpetrators. The mean scores on the FSOS for each of the six groups were significantly higher than those of the controls, meaning that all six groups were more strongly oriented towards sex with females than the controls. The statistically significant results predicted by conditioning theory and by the idea that early sexual behaviors with female partners would tend to condition an adult orientation toward sex with female partners are those for MDI ( $n = 7$ ), SSI ( $n = 35$ ), and CSA-AF ( $n = 23$ ).

In women, CSA by adult females (CSA-AF) resulted in MSOS scores of the victims that were significantly lower than those of the controls, meaning that those groups with significantly lower scores were less strongly oriented towards sex with male partners than the controls. The effects of Father-daughter incest (FDI), Mother-daughter incest (MDI), Brother-sister incest (BSI), and Sister-sister incest (SSI) on the MSOS did not reach the level of statistical significance (Table 1). CSA by adult males (CSA-AM) resulted in *male sexual orientation scale* (MSOS) scores of the female victims that were significantly higher than those of the controls. This result showed statistically significant conditioning effects of CSA-AM ( $n = 398$ ) in the direction predicted by the idea that early sexual behaviors with male partners would tend to condition an adult orientation toward sex with male partners.

### 2.1.2. Male participants

The quasi-experimental independent ANOVA variable (Shadish et al., 2002) defining the six groups of perpetrators and the controls is defined in Table 2. The controls were the 1,312 male participants who were not victims of one of the six categories of perpetrators. The results of the one-way ANOVA analyzing the effects of CSA or incest by the six groups of perpetrators on the adult sexual orientations of the male victims are also shown in Table 2. FSI, BBI, SBI, and CSA-AM all resulted in MSOS scores of the victims that were significantly higher than those of the controls, meaning that those groups with the significantly higher scores were more strongly oriented towards sex with male partners than the controls. The statistically significant results for the MSOS predicted by conditioning theory and by the idea that early sexual behaviors with male partners would tend to condition an adult orientation toward sex with male partners are those for the FSI, BBI, and CSA-AM groups.

The mean score on the FSOS for the CSA-AF group was significantly higher than that of the controls while the mean score of the CSA-AM group on the FSOS was significantly lower than the mean score of the controls (Table 2). The data showed a significant conditioning effect of sex with females on the FSOS in the CSA-AF group, the group with the largest  $n$ . The mean score on the FSOS in the MDI group was nearly as large as that in the CSA-AF group, but it failed to reach statistical significance because of the far smaller  $n$  (3 vs 146).

## 2.2. Research objective 2) determination of “the effects of early incest or CSA by partners of either sex on the adult sexual orientations of the victims as measured by an ANCOVA as well as the effects of early partnered-sex with under-age partners of either sex and the effects of early masturbation using images of either sex entered as covariates”

We used three different measures of sexual orientation for each sex: the sexual orientation as measured by the FSOS, the sexual orientation as measured by the MSOS, and the self-identified sexual orientation as measured by a binary variable. The two sexes were analyzed separately.

### 2.2.1. Female participants

Covariance analysis on a total of four covariates was used to examine the effects of the sexual behaviors of the same six groups used for the ANOVAs above after adjustment for other sexual behaviors that had occurred with underage partners before the participants reached 18 years of age (Table 3). The covariates were measures of counter-conditioning or reinforcing conditioning resulting from masturbating using images of females, masturbating using images of males, sexual experiences with female partners who were under the age of 18, and sexual experiences with male partners who

**Table 3. Covariance analysis of effects of incest and CSA on adult sexual orientations of female victims**

Groups	n	MSOS (N = 2,828, adj. $r^2 = .119$ )				FSOS (N = 2,828, adj. $r^2 = .331$ )			
		B ± SE <sup>1</sup>	M <sup>2</sup>	p <sup>3</sup>	$\eta^2$ <sup>4</sup>	B ± SE <sup>1</sup>	M <sup>2</sup>	p <sup>3</sup>	$\eta^2$ <sup>4</sup>
FDI (Father-daughter incest)	64	0.064 ± 0.285	6.248	ns <sup>4</sup>	<.001	0.846 ± 0.226	1.282	<.001 <sup>4</sup>	.006
MDI (Mother-daughter incest)	7	-0.506 ± 0.854	5.678	ns <sup>4</sup>	<.001	1.547 ± 0.677	2.086	ns <sup>4</sup>	.001
BSI (Brother-sister incest)	53	-0.255 ± 0.316	5.929	ns <sup>4</sup>	<.001	0.967 ± 0.251	1.506	.038 <sup>4</sup>	.003
SSI (Sister-sister incest)	35	0.085 ± 0.393	6.269	ns <sup>4</sup>	<.001	0.455 ± 0.312	0.994	ns <sup>4</sup>	<.001
CSA-AM (CSA by an adult male)	398	0.515 ± 0.125	6.699	<.001 <sup>4</sup>	.007	-0.018 ± 0.099	0.521	ns <sup>4</sup>	<.001
CSA-AF (CSA by an adult female)	23	-3.057 ± 0.474	3.127	<.001 <sup>4</sup>	.005	3.550 ± 0.376	4.089	<.001 <sup>4</sup>	.012
Controls	2,248	0 <sup>5</sup>	6.184	- <sup>6</sup>		0 <sup>5</sup>	0.539	- <sup>6</sup>	
Constant		6.184 ± 0.064				0.539 ± 0.051			
Covariates									
Sex of any kind with males under 18		0.788 ± 0.089		<.001	.019	-0.046 ± 0.070		ns	.001
Sex of any kind with females under 18		-0.170 ± 0.115		ns	<.001	1.478 ± 0.091		<.001	.086
Masturbating using images of males		1.862 ± 0.126		<.001	.082	-0.525 ± 0.100		ns	.001
Masturbating using image of females		-1.270 ± 0.151		<.001	.026	2.469 ± 0.120		<.001	.136

<sup>1</sup>Estimated regression coefficient ± estimated SE. <sup>2</sup>Adjusted mean from the covariance analysis. <sup>3</sup>Calculated on the rank-transformed data. <sup>4</sup>Corrected for 6 comparisons to a single control using a Bonferroni correction. <sup>5</sup>This parameter is zero because it is redundant. The mean for the controls is shown by the constant in a covariance analysis when reference-cell coding is used. <sup>6</sup>Control  $\eta^2$  partial eta squared (a measure of effect size) calculated on the rank-transformed data.



were under the age of 18. We performed the covariance analyses using four 0/1 dummy variables that described whether each of the four above behaviors had occurred before the participant had reached the age of 18. The covariance analyses also provided measures of the effect sizes of each of the six behaviors previously analyzed by the ANOVA and also each of the four covariates (Table 3).

The covariance analysis of the MSOS dependent variable confirmed that the effects of CSA-AM and CSA-AF identified by the ANOVA remained statistically significant. The results of the analysis revealed a statistically significant effect of CSA-AM in the direction predicted by the conditioning theories for the MSOS. It showed that, based on the covariates, sex of any kind with males who were under 18 years of age and masturbating using images of males significantly augmented the scores on the MSOS (as shown by the positive sign of the regression coefficient) while masturbating using images of females significantly decreased scores on the MSOS (as shown by the negative sign of the regression coefficient). Masturbating using images of males had the largest effect size, followed by masturbating using images of females, sex of any kind with males under 18, CSA-AM, and CSA-AF (in order of decreasing effect size among the statistically significant predictors, Table 3).

The covariance analysis of the FSOS dependent variable confirmed the effects of FDI, BSI, and CSA-AF identified by the ANOVA remained statistically significant. However, the effects of the other three groups lost significance in the covariance analysis after adjusting for the four covariates. These results revealed a statistically significant effect of CSA-AF in the direction predicted by the conditioning theories for the FSOS. The covariance analysis of the FSOS dependent variable also revealed that, based on the covariates, sex of any kind with females under 18 years of age and masturbating using images of females significantly augmented the scores on the FSOS. Masturbating using images of females had the largest effect size, followed by sex of any kind with females under 18, CSA-AF, FDI, and BSI (in order of decreasing effect size among the statistically significant predictors, Table 3).

The results of the binary multiple logistic regression analyzing the effects of CSA or incest by six groups of perpetrators on the adult sexual orientations of the female victims as measured by the self-identified sexual orientation are shown in Table 4. The self-identified sexual orientation was coded “1” if participants self-identified as not heterosexual and “0” for all other cases. Only 2,396 of the 2,828 total female cases were available for this analysis because the item was added after 432 of the women had already participated in the study. We used a multiple logistic regression analysis with independent variables analogous to an ANCOVA. We set up the predictors for the logistic regression in Table 4 using reference-cell coding by creating six 0/1 dummy variables corresponding to the six

**Table 4. Effects of incest and CSA on adult self-identified sexual orientations of female victims**

Groups	n	Not heterosexual (%)	B ± SE	p <sup>1</sup>	Exp (B)	
1	FDI (Father-daughter incest)	45	13.5	1.03 ± 0.42	.014	2.79
2	MDI (Mother-daughter incest)	4	33.3	2.19 ± 0.87	.012	8.96
3	BSI (Brother-sister incest)	36	20.0	1.49 ± 0.39	<.001	4.48
4	SSI (Sister-sister incest)	26	10.3	0.73 ± 0.62	ns	2.07
5	CSA-AM (CSA by an adult male)	312	5.7	0.09 ± 0.11	ns	1.09
6	CSA-AF (CSA by an adult female)	9	60.9	3.33 ± 0.44	<.001	27.86
7	Controls <sup>2</sup>	1,809	5.3			
	Constant from logistic regression			-2.89 ± 0.10		

A total of 2,396 cases were available for the analysis. The Nagelkerke R squared was .074. <sup>1</sup>Calculated from the logistic regression analysis with adjustment for all six variables in the model. <sup>3</sup>The logistic regression Exp (B) results can be interpreted as the multiplicative change in the likelihood that a participant with a given trauma will self-identify as non-heterosexual in comparison to the control group.

types of trauma tested in the ANOVA against the controls. Each of the six was coded “1” if a participant belonged to that group and “0” for all other cases, leaving the control group as the reference group and without a corresponding dummy variable. All six were forced into the multiple logistic regression model by using block entry. The  $EXP(B)$  results from this analysis and subsequent analyses provide estimates of the increase in the likelihood that a participant in the tabulated group will self-identify as not heterosexual in comparison to the control group after adjustment for all other variables in the model. As shown in Table 4, the likelihood of a participant in the FDI, MDI, BSI, and CSA-AF groups self-identifying as not heterosexual was 2.79, 8.96, 4.48, and 27.86 times higher than the controls if the study participants were victims of FDI, MDI, BSI, and CSA-AF, respectively.

Block entry of the most powerful covariate variable related to behaviors that occurred prior the participant reaching 18 measuring whether or not the participant had endorsed having experienced crushes predominantly or mostly on females after puberty to the above model increased the Nagelkerke R squared from the value of .074 to .340. In that model, those who experienced crushes predominantly or mostly on females after puberty had a likelihood of self-identifying as not heterosexual that was 129 times higher than the controls. After adjustment for the added covariate, the likelihood of a participant self-identifying as not heterosexual was 14.1, 4.1, and 7.6 times higher than the controls if the study participants were victims of MDI ( $p = .003$ ), BSI ( $p = .003$ ), and CSA-AF ( $p = .003$ ), respectively (full model not shown). It should be noted that the FDI effect was technically no longer statistically significant because the  $p$ -value was reduced to .057 after adjustment for the added covariate.

The most parsimonious model for predicting a female participant’s self-identified sexual orientation was using the FSOS (which is based on behaviors that occurred in adulthood) and the variable measuring whether or not the participant had endorsed having experienced crushes predominantly or mostly on females after puberty but before the participant reached the age of 18. This model had a Nagelkerke R squared value of .568. After adjustment for the other variable in the model, this model predicted that the likelihood of a participant self-identifying as not heterosexual increased by 1.867 times higher than the controls for each 1-unit increase in the FSOS above zero. Endorsing having experienced crushes predominantly or mostly on females after puberty increased the likelihood of self-identifying as not heterosexual by approximately 8.202 times higher than the controls after adjustment for the other variable in the model. None of the reference-cell group predictors in the first two models was statistically significant once the FSOS was added to the model (full model not shown).

### 2.2.2. Male participants

The covariance analysis of the MSOS dependent variable confirmed that the effect of SBI identified by the ANOVA remained statistically significant (Table 5). The covariance analysis results for the covariates showed that sex of any kind with males and masturbating using images of males that occurred before 18 years of age significantly augmented the scores on the MSOS while it showed sex of any kind with females and masturbating using images of females that occurred under 18 years of age significantly decreased scores on the MSOS. The findings for the covariates are all consistent with the results predicted from conditioning theories. The covariates were such powerful predictors that the effects of FSI, BBI, and CSA-AM seen in Table 2 ANOVA were no longer present in Table 5 after adjusting for the effects of the four covariates. Masturbating using images of males had the largest effect size followed by sex of any kind with males, masturbating using images of females, SBI, and sex of any kind with females (in order of decreasing effect size among the statistically significant predictors, Table 5).

The covariance analysis of the FSOS dependent variable confirmed that the statistically significant effects identified for all six groups in the ANOVA presented in Table 2 remained statistically significant in Table 5. The covariance analysis of the FSOS dependent variable also revealed that sex of any kind with females and masturbating using images of females significantly augmented the scores on the FSOS while masturbating using images of males significantly decreased scores

**Table 5. Covariance analysis of effects of incest and CSA on adult sexual orientations of male victims**

Groups	n	MSOS (N = 1,556, adj. $r^2 = .462$ )				FSOS (N = 1,556, adj. $r^2 = .453$ )			
		B ± SE <sup>1</sup>	M <sup>2</sup>	p <sup>3</sup>	$\eta^{2+}$	B ± SE <sup>1</sup>	M <sup>2</sup>	p <sup>3</sup>	$\eta^{2+}$
FSI (Father-son incest)	5	1.205 ± 0.766	2.345	ns <sup>4</sup>	<.001	-0.104 ± 0.947	6.602	ns <sup>4</sup>	<.001
MSI (Mother-son incest)	3	-1.400 ± 0.984	-0.260	ns <sup>4</sup>	.002	1.073 ± 1.216	7.779	ns <sup>4</sup>	<.001
BBI (Brother-brother incest)	28	-0.148 ± 0.351	0.992	ns <sup>4</sup>	<.001	0.813 ± 0.434	7.519	ns <sup>4</sup>	.003
SBI (Sister-brother incest)	28	0.826 ± 0.330	1.966	.011 <sup>4</sup>	.006	0.063 ± 0.408	6.769	ns <sup>4</sup>	.002
CSA-AM (CSA by an adult male)	34	1.497 ± 0.317	2.637	ns <sup>4</sup>	.001	-0.576 ± 0.392	6.130	ns <sup>4</sup>	<.001
CSA-AF (CSA by an adult female)	146	0.016 ± 0.150	1.156	ns <sup>4</sup>	<.001	0.457 ± 0.186	7.163	.012 <sup>4</sup>	.006
Controls	1,312	0 <sup>5</sup>	1.140	- <sup>6</sup>		0 <sup>5</sup>		- <sup>6</sup>	
Constant		1.140 ± 0.100				6.706 ± 0.124			
Covariates									
Sex of any kind with males under 18		1.710 ± 0.161		<.001	.074	-0.604 ± 0.199		ns	<.001
Sex of any kind with females under 18		-0.186 ± 0.092		.019	.004	0.580 ± 0.199		<.001	.014
Masturbating using images of males		4.927 ± 0.162		<.001	.244	-4.257 ± 0.200		<.001	.091
Masturbating using image of females		-1.134 ± 0.112		<.001	.013	2.357 ± 0.138		<.001	.094

<sup>1</sup>Estimated regression coefficient ± estimated SE. <sup>2</sup>Adjusted mean from the covariance analysis. <sup>3</sup>Calculated on the rank-transformed data. <sup>4</sup>Corrected for 6 comparisons to a single control using a Bonferroni correction. <sup>5</sup>This parameter is zero because it is redundant. The mean for the controls is shown by the constant in a covariance analysis when reference-cell coding is used. <sup>6</sup>Control <sup>†</sup>Partial eta squared (a measure of effect size) calculated on the rank-transformed data.

**Table 6. Effects of incest and CSA on adult self-identified sexual orientations of male victims**

Groups	n	Not heterosexual (%)	B ± SE	p <sup>1,2</sup>	Exp (B)
FSI (Father-son incest)	4	25.0	1.51 ± 1.16	ns	4.5
MSI (Mother-son incest)	1	0.0	-18.6 ± 40,192	ns	0.0
BBI (Brother-brother incest)	22	22.7	1.38 ± 0.52	.008	3.976
SBI (Sister-brother incest)	20	20.0	1.218 ± 0.57	.033	3.38
CSA-AM (CSA by an adult male)	32	50.0	2.60 ± 0.37	<.001	13.5
CSA-AF (CSA by an adult female)	124	3.2	-0.80 ± 0.52	ns	0.5
Controls <sup>3</sup>	1,118	6.9			
Constant from logistic regression			-2.60 ± 0.12		

A total of 1,321 cases were available for the analysis. The Nagelkerke R squared was .094. <sup>1</sup>Calculated from the logistic regression analysis with adjustment for all six variables in the model. <sup>2</sup>Recalculation of the logistic regression without the MSI data to eliminate estimation of zero for the EXP(B) of the MSI data produced almost unchanged estimates of the remaining regression coefficients and p-values. <sup>3</sup>The logistic regression Exp (B) results can be interpreted as the multiplicative change in the likelihood that a participant with a given trauma will self-identify as non-heterosexual in comparison to the control group.

on the FSOS (Table 5). Masturbating using images of females had the largest effect size followed by masturbating using images of males, sex of any kind with females and CSA-AF (in order of decreasing effect size among the statistically significant predictors, Table 5).

The results of the binary multiple logistic regression analyzing the effects of CSA or incest by six groups of perpetrators on the adult self-identified sexual orientation are displayed in Table 6. Only 1,312 of the 1,556 total male cases were available for this analysis because the item was added after 244 of the men had already participated in the study. We set up the predictors and interpreted the results as described above for the women. As displayed in Table 6, block entry of the six reference-cell coded groups from the ANOVA revealed that the likelihood of a participant self-identifying as not heterosexual was 3.98, 3.38, and 13.5 times higher than the controls if the study participants were victims of BBI, SBI, and CSA-AM, respectively. The estimated increase in the likelihood of self-identifying as non-heterosexual of 4.5 times was, counter-intuitively, not statistically significant for the FSI group because of the smaller n in the group.

Block entry of the most powerful covariate variable related to behaviors that occurred prior the participant reaching 18 (measuring whether or not the participant had endorsed having experienced crushes predominantly or mostly on males after puberty) to the above model increased the Nagelkerke R squared from the value of .094 to .584. In that model, endorsing having experienced crushes predominantly or mostly on males after puberty increased the likelihood of self-identifying as not heterosexual by 158 times higher than the controls. After adjustment for all seven variables in the model, the likelihood of a participant self-identifying as not heterosexual was 6.4 and 3.9 times higher than the controls if the study participants were victims of BBI and CSA-AM, respectively. Victims of BBI remained statistically significant at p = .013 in the new model, but CSA-AM (p = .054) narrowly missed statistical significance at the p = .05 level.

The most parsimonious model for predicting a male participant's self-identified sexual orientation was using the MSOS as the sole predictor (p < .001), resulting in a Nagelkerke R squared value of .742. This model predicted the likelihood of a participant self-identifying as not heterosexual increased by 2.02 times higher than the controls for each 1-unit increase in the MSOS above zero. Endorsing having experienced crushes predominantly or mostly on males after puberty remained a statistically significant predictor (at p < .001) with MSOS also in the model, resulting in a Nagelkerke R squared value of .758.

### **2.3. Research objective 3) determination of “the effects of early incest or CSA by partners of either sex on early sexual behaviors with other partners under the age of 18 and on early masturbation using images of adults of either sex”**

The analyses presented below tested differences between each group and the controls in whether or not a behavior occurred, the earliest and latest ages at which the behavior occurred, and the number of partners rather than the order in which behaviors occurred. (The order in which the behaviors occurred will be addressed later on in research objective four, using analyses that take account of the chronological order determined from the relative ages at which the events occurred).

#### *2.3.1. Experience of females with male partners*

The percentages of female participants who engaged in sex of any kind with male partners under the age of 18 before themselves reaching 18 years of age in each of groups 1–6 were numerically higher than that of the controls. The difference between the percentages of male partners under 18 in the combined 1–6 groups versus the controls was highly significant ( $p < .001$  by Pearson  $\chi^2$ , Table 7). The sexual behaviors of the female participants who engaged in the behavior before 18 years of age with male partners under the age of 18 began significantly earlier than controls for the FDI, BSI, SSI, and CSA-AM groups (Table 7). The sexual behaviors with male partners under the age of 18 stopped earlier than controls for the BSI and the SSI groups, reflecting the tendency of the BSI behavior itself or behaviors with partners under the age of 18 triggered by the BSI or SSI to wane earlier than sexual behaviors with partners under the age of 18 in the controls (Table 7). The number of *male* partners who were under the age of 18 among the participants who engaged in the behavior before reaching 18 years of age were significantly higher than controls in the CSA-AM group. The number of male partners in the MSI group was far higher *numerically* than that in either the CSA-AM group or the controls, but it failed to reach statistical significance because of the small number of cases in the group (Table 8).

#### *2.3.2. Experience of females with female partners*

The percentage of female participants who engaged in sex of any kind with female partners under the age of 18 before themselves reaching 18 years of age in each of groups 1–6 was numerically higher than that of the controls. The differences among the groups were highly significant ( $p < .001$  by Pearson  $\chi^2$ , Table 9 legend). The sexual behaviors of female participants who engaged in the behavior before 18 years of age began significantly earlier than controls in the SSI group at a median age of 6 years of age, a full five years earlier than the median age for the controls who engaged in the behavior (Table 9). Same-sex behaviors with females under 18 stopped earlier than controls for the SSI group, reflecting the tendency of the SSI behavior itself to wane earlier than same-sex behaviors with partners in the controls. The number of female partners who were under the age of 18 among the participants who engaged in the behavior before reaching 18 years of age were significantly higher than controls only in the CSA-AF group (Table 8).

#### *2.3.3. Experience of males with female partners*

There was a highly significant difference in the percentages of participants in the seven groups who engaged in sex of any kind with female partners under the age of 18 before themselves reaching 18 years of age ( $p < .001$  by Pearson  $\chi^2$ , after combining groups 1–6 for comparison to the controls to eliminate expected counts less than five, legend of Table 10). The significant  $\chi^2$  reflected *numerically* higher rates of opposite sex behaviors with partners under the age of 18 than controls in four of the six groups (FSI, MSI, SBI, and CSA-AF) and *numerically* lower rates of opposite sex behaviors than controls in the other two groups (BBI and CSA-AM). The sexual behaviors of male participants who engaged in sexual behaviors with opposite-sex partners under the age of 18 before 18 years of age began significantly earlier than controls for the SBI and CSA-AM groups, but it was also similar numerically but not significantly lower in the FSI and the MSI groups (Table 10). On average, sexual behaviors with female partners under 18 stopped earlier than controls for the SBI group, reflecting the tendency of the SBI behavior, itself, to wane earlier than behaviors with female partners under 18 among the controls. The opposite-sex

**Table 7. Experiences of females with male partners who were under 18 years of age tabulated by group**

Group	n <sup>2</sup>	% <sup>3</sup>	Earliest age with a male under 18 years of age (N = 1,432, adj. r <sup>2</sup> = .090 <sup>1,4</sup> )				Latest age with a male under 18 years of age (N = 1329, adj. r <sup>2</sup> = .083 <sup>1,4</sup> )			
			M ± SD	MDN	p <sup>4,5</sup>	η <sup>4†</sup>	M ± SD	MDN	p <sup>4,5</sup>	η <sup>4†</sup>
FDI (Father-daughter incest)	40	62.5	10.9 ± 4.5	12	<.001	.020	16.3 ± 1.6	17	ns	.004
MDI (Mother-daughter incest)	5	71.4	9.4 ± 5.2	7	ns	.004	16.0 ± 2.2	17	ns	<.001
BSI (Brother-sister incest)	53	100.0	8.5 ± 3.3	8	<.001	.073	13.1 ± 4.1	14	<.001	.079
SSI (Sister-sister incest)	20	57.1	11.7 ± 4.4	13.5	.041	.005	15.3 ± 3.6	17	.024	.006
CSA-AM (CSA by an adult male)	292	73.4	13.6 ± 3.3	15	.048	.005	16.6 ± 1.5	17	ns	<.001
CSA-AF (CSA by an adult female)	11	47.8	12.6 ± 4.5	15	ns	.001	17.0 ± 0.0	17	ns	.001
Controls	1,011	45.0	14.2 ± 2.9	15	– <sup>3</sup>	– <sup>3</sup>	16.5 ± 1.8	17	– <sup>3</sup>	– <sup>3</sup>

<sup>1</sup>N with experience with male partners before reaching 18 years of age and adjusted r<sup>2</sup> ns are for those who had experience with male partners who were under the age of 18. The difference between in the percentages of male partners under 18 in the combined 1–6 groups versus the controls was significant [X<sup>2</sup>(1,2828) = 139.5, p < .001]. <sup>3</sup>Percent of all participants in group who before reaching 18 years of age engaged in sex with male partners who were under 18 years of age. <sup>4</sup>Calculated on the rank-transformed data. <sup>5</sup>Corrected for multiple comparisons to a single control using Dunnett's tables.

**Table 8. Numbers of male and female partners who were under 18 years of age tabulated by group for female participants**

Group	Number of male partners who were under 18 years of age (N = 1,432, adj. r <sup>2</sup> = .030 <sup>1,3</sup> )				Number of female partners who were under 18 years of age (N = 580, adj. r <sup>2</sup> = .024 <sup>1,3</sup> )					
	n <sup>3</sup>	M ± SD	MDN	p <sup>1,2</sup>	η <sup>2†</sup>	n <sup>3</sup>	M ± SD	MDN	p <sup>1,2</sup>	η <sup>2†</sup>
FDI (Father-daughter incest)	40	5.7 ± 5.4	4	ns	.003	21	2.8 ± 2.7	1	ns	<.001
MDI (Mother-daughter incest)	5	10.2 ± 6.3	12	ns	.004	3	2.7 ± 1.2	2	ns	.002
BSI (Brother-sister incest)	53	5.1 ± 8.2	2	ns	<.001	19	3.5 ± 2.7	3	ns	.006
SSI (Sister-sister incest)	20	4.5 ± 3.4	3	ns	<.001	35	3.5 ± 3.9	3	ns	.008
CSA-AM (CSA by an adult male)	292	7.9 ± 11.9	4	<.001	.028	103	3.4 ± 4.0	2	ns	.010
CSA-AF (CSA by an adult female)	11	4.2 ± 1.8	4	ns	.001	15	4.8 ± 4.8	3	.008	.018
Controls	1,011	4.6 ± 5.6	3	– <sup>3</sup>	– <sup>3</sup>	384	2.4 ± 2.3	2	– <sup>3</sup>	– <sup>3</sup>

<sup>1</sup>Calculated on the rank-transformed data. <sup>2</sup>Corrected for multiple comparisons to a single control using Dunnett's tables. <sup>3</sup>ns are for those who had experience with female partners who were under the age of 18. <sup>3</sup>Control <sup>3</sup>partial eta squared (a measure of effect size) calculated on the rank-transformed data.



**Table 9. Experiences of females with female partners who were under 18 years of age tabulated by group**

Group	n <sup>2</sup>	% <sup>3</sup>	Earliest age with a female under 18 years of age (N = 580, adj. r <sup>2</sup> = .071 <sup>1,4</sup> )				Latest age with a female under 18 years of age (N = 580, adj. r <sup>2</sup> = .052 <sup>1,4</sup> )			
			M ± SD	MDN	p <sup>4,5</sup>	η <sup>4†</sup>	M ± SD	MDN	p <sup>4,5</sup>	η <sup>4†</sup>
FDI (Father-daughter incest)	21	32.8	10.1 ± 3.4	9	ns	.002	13.3 ± 3.4	14	ns	<.001
MDI (Mother-daughter incest)	3	42.9	9.0 ± 5.2	6	ns	.002	15.3 ± 2.9	17	ns	.001
BSI (Brother-sister incest)	19	35.8	10.6 ± 3.7	10	ns	<.001	14.1 ± 3.1	15	ns	.001
SSI (Sister-sister incest)	35	100.0	7.0 ± 2.4	6	<.001	.059	10.4 ± 3.4	11	<.001	.028
CSA-AM (CSA by an adult male)	103	25.9	10.3 ± 3.9	10	ns	.004	13.4 ± 3.4	14	ns	.001
CSA-AF (CSA by an adult female)	15	65.2	14.2 ± 3.6	16	.009	.018	16.2 ± 2.2	17	.001	.018
Controls	384	17.1	11.0 ± 3.9	11	– <sup>3</sup>	– <sup>3</sup>	13.2 ± 3.6	14	– <sup>3</sup>	– <sup>3</sup>

<sup>1</sup>N with experience with female partners before reaching 18 years of age and adjusted r<sup>2</sup>. <sup>2</sup>ns are for those who had experience with female partners who were under the age of 18. X<sup>2</sup>(4, 2,2,793) = 66.26, p < .001 (to eliminate cells in the X<sup>2</sup> with counts less than 5, the SSI group was removed and the MDI group was recoded to combine it with the CSA-AF group). <sup>3</sup>percent of all participants in group who before reaching 18 years of age engaged in sex with female partners who were under 18 years of age. <sup>4</sup>Calculated on the rank-transformed data. <sup>5</sup>Corrected for multiple comparisons to a single control using Dunnett's tables.

**Table 10. Experiences of males with female partners who were under 18 years of age tabulated by group**

Group	n <sup>2</sup>	% <sup>3</sup>	Earliest age with a female under 18 years of age (N = 734, adj. r <sup>2</sup> = .084 <sup>1,4</sup> )				Latest age with a female under 18 years of age (N = 734, adj. r <sup>2</sup> = .072 <sup>1,4</sup> )			
			M ± SD	MDN	p <sup>4,5</sup>	η <sup>4†</sup>	M ± SD	MDN	p <sup>4,5</sup>	η <sup>4†</sup>
FSI (Father-son incest)	4	80.0	10.0 ± 4.5	11	ns	.008	15.2 ± 3.5	17	ns	.002
MSI (Mother-son incest)	2	67.7	10.5 ± 7.8	5	ns	.001	17.0 ± 0.0	17	ns	<.001
BBI (Brother-brother incest)	12	42.9	12.5 ± 3.2	13	ns	.006	15.3 ± 3.1	17	.049	.010
SBI (Sister-brother incest)	28	100.0	8.2 ± 4.0	8	<.001	.065	14.6 ± 3.5	17	<.001	.049
CSA-AM (CSA by an adult male)	13	38.2	10.2 ± 3.9	13	<.001	.022	15.7 ± 2.3	17	.001	.021
CSA-AF (CSA by an adult female)	103	70.5	13.9 ± 3.0	14	ns	.003	16.7 ± 1.4	17	ns	.002
Controls	572	43.6	13.9 ± 3.0	15	– <sup>6</sup>	– <sup>6</sup>	16.5 ± 1.9	17	– <sup>6</sup>	– <sup>6</sup>

<sup>1</sup>N with experience with female partners before reaching 18 years of age and adjusted r<sup>2</sup>. <sup>2</sup>ns are for those who had experience with female partners who were under the age of 18. X<sup>2</sup>(1, 1,556) = 42.90 for combined groups 1–6 vs controls to correct for groups with expected counts less than five, p < .001. <sup>3</sup>Percent of all participants in group who before reaching 18 years of age engaged in sex with female partners who were under 18 years of age. <sup>4</sup>Calculated on the rank-transformed data. <sup>5</sup>Corrected for multiple comparisons to a single control using Dunnett's tables.

behaviors with partners under 18 also tended to wane numerically earlier than those of the controls in the FSI, BBI, and CSA-AM groups (groups which all involved same-sex behaviors), but because of the larger  $n$ , only the early waning in the BBI and CSA-AM groups reached statistical significance. The only significant difference in the number of *female* partners who were under the age of 18 among the participants who engaged in the behavior before reaching 18 years of age was that of the CSA-AF group which had a significantly higher number of female partners than the controls (Table 11).

#### 2.3.4. Experience of males with male partners

There was a highly significant difference in the percentages participants in the seven groups who engaged in sex of any kind with male partners under the age of 18 before themselves reaching 18 years of age ( $p < .001$  by Pearson  $\chi^2$ , Table 12). Put succinctly, the significant  $\chi^2$  reflected higher rates of same sex behaviors in five of the six groups, with only the CSA-AF group having a numerically *lower rate* than controls. There was no significant difference between any of the seven groups in the earliest age that behaviors with male partners under 18 began among those that had engaged in the behavior (Table 12). The same-sex behavior with male partners under 18 stopped numerically later than controls in the CSA-AM group, but this narrowly missed statistical significance ( $p = .053$ , Table 12). The number of male partners who were under the age of 18 among the participants who engaged in the behavior before reaching 18 years of age was significantly higher than controls for both the FSI and the CSA-AM groups (Table 11).

#### 2.3.5. Experience of females and males with masturbation

The numbers and percentages of the female and male participants who before reaching the age of 18 masturbated using images of adult females or images of adult males are shown in Tables 13 and 14, respectively. There were significant differences for both the females and the males among the seven groups in the percentages who masturbated using each type of image as shown by  $\chi^2$  after combining the first six groups for comparison to the controls to eliminate cells with counts less than five (Tables 13 legend and 14 legend, respectively).

### **2.4. Research objective 4) determination of “the effects of early incest or CSA by partners of either sex on the sexual behaviors in which the victims engaged prior to reaching 18 years of age, taking into account the order in which the behaviors occurred to establish those in which the early incest or CSA by partners of either sex could have been causally related to the outcome measure as determined by antecedence”**

Our study contained data that allowed us to explore whether the initial experience with the perpetrator triggered subsequent behaviors that may have reinforced (or opposed) the effect of the initial CSA on the adult sexual orientations of the victims. Two possible effects that would reinforce the impact of the sex of the perpetrators on the adult sexual orientations of the victims would be triggering the participant to seek out sex from underage partners of the same sex as the perpetrator or to begin masturbating using images of adults of the same sex as the perpetrator. On the other hand, if the impact of the early interaction with the perpetrator was an increased interest in sex, it was also possible that the impact of the early interaction with the perpetrator would be to trigger the participant to seek out sex from underage partners who happened to be of the opposite sex from the perpetrator or to begin masturbating using images of adults who happened to be of the opposite sex from the perpetrator. Because we had data on the earliest ages that the participants engaged in each of the behaviors, we were able to deduce the sequence of these events by examining the difference in ages at which any two events occurred on a participant-by-participant basis. We focused on the chronological order of the events to facilitate evaluating the possible cause-and-effect relationship between the two events. To produce the statistics presented in Table 15, we subtracted the age that the right most behavior (B) in the left hand column of Table 15 began from the age at which the left-most behavior (A) in the left hand column of Table 15 began, and we computed one-sample  $t$ -tests compared to a theoretical zero under the null-hypothesis that there was no causal relationship between the onset of the two behaviors (Table 15).

**Table 11. Numbers of male and female partners who were under 18 years of age tabulated by group for male participants**

Group	Number of male partners who were under 18 years of age (N = 204, adj. r <sup>2</sup> = .073 <sup>1</sup> )				Number of female partners who were under 18 years of age (N = 734, adj. r <sup>2</sup> = .009)					
	n <sup>3</sup>	M ± SD	MDN	p <sup>1,2</sup>	η <sup>2†</sup>	n <sup>3</sup>	M ± SD	MDN	p <sup>1,2</sup>	η <sup>2†</sup>
FSI (Father-son incest)	4	18.5 ± 21.9	10.5	.015	.029	4	6.0 ± 6.2	4	ns	<.001
MSI (Mother-son incest)	2	2.0 ± 1.4	2	ns	.002	2	11.5 ± 12.0	11.5	ns	<.001
BBI (Brother-brother incest)	28	3.8 ± 4.3	2	ns	<.001	12	3.1 ± 3.3	2	ns	.001
SBI (Sister-brother incest)	11	3.4 ± 1.5	3	ns	.008	28	5.1 ± 5.4	3.5	ns	.001
CSA-AM (CSA by an adult male)	27	13.4 ± 17.3	5	<.001	.074	13	5.3 ± 3.0	4	ns	<.001
CSA-AF (CSA by an adult female)	7	3.7 ± 3.2	3	ns	.002	103	14.5 ± 25.3	8	.009	.014
Controls	122	4.5 ± 11.4	2	– <sup>3</sup>	– <sup>3</sup>	572	7.8 ± 19.7	3	– <sup>3</sup>	– <sup>3</sup>

<sup>1</sup>Calculated on the rank-transformed data. <sup>2</sup>Corrected for multiple comparisons to a single control using Dunnett's tables. <sup>3</sup>ns are for those who had experience with female partners who were under the age of 18. <sup>3</sup>Control <sup>3</sup>partial eta squared (a measure of effect size) calculated on the rank-transformed data.

**Table 12. Experiences of males with male partners who were under 18 years of age tabulated by group**

Group	n <sup>2</sup>	% <sup>3</sup>	Earliest age with a male under 18 years of age (N = 204, adj. r <sup>2</sup> = -.012 <sup>1</sup> )				Latest age with a male under 18 years of age (N = 204, adj. r <sup>2</sup> = .045 <sup>1,4</sup> )			
			M ± SD	MDN	p <sup>5</sup>	η <sup>4†</sup>	M ± SD	MDN	p <sup>4,5</sup>	η <sup>4†</sup>
FSI (Father-son incest)	4	80.0	10.5 ± 3.1	10.5	ns	<.001	16.0 ± 2.0	17	ns	.010
MSI (Mother-son incest)	2	66.7	9.0 ± 5.7	9	ns	.002	12.5 ± 0.7	12.5	ns	.005
BBI (Brother-brother incest)	28	100.0	10.1 ± 3.0	10	ns	.003	13.0 ± 3.1	13.5	ns	.013
SBI (Sister-brother incest)	11	39.36	9.4 ± 3.7	8	ns	.006	13.3 ± 3.1	13	ns	.003
CSA-AM (CSA by an adult male)	27	79.4	11.1 ± 4.4	12	ns	.002	15.6 ± 2.4	17	.053	.034
CSA-AF (CSA by an adult female)	10	6.8	11.7 ± 3.2	13	ns	.004	14.5 ± 2.7	15	ns	.001
Controls	122	9.3	10.6 ± 3.9	11	-.6	-.6	13.8 ± 3.6	15	-.6	-.6

<sup>1</sup>N with experience with male partners before reaching 18 years of age and adjusted r<sup>2</sup>. <sup>2</sup>ns are for those who had experience with male partners who were under the age of 18. X<sup>2</sup>(1,1556) = 104.6, for combined groups 1-6 vs controls to eliminate expected values under 5, p < .001. <sup>3</sup>Percent of all participants in group who before reaching 18 years of age engaged in sex with male partners who were under 18 years of age. <sup>4</sup>Calculated on the rank-transformed data. <sup>5</sup>Corrected for multiple comparisons to a single control using Dunnett's tables

**Table 13. Masturbation using images of adult males or females in female study participants**

Group		n	Images of males		Images of females	
			n <sub>1</sub>	% <sup>1</sup>	n <sub>2</sub>	% <sup>2</sup>
1	FDI (Father-daughter incest)	64	17	26.6	13	20.3
2	MDI (Mother-daughter incest)	7	6	85.7	5	71.4
3	BSI (Brother-sister incest)	53	16	30.2	17	32.1
4	SSI (Sister-sister incest)	35	13	37.1	9	25.7
5	CSA-AM (CSA by an adult male)	398	121	30.4	82	20.6
6	CSA-AF (CSA by an adult female)	23	2	8.7	5	21.7
7	Controls	2,248	425	18.9	274	12.2

n<sub>1</sub> Number who masturbated using images of males. <sup>1</sup>percent who masturbated using images of males. n<sub>2</sub> Number who masturbated using images of females. <sup>2</sup>percent who masturbated using images of females.  $\chi^2[1, 2828] = 34.34, p < .001$  for comparison of combined groups 1-6 vs controls for masturbating using images of males.  $\chi^2[1, 2828] = 39.79, p < .001$  for comparison of combined groups 1-6 vs controls for masturbating using images of females.

**Table 14. Masturbation using images of adult males or females in male study participants**

Group		n	Images of males		Images of females	
			n <sub>1</sub>	% <sup>1</sup>	n <sub>2</sub>	% <sup>2</sup>
1	FSI (Father-son incest)	5	2	40.0	5	100.0
2	MSI (Mother-son incest)	3	0	0.0	2	66.7
3	BBI (Brother-brother incest)	28	8	28.6	21	75.0
4	SBI (Sister-brother incest)	28	4	14.3	25	89.3
5	CSA-AM (CSA by an adult male)	34	25	73.5	19	55.9
6	CSA-AF (CSA by an adult female)	146	5	3.4	137	93.8
7	Controls	1,312	121	9.2	1,027	78.3

n<sub>1</sub> Number who masturbated using images of males. <sup>1</sup>percent who masturbated using images of males. n<sub>2</sub> Number who masturbated using images of females. <sup>2</sup>percent who masturbated using images of females.  $\chi^2[1, 1556] = 15.93, p < .001$  for comparison of combined groups 1-6 vs controls for masturbating using images of males.  $\chi^2[1, 1556] = 6.412, p = .011$  for comparison of combined groups 1-6 vs controls for masturbating using images of females.

## 2.5. Female participants

### 2.5.1. Sex with underage females

To calculate the statistics in Table 15, we examined the data from all the female study participants who had engaged in sex with both underage and adult women before the age of 18 without consideration to the group assignments for the ANOVA. There was no statistically significant trend for the 19 women who reported sexual experiences with both underage and adult women (Table 15, comparison 8). However, sex with underage females significantly tended to precede sex with underage males in the 398 women who had engaged in both behaviors before reaching 18 years of age (Table 15, comparison 9). We used the six groups of perpetrators defined in Table 1 for the following statistical tests focused on the groups.

### 2.5.2. Sex with underage females in victims of father-daughter incest (FDI)

Among the 64 victims of FDI, 21 (33%) reported sex with underage females at an average of 10.1 years of age (range 5–17 years of age). We were able to examine the order in which the FDI and the sex with underage females occurred in only 13 cases because only 13 of the 21 who had experience with underage females provided information about the age at which the FDI first occurred. Four FDI victims reported that sex with an underage female had occurred 1–3 years before the first instance of FDI. In two cases both events occurred within the same year, and in

**Table 15. Order in which participants engaged in behavior-pairs**

Behavior pairs for earliest age differences <sup>1</sup> (the difference was computed from the earliest ages that the participants engaged in the two behaviors (behavior A-behavior B) by subtraction as shown.	Male Participants				Female Participants			
	n <sup>2</sup>	M ± SD <sup>3</sup>	A, B <sup>4</sup> %	B, A <sup>5</sup> %	n	M ± SD	A, B <sup>4</sup> %	B, A <sup>5</sup> %
1 Sex with adult male—masturbating using images of adult males	27	0.5 ± 4.2	33.3	55.6	137	-0.4 ± 3.8	42.3	46.0
2 Sex with adult female—masturbating using images of adult females	140	2.5 ± 2.7***	8.6	81.4	7	2.1 ± 2.5	14.3	71.4
3 Sex with a male of any age—masturbating using images of adult males	97	-2.6 ± 3.7***	71.1	16.5	404	-1.5 ± 3.4***	54.7	24.5
4 Sex with a female of any age—masturbating using images of adult females	710	0.6 ± 3.2***	22.8	55.9	210	-3.1 ± 4.3***	65.2	20.5
5 Sex with a male of any age—masturbating using images of adult females	155	-2.5 ± 3.8***	67.7	20.6	286	-1.7 ± 3.7***	61.9	22.7
6 Sex with a female of any age—masturbating using images of adult males	63	-2.3 ± 4.0***	55.6	23.8	226	-3.6 ± 4.1***	73.0	15.5
7 Sex with adult male—sex with an underage male	35	2.3 ± 4.3**	8.6	51.4	329	1.0 ± 3.6***	14.9	46.5
8 Sex with adult female—sex with an underage female	106	1.9 ± 2.6***	5.7	61.3	19	1.2 ± 3.12	15.8	36.8
9 Sex with an underage male—sex with an underage female	111	-1.5 ± 4.2***	49.5	30.6	398	1.4 ± 4.4***	34.7	53.0
10 Sex with adult male—sex with an underage female	20	2.5 ± 5.6	25.0	65.0	123	2.8 ± 5.1***	22.8	65.0
11 Sex with adult female—sex with an underage male	14	2.6 ± 5.1	21.4	78.6	14	1.3 ± 6.2	42.9	50.0

<sup>1</sup>Behavior pairs for earliest age differences (the difference was computed from the earliest ages that the participants engaged in the two behaviors (earliest age for behavior A—earliest age for behavior B) by subtraction as shown. <sup>2</sup>The ns are reduced because differences could only be computed if participants engaged in both behaviors before the age of 18. <sup>3</sup>The M ± SD values shown are for the difference in earliest ages for the behavior pairs shown in the first column. Negative results indicated that the right-most behavior followed the left-most by a year or more (A, B). Positive values indicated that the right-most behavior preceded the left-most behaviors by a year or more (B, A). These differences were used to compute 1-sample t-tests with the p-values shown as follows: \* = p < .05, \*\* = p < .01, \*\*\* = p < .001. <sup>4</sup>Percent with negative differences (behavior B followed behavior A). <sup>5</sup>Percent with positive differences (behavior A followed behavior B). The percent with zero values (those in which the two behaviors occurred in the same year of age) can be computed as the percent that were neither negative nor positive.



seven cases the FDI occurred 4–11 years before the first occurrence of sex with underage females. The one-sample *t*-test on these 13 cases revealed that onset of the FDI significantly tended to antedate the sex with underage females [ $t(12) = -2.53, p = .026$ ].

### 2.5.3. Sex with underage females in victims of MDI

Among the 7 victims of MDI, three (43%) reported sex with underage females at an average of 9.0 years of age (range 6–15 years of age). We were not able to examine the order in which the MDI and the sex with underage females occurred because only one MDI victim provided information about the age at which the MDI occurred (Table 9).

### 2.5.4. Sex with underage females in victims of CSA-AF

Among the 23 victims of CSA-AF, 15 also reported having sex with underage females. Thirty-five percent of those 15 cases were under 16 when the CSA-AF first occurred. The one-sample *t*-test was not statistically significant. Sex with underage females clearly preceded the CSA-AF in only four (27%) of those 15 cases (Table 9). Sex with underage females clearly followed the CSA-AF by one year in two (13%) of those 15 cases (in which the CSA-AF occurred at the ages of 15 and 16). The nine (60%) of those 15 cases in which both events occurred within the same year were problematic because the order in which the events occurred was unknown. If the CSA-AF were assumed to have preceded sex with underage females in those cases, CSA-AF could have preceded sex with underage females in as many as 11 (73%) of those 15 cases.

### 2.5.5. Sex with females in victims of brother-sister incest (BSI)

Among the 53 victims of BSI, there were 19 who reported sexual experiences with both underage females and underage males. The one-sample *t*-test on these 19 cases showed that in BSI, sex with the brother had significantly tended to precede sex with underage females ( $p = .015$ , in 63% of the 19 BSI cases), the reverse of what was shown in the 398 cases evaluated in the data as a whole (Table 15). These results were consistent with the idea that the BSI had triggered an interest in sex that had subsequently led the BSI victims to engage in sex with underage females.

### 2.5.6. Masturbating using images of adult women

We first examined the association between a history of sex with females of any age before 18, a history of sex with men of any age before 18, and a history of masturbating using images of adult women before 18 using multiple logistic regression. A history of sex with females increased the likelihood of masturbating using images of adult females by 5.278 times, and a history of sex with males increased the likelihood of masturbating using images of adult females by 1.665 times (both  $p < .001$ ). We next examined the order in which the two behaviors occurred on a case-by-case basis.

When we examined the order in which the two events occurred in all 210 participants who had engaged in both behaviors, sex with a female of any age significantly tended to have preceded masturbating using images of adult females (in 65.2% of the 188 cases, Table 15, comparison 4). Similarly, when we examined the order in which the two events occurred in all 286 participants who had engaged in both behaviors, sex with a male of any age significantly tended to have preceded masturbating using images of adult females (in 61.9% of the 286 cases, Table 15, comparison 5). This case-by-case analysis was consistent with early sexual behavior with both male and female partners increasing the likelihood of masturbating using images of females, as indicated by the initial logistic regression analysis.

## 2.6. Male participants

### 2.6.1. Sex with underage males

The *t*-tests in Table 15 revealed that sex with underage males significantly tended to antedate sex with adult males (Table 15, comparison 7). There were approximately six cases in which sex with underage males antedated sex with adult males for each one that occurred in the opposite order when all those who had engaged in both behaviors were considered together. However, when the

data from the various victim groups were considered individually, different information emerged, group by group, based on the six groups of perpetrators defined in Table 2.

#### 2.6.2. *Victims of FSI*

Of the five men who were victims of FSI, four also had experience with underage males. In three of the four cases, sex with the victim's father had preceded sex with the underage male (Table 2).

#### 2.6.3. *Victims of BBI*

Of the 28 men who were victims of BBI, only one reported having sex with an adult male before reaching 18 years of age. In that case, sex with the adult male occurred 9 years after the incident of sex with the brother. Therefore, for BBI, sex with the brother or another underage male was the first sexual experience of the victim with a male of any age.

#### 2.6.4. *Victims of CSA-AM*

Of the 34 men who were victims of CSA-AM, 27 had also experienced sex with an underage male before the age of 18. The one-sample *t*-test revealed that sex with underage males significantly tended to precede the CSA-AM [ $t(26) = 3.16, p = .004$ ]. One third of the 27 victims were under 14 years of age when the CSA-AM first occurred. In one case, sex with underage males followed after CSA-AM which had occurred at three years of age. In 14 cases, CSA-AM and sex with underage males occurred within the same year—at median of 14 years of age. In 12 of the 27 cases (44%, Table 12), sex with underage males had preceded CSA-AM occurring at a median of 16 years of age. Sex with an underage male had preceded CSA-AM in only one case when the CSA-AM occurred before 14 years of age. In seven cases, only CSA-AM occurred. Thus, in only eight of 34 victims of CSA-AM (24%) was it clear that the CSA-AM was the first sexual experience with a male. However, the 14 cases in which CSA-AM and sex with underage males occurred within the same year were problematic in that they could have occurred in either sequence, and 15 (44%) of the 34 CSA-AM victims were 14 years of age or younger at the time the first episode occurred. If CSA-AM were assumed to have preceded the sex with underage males in those 14 problematic cases in which both events occurred in the same year, it would lead to the conclusion that CSA-AM could have preceded sex with underage males in as many as 55% of the 27 CSA-AM cases in which both events occurred.

#### 2.6.5. *Sex with males in victims of SBI*

As mentioned above (when all the data from the male participants were considered together), among the 106 men who reported experiencing sex with both underage females and underage males before reaching 18 years of age, there was a significant tendency for sex with males to have preceded sex with females (Table 15). However, a different picture emerged when we examined the SBI cases on a case-by-case basis. Among the 28 cases of SBI, there were eleven cases in which sex with both underage males and the sister was reported. The one-sample *t*-test for these 11 cases showed the reverse of what was seen in the 106 cases when they were considered as a whole. In the victims of SBI, sex with males significantly tended to follow sex with the sister ( $p = .014$ ). In eight of the eleven cases, sex with the sister preceded sex with underage male partners, and in the another three cases, both events occurred within the same year. The SBI findings were consistent with the idea that interest in sex triggered by the SBI had led to the sexual experience with the underage male in at least 73% of those eleven cases.

#### 2.6.6. *Masturbating using images of adult men*

We first examined the association between a history of sex with males of any age before 18, a history of sex with females of any age before 18, and a history of masturbating using images of adult men before 18 using multiple logistic regression and the data from all of the men in the present study. A history of sex with males increased the likelihood of masturbating using images of adult males by 18.36 times, and a history of sex with females before 18 decreased the likelihood of masturbating using images of adult men by 0.413 times. The one-sample *t*-test in Table 15 comparison 3 revealed that sex with males of any age significantly tended to antedate onset of

masturbating using images of adult men. However, there was no significant trend in the order in which sex with *adult men* and masturbating using images of adult men occurred when the data from all study participants who had engaged in both behaviors were considered as a whole (Table 15, comparison 1). In contrast, masturbating using images of adult females significantly tended to antedate sex with adult females, and it also significantly tended to antedate sex with females of all ages in the large number of men who reported engaging in both behaviors (Table 15, comparison 2 and comparison 4, respectively).

#### 2.6.7. *Victims of FSI*

Of the five men who were victims of FSI, two began masturbating using images of adult males. In the both cases for which data were available, masturbating using images of adult males began one year *before* the first episode of FSI. Four FSI victims also had engaged in sex with underage males. In three of the four cases sex with underage males preceded the FSI by 1–3 years. In the fourth case, sex with underage males followed 3 years *after* the first episode of FSI.

#### 2.6.8. *Victims of CSA-AM*

The one-sample *t*-test on the data from the 25 victims of CSA-AM who engaged in masturbation using images of adult males was not statistically significant. Of the 25 men who were victims of CSA-AM and who began masturbating using images of adult males, 13 (52%) began masturbating using the images 1–8 years before the CSA-AM. There were another nine victims of CSA-AM (36%) whose masturbation using images of adult males had followed the CSA-AM by 1–9 years and before the participant had reached 18 years of age. There were another three victims of CSA-AM (12%) who began both behaviors within the same year. Nine (25%) of the 34 *total* CSA-AM victims did not begin masturbating using male images before reaching 18 years of age.

#### 2.6.9. *Victims of BBI*

Of the 28 victims of BBI, seven (25%) began masturbating using images of adult men 2–5 years after the first onset of the BBI, and one BBI victim (3.6%), began masturbating using images of adult men one year before onset of the BBI. The paired *t*-test analysis in these eight cases showed that sex with a male of any age significantly antedated masturbating using images of adult men ( $p = .005$ ). This case-by-case analysis made it clear that sexual behaviors with brothers tended to increase the likelihood that the BBI victims would subsequently engage in masturbating using images of adult males. The remaining 20 victims of BBI had not begun masturbating using images of adult males by 18 years of age. In contrast to the 28.6% of BBI victims who had begun masturbating using images of adult men, none of the three victims of MSI, four (14.3%) of 28 cases of SBI, and five (3.4%) of 146 cases of CSA-AF began masturbating using images of adult males before they reached 18 years of age. We also examined the sequence of behaviors related to female partners on a case-by-case basis.

#### 2.6.10. *Sex with underage females in victims of MSI*

All three of victims of MSI had also had experienced with sex with an underage female. In both MSI cases who provided details about the MSI, sex with the mother had been preceded 7–8 years earlier by sex with an underage female (Table 10).

#### 2.6.11. *Sex with adult females in victims of SBI*

Of the 28 cases of SBI, two also reported having sex with an adult woman before reaching the age of 18. In those two SBI cases the victim first experienced sex with his sister and subsequently engaged in sex with the adult female seven and eight years later. Thus in 100% of the SBI cases, the SBI was the first sexual experience of the brother with a female of any age.

#### 2.6.12. *Sex with underage females in victims of BBI*

In the 111 cases in the entire data set in which male participants had reported sex with both underage males and underage females, the sex with the male significantly tended to precede the sex with the female (Table 15, comparison 9). Among the 28 cases of BBI, twelve reported having

experienced sex with both the brother and underage females. In 10 of the twelve cases, sex with the underage female followed sex with the brother, and in the other two cases it occurred within the same year (a finding that was significant,  $p = .004$  by one-sample  $t$ -test). These findings were consistent with the idea that interest in sex triggered by the BBI had led to the sexual experience with the underage female in at least 83% of those nine cases.

#### 2.6.13. Sex with underage females in male victims of CSA-AF

In the 111 cases in the entire data set in which male participants had reported sex with both adult females and underage females, the sex with the underage female significantly tended to precede the sex with the adult female (Table 15, comparison 9). The median age for the first occurrence of the CSA-AF was 16 years of age. Of the 146 cases of men who were victims of CSA-AF, 103 had experience with both adult women and underage females. In the *other* 43 cases, the only sexual experience of the male before the age of 18 with a female was with an adult woman. In only six of the 103 cases did sex with the underage female come after sex with the adult woman. In 35 cases both behaviors occurred within the same year. In the other 62 cases, sex with an underage female had preceded sex with an adult female before the participant had reached 18 years of age. Thus, in 49 of the 146 cases (34%), the underage male had clearly been initiated into sex with females by an adult woman. However, the cases did not support the idea that CSA-AF significantly increased the likelihood that the CSA-AF victims would subsequently seek out sex with underage females because the paired  $t$ -test on the differences showed that sex with underage females significantly tended to precede sex with adult females [ $t(102) = 7.14$ ,  $p < .001$ ].

### 3. Discussion

This was the first study to report in a single paper the effects of all types of parental incest, and all types of sibling incest, as well as CSA by unrelated adult males and females on the adult sexual orientations of men and women who were under the age of 18 when the sexual encounters occurred. The data from the male and female participants were analyzed separately, so, in effect, the quasi-experimental independent ANOVA variable was separately analyzed in two different studies with one study essentially confirming the results of the other using participants of the opposite sex. In each sex, the effects of CSA and incest on the adult sexual orientation of the victims could be predicted by the combined effects of classical and operant conditioning acting synergistically with sexual imprinting and critical period learning: Early victimization by same-sex perpetrators of CSA or incest significantly increased the likelihood that the victims would develop an adult sexual orientation that had a same-sex component. For example, in women CSA significantly increased the scores of the MDI and CSA-AF victims on the FSOS (Table 1), and both also significantly increased the likelihood that the CSA-AF victims would self-identify as not heterosexual as adults after adjustment for early same-sex crushes (33.3% of the victims of MDI and 60.9% of the victims for CSA-AF, Table 4). Similarly, in men, FSI, BBI, and CSA-AM significantly increased the scores of the CSA-AM victims on the MSOS (Table 2), and BBI and CSA-AM both also significantly increased the likelihood that the victims would self-identify as not heterosexual as adults (22.7% of the BBI victims and 50.0% of the CSA-AM victims, Table 6).

Our present study was designed to go as far as was ethically possible toward addressing the issue of causality between the early CSA or incest and the adult sexual orientations of the victims. A truly prospective design would have been unethical because the potential participants in a putative truly prospective design would have been underage and unable to give consent to such a study. The natural, quasi-experimental (Shadish et al., 2002, pp.13–17) pseudoprospective (Douglas et al., 2003) design of our study allowed us to obtain evidence strongly supporting a causal link between events that had occurred before the participants reached the age of 18 and their adult sexual orientations by collecting the necessary data from adult participants who been victims of the CSA or incest winnowed out of the large total sample. In participants of each sex, the quasi-experimental independent ANOVA variable (Shadish et al., 2002) defined the six incest or CSA groups and the controls. Each of the forms of early CSA and incest in the analyzed data clearly preceded the adult sexual orientations of the victims, arguing strongly in favor of the

conclusion that the CSA and childhood incest caused the adult sexual orientations rather than the reverse because the former events were antecedent to the later outcome. Further discussion of the above issue of causality is presented below under “Limitations of the study.” See Douglas et al. (2003) and Shadish et al. (2002) for further details. To allow us to more clearly complete the discussion below we will use the word “cause” even though we realize that, *technically*, natural, quasi-experimental pseudoprospective designs can never *fully* prove cause-and-effect. Our current findings reinforced the findings from other studies already reviewed and cited in the introduction. For example, in each sex the incidence of same-sex orientations measured within the study populations was far higher numerically in incestuous same-sex siblings (who were not twins) than it was in identical twins (Beard et al., 2013; Stroebe et al., 2013b). Thus, the more powerful effect of same-sex sibling incest among a subset of the same-sex identical twins could explain the data published by Bailey et al. (2000) on twins obtained from an Australian twin registry, but conversely, the less-powerful putative genetic effect hypothesized by Bailey et al. (2000) could not explain the far higher rate of same-sex orientations in incestuous same-sex siblings (who were not twins) demonstrated by Beard et al. (2013) and Stroebe et al. (2013b). A similar conclusion—that the genetic effect was far from determinant—was published by Sanders et al. (2015) without even considering the data from Beard et al., (2013, 2015) or Stroebe et al. (2013b).

In earlier papers (e.g., Finkelhor, 1984; Mendel, 1995), the causality between CSA-AM and non-heterosexual adult orientations had been questioned on the basis that the CSA-AM victims may already have been “homosexual” or especially attractive to the perpetrators at the time that the CSA-AM first occurred. The detailed data available in the present study allowed us to show that in most cases when the CSA-AM in boys first occurred before 14 years of age, it *preceded* sex with underage males and masturbating using images of adult males. Our findings, therefore, were consistent with the conclusion that when CSA-AM occurred early in a young male’s life, it often could be implicated in initiating either subsequent sexual behaviors with underage males or subsequent masturbation using images of adult males. However, in other males who were 14 or older at the time of the first CSA-AM, the causal pathway appeared often to begin with early sexual behaviors with underage males, followed by masturbating using images of adult males and CSA-AM. (Early sexual experiences with female or male peer-partners or underage partners of more disparate ages are known to be common in both males and females as shown in data from the present study (percentage-columns of Tables 7 and 12 for females and males, respectively) and that of Reynolds, Herbenick, & Bancroft, 2003).

Conversely, the sexual orientations of victims of opposite-sex CSA or incest perpetrators tended to be toward the opposite sex. Furthermore, additional data from the covariates analyzed in our study provided evidence that the effects of masturbating using same-sex and opposite-sex images and early sexual experiences with same-sex and opposite-sex partners under 18 tended to modulate the adult sexual orientations of the participants in both sexes of participants, as predicted by conditioning theory (Tables 3 and Table 5 for females and males, respectively).

As expected from previous studies showing that interest in sex was increased by early sexual experiences (eg., Griffee et al., 2014a and Griffee et al., 2014b), victimization before the age of 18 by any of these six types of sexual perpetrators tended to increase the likelihood that participants would have other early sexual experiences with male or female partners who were under the age of 18, a finding that has been reported previously in other studies (Beard et al., 2013; O’Keefe et al., 2014; Stroebe et al., 2012, 2013a, 2013b; Yates, 1982). The experiences with same-sex adult-perpetrators or same-sex partners under the age of 18 explained our observation that the mean scores on the female sexual orientation scale (FSOS) for each of the six groups of female victims were significantly higher than those of the controls (Table 1).

By showing that childhood incest and CSA by adults of either sex have profound effects on the adult sexual orientations of the victims, our paper clarifies the relationship between these events and the adult sexual orientations of the victims. Understanding that adult sexual orientations are



the result of conditioning from early sexual experiences in cases of abuse rather than the inalterable result of inherited genes is extremely important to both the young victims and their therapists for the following reasons. If both the victims and their therapists believe that adult orientations are the inalterable result of inherited genes, any subsequent same-sex behaviors (or opposite sex behaviors) of the victim will be interpreted as evidence that the child or adolescent is carrying one or more genes that are producing the behavior and that any attempt to encourage development of a desired opposite-sex or same-sex adult sexual orientation is futile. The gene-based belief system, therefore, tends to promote the self-fulfilling prophecy that early same sex behaviors mean there will be an adult sexual orientation that matches the behavior. This is because the belief will promote more of the early same-sex behaviors with partners and support early masturbation using same sex images that match the believed genetically-determined sexual orientation while simultaneously inhibiting the corresponding opposite-sex behaviors.

On the other hand, understanding that the sexual orientations of adults are the product (through conditioning and sexual imprinting) of all the early sexual experiences of individuals provides a theoretical base that allows each individual to potentially modulate their own adult sexual orientations during the critical period (during which it is actively developing and evolving, Beard et al., 2015). Support for the potential for individuals modulating their adult orientations while they are still young was provided by our extensive data revealing that the images that participants used during masturbation and the partnered sexual experiences they engaged in statistically altered their predicted adult orientation (Tables 3 and 5). It is important to reiterate that the most powerful effects of conditioning on adult sexual orientation are those that operate during the critical period for development of adult sexual orientations. This critical period appears to begin as early as approximately two years of age and to taper off as adolescence merges into adulthood (Beard et al., 2015). It is also important for both victims and the therapists who treat them to be aware that early experiences with sexual partners increase the risk that the victims will engage in risky sexual behaviors. Therapy for the young victims must include provision of training in the use of birth control methods as well as techniques to avoid revictimization (Griffee et al., 2012).

### **3.1. Limitations of the study**

We will address three topics related to real and perceived limitations to this study: the nature of the sample, the perceived inability of a correlative study to establish cause and effect, and sample size. First, studies have established the validity of retrospective self-report for obtaining data on sexual behaviors (Hamilton & Morris, 2010; Hardt & Rutter, 2004). As previously mentioned, the study's pseudoprospective design (Douglas et al., 2003) allowed us to demonstrate a causal link between events that had occurred before the participants reached the age of 18 and their adult sexual orientations by collecting the necessary data from adult participants winnowed out of the large sample who been victims of the CSA or incest. Our study was based on a convenience sample that was self-selected because study participants could refuse to participate. We also deliberately oversampled the lesbian, gay, bisexual and transsexual (LGBT) population. For both of the latter reasons, our data could not be used to estimate the incidence of any variable in any defined population.

On the other hand, our showing the likelihood of the various outcomes depended on childhood experiences was far more useful than measures of incidence because the incidence of adult outcomes in defined populations would be expected to vary with the incidence of the childhood behaviors in the defined populations and to change over time as the incidence of the childhood behaviors varied. However, our sample was also a regression sample suitable for analysis of variance, covariance analysis, and regression analysis because the dependent variables were random variables (Kleinbaum, Kupper, Nizam, & Rosenberg, 2014). Our sample was also an epidemiological sample suitable for identifying risk factors via logistic regression (Hosmer & Lemeshow, 2000).

Second, it is a well-known principal that a pure correlative study cannot by itself be used to prove cause and effect (Kleinbaum et al., 2014, pp. 42–45). However, because we also had data on the time sequence of events our data was *not* purely correlational. And because time only moves in one direction, correlative relationships with one factor clearly antecedent to the other rule out the possibility that the later event caused the prior event (Douglas et al., 2003; Hill, 1965; Kleinbaum et al., 2014; Offord & Kraemer, 2000; Shadish et al., 2002; Susser, 1991). As mentioned previously, each of the forms of early CSA and incest clearly preceded the adult sexual orientations of the victims, arguing in favor of the conclusion that the CSA and childhood incest caused the adult sexual orientations rather than the reverse because the former events were antecedent to the later outcome. This leaves the possibility of some third factor, like genetics, explaining the correlative relationship (Kleinbaum et al., 2014). However, arguing against a genetic predisposition in the child-victims causing them to seek-out and be responsible for instigating the FDI, FSI, MDI, MSI, CSA-AM or CSA-AF was the fact that it is well established that it is the adult perpetrators who are responsible for instigating these forms of incest perpetrated by parents or CSA by unrelated adults, not the victims (Sheinberg & Fraekel, 2001).

A well-established epidemiological principal is that an etiological relationship can be established by a combination of evidence consisting of an epidemiologically-established predictive relationship between an antecedent putative cause and the outcome event if the mechanism of the cause and effect has been established by verifiable biological research (Hill, 1965; Susser, 1991). The three causal mechanisms explaining the effects of early same-sex and opposite-sex behaviors, whether actual or covert, on the adult sexual orientation: classical conditioning (Hoffmann, 2012; Pfaus et al., 2012), operant conditioning (Hoffmann, 2012; Pfaus et al., 2012), and sexual imprinting (Berezkei et al., 2004, 2009; Griffee et al., 2017; Irwin & Price, 1999; Seki et al., 2012; Vukovic et al., 2015) have been extensively studied in well controlled animal and human studies. Hence, the coherence of the evidence is overwhelming, and the combined evidence does establish a cause and effect relationship between the early sexual behaviors and the adult sexual orientation outcomes.

Third, although the sizes of some of the groups in the ANOVA were relatively small (e.g., the MDI and CSA-AF groups in Table 1, and the FSI and MSI groups in Table 2), the control group was large enough that many of the comparisons of these small groups to the controls reached statistical significance. Furthermore, the similarity between the MDI and CSA-AF groups because of the similarity of the sex and age of the perpetrators and the similarity of the results provided additional support that the outcomes were not the result of random chance. Nevertheless, it is clear that additional studies of the effects of MDI, MSI, and CSA-AF on the victim's adult orientations would be very helpful in completely delineating the effects of these (fortunately rare) forms of CSA on the victims' adult sexual orientations.

### **3.2. Benefits of the study findings for victim therapy**

An important reason for therapists to have an accurate understanding of the true mechanisms creating the adult orientations of humans and also the mechanisms underlying compulsive sexual behavior is that therapists working with child and adolescent victims can provide those victims with accurate information about the potential sexual-orientation and compulsive sexual behavior effects of the incest or CSA that the victims have suffered. Additionally, the therapists can also provide ways young victims can lessen that impact through future choices that the victims make in their covert behaviors such as the future choices of the fantasy and visual aids they use during masturbation, the future choices they make in literature and entertainment, and the future choices they make related to sexual behaviors with partners while they are still within the critical period during which their adult sexual orientation is being developed (Beard et al., 2015). Providing the victims with accurate information should be highly therapeutic by allowing victims to gain control of their own destiny (King, Wardecker, & Edelstein, 2015).



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### References

Alhamad, A. M. (2013). Impact of childhood sexual abuse on adult sexual orientation in a group of Saudi males. *European Psychiatry*, 28, 1. doi:10.1016/j.eurpsy.2011.07.002

Bailey, M. J., Dunne, M. P., & Martin, N. G. (2000). Genetic and environmental influences on sexual orientation and its correlates in an Australian twin sample. *Journal of Personality and Social Psychology*, 78, 524–536.

Beard, K. W., Griffee, K., Newsome, J. E., Harper-Dorton, K. V., O'Keefe, S. L., Linz, T. D., ... Nichols, A. (2017). Father-daughter incest: Effects, risk-factors, and

a proposal for a new parent-based approach to prevention. *Sexual Addiction & Compulsivity*, 24, 79–107. doi:10.1080/10720162.2017.1306467

Beard, K. W., O'Keefe, S. L., Swindell, S., Stroebel, S. S., Griffee, K., Young, D. H., & Linz, T. D. (2013). Brother-brother incest: Data from anonymous computer-assisted self-interviews. *Sexual Addiction & Compulsivity*, 20, 217–253. doi:10.1080/10720162.2013.807483

Beard, K. W., Stroebel, S. S., O'Keefe, S. L., Harper-Dorton, K. V., Griffee, K., Young, D. H., ... Campbell, N. M. (2015). Childhood and adolescent sexual behaviors predict adult sexual orientations. *Cogent Psychology*, 2, 1067568. doi:10.1080/23311908.2015.1067568

Berezkei, T., Gyuris, P., & Weisfeld, G. E. (2004). Sexual imprinting in human mate choice. *Proceedings of the Royal Society B: Biological Sciences*, 271, 1129–1134. doi:10.1098/rspb.2003.2672

Berezkei, T., Hegedus, G., & Hajnal, G. (2009). Facialmetric similarities mediate mate choice: Sexual imprinting on opposite-sex parents. *Proceedings of the Royal Society B: Biological Sciences*, 276, 91–98. doi:10.1098/rspb.2008.1021

Bickham, P. J., O'Keefe, S. L., Baker, E., Berhie, G., Kommer, M. J., & Harper-Dorton, K. V. (2007). Correlates of early overt and covert sexual behaviors in heterosexual women. *Archives of Sexual Behavior*, 36, 724–740. doi:10.1007/s10508-007-9220-1

Brookey, R. A. (2001). Bio-rhetoric, background beliefs and the biology of homosexuality. *Argumentation and Advocacy*, 37, 171–183. doi:10.1080/00028533.2001.11951668

Brookey, R. A. (2002). *The rhetoric and power of the gay gene*. Bloomington, IN: Indiana University Press.

Cheyenne8311, Risatofu, JunnyJai, Shanmom2883, Burgdoffs, Inkedmom94,...Trainwreck07. (2016, December 14). What age do boy/girl siblings stop bathing together? Retrieved from <https://community.babycenter.com/post/a65059693/what-age-do-boygirl-siblings-stop-bathing-together>

Chilali, C., Butterflyjuju, C., & KyMom, L. (2011, January 22). How old is too old for same sex kids to bathe together? Retrieved from [https://community.babycenter.com/post/a26063399/how\\_old\\_is\\_too\\_old\\_for\\_same\\_sex\\_kids\\_to\\_bathe\\_together?cpg=2](https://community.babycenter.com/post/a26063399/how_old_is_too_old_for_same_sex_kids_to_bathe_together?cpg=2)

Damato, E. G., Brubaker, J. A., & Burant, C. (2012). Sleeping arrangements in families with twins. *Newborn and Infant Nursing Reviews*, 12, 171–178. doi:10.1053/j.nainr.2012.06.001

Desmarais, C., Roeber, B. J., Smith, M. E., & Pollak, S. D. (2012). Sentence comprehension in postinstitutionalized schoolage children. *Journal of Speech, Language, and Hearing Research*, 55, 45–54. doi:10.1044/1092-4388(2011/10-0246)

Douglas, K. S., Otto, R. K., & Borum, R. (2003). Clinical forensic psychology. In I. B. Weiner, J. A. Schinka, & W. F. Velicer (Eds.), *Handbook of psychology, research methods in psychology* (Vol. 2, pp. 189–211). Hoboken, NJ: Wiley.

Finkelhor, D. (1984). *Child sexual abuse: New theory and research*. New York, N.Y.: The Free Press.

Fox, N. A., & Rutter, M. (2010). Introduction to the special section on the effects of early experience on development. *Child Development*, 81, 23–27. doi:10.1111/cdev.2010.81.issue-1

Fox, S. E., Levitt, P., & Nelson, C. A. (2010). How the timing and quality of early experiences influence the development of brain architecture. *Child Development*, 81, 28–40. doi:10.1111/cdev.2010.81.issue-1

Goodwin, J., & DiVasto, P. (1979). Mother–Daughter incest. *Child Abuse & Neglect*, 3, 953–957. doi:10.1016/0145-2134(79)90132-7

- Goodwin, J., & DiVasto, P. (1989). Female homosexuality: A sequel to mother–Daughter incest. In J. M. Goodwin (Ed.), *Sexual abuse: Incest victims and their families* (pp. 140–146). Chicago, IL: Year Book Medical Publishers.
- Greenberg, A. S., & Bailey, J. M. (1993). Do biological explanations of homosexuality have moral, legal, or policy implications? *Journal of Sex Research*, 30, 245–251. doi:10.1080/00224499309551708
- Griffee, K., O’Keefe, S. L., Beard, K. W., Young, D. H., Kommer, M. J., & Linz, T. D. (2014a). Human sexual development is subject to critical period learning: Paradigm shifting implications for sexual therapy and for child rearing. *International Journal of Sexual Health*, 26, 295–313. doi:10.1080/19317611.2014.898725
- Griffee, K., O’Keefe, S. L., Beard, K. W., Young, D. H., Kommer, M. J., Linz, T. D., ... Stroebe, S. S. (2014b). Human sexual development is subject to critical period learning: Implications for sexual addiction, sexual therapy, and for child rearing. *Sexual Addiction & Compulsivity*, 21, 114–169. doi:10.1080/10720162.2014.906012
- Griffee, K., O’Keefe, S. L., Stroebe, S. S., Beard, K. W., Swindell, S., & Young, D. H. (2012). On the brink of paradigm change? Evidence for unexpected predictive relationships among sexual addiction, masturbation, sexual experimentation, and revictimization, child sexual abuse, and adult sexual risk. *Sexual Addiction & Compulsivity: the Journal of Treatment & Prevention*, 19, 225–264. doi:10.1080/10720162.2012.705140
- Griffee, K., Stroebe, S. S., O’Keefe, S. L., Harper-Dorton, K. V., Beard, K. W., Young, D. H., ... Kuo, S.-Y. (2017). Sexual Imprinting of Offspring on their Parents and Siblings. *Cogent Psychology*, 4, 1307632. doi:10.1080/23311908.2017.1307632
- Griffee, K., Swindell, S., O’Keefe, S. L., Stroebe, S. S., Beard, K. W., Shih-Ya Kuo, S.-Y., & Stroupe, W. (2016). Etiological risk factors for sibling incest: Data from an anonymous computer-assisted self-interview. *Sexual Abuse: A Journal of Research and Treatment*, 28, 620–659. doi:10.1177/1079063214558941
- Hamer, D. H., Hu, S., Magnuson, V. L., Hu, N., & Pattatucci, A. M. L. (1993). A linkage between DNA markers on the X chromosome and male sexual orientation. *Science*, 261, 321–327. doi:http://dx.doi.org/10.1126/science.8332896
- Hamilton, D. T., & Morris, M. (2010). Consistency of self-reported sexual behavior in surveys. *Archives of Sexual Behavior*, 39, 842–860. doi:10.1007/s10508-009-9505-7
- Hardt, J., & Rutter, M. (2004). Validity of adult retrospective reports of adverse childhood experiences: Review of the evidence. *Journal of Child Psychology and Psychiatry*, 45, 260–273. doi:10.1111/jcpp.2004.45.issue-2
- Hayward, K. M., Johnston, C. C., Campbell-Yeo, M., . L., Price, S. L., Houk, S. L., Whyte, R. K., ... Caddell, K. E. (2015). Effect of cobedding twins on coregulation, infant state, and twin safety. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 44, 193–202. doi:10.1111/1552-6909.12557
- Hill, A. B. (1965). The environment and disease: Association or causation. *Proceedings of the Royal Society of Medicine*, 58, 295–300.
- Hoffmann, H. (2012). Considering the role of conditioning in sexual orientation. *Archives of Sexual Behavior*, 41, 63–71. doi:10.1007/s10508-012-9915-9
- Hosmer, D. W., & Lemeshow, S. (2000). *Applied logistic regression* (2nd ed.). New York, NY.: Wiley.
- Hutchison, L., Stewart, A. W., & Mitchell, E. A. (2010). The prevalence of cobedding and SIDS-related child care practices in twins. *European Journal of Pediatrics*, 169, 1477–1485. doi:10.1007/s00431-010-1185-8
- Irwin, D. E., & Price, T. (1999). Sexual imprinting, learning, and speciation. *Heredity*, 82, 347–354. doi:http://dx.doi.org/10.1038/sj.hdy.6885270
- Johnson, R. L., & Shrier, D. K. (1985). Sexual victimization of boys: Experience at an adolescent medicine clinic. *Journal of Adolescent Health Care*, 6, 372–376.
- Kelly, R. J., Jeffrey 1. Wood, J., . J., Gonzalez, L. S., MacDonald, V., & Waterman, J. (2002). Effects of mother-son incest and positive perceptions of sexual abuse experiences on the psychosocial adjustment of clinic-referred men. *Child Abuse & Neglect*, 26, 425–441. doi:10.1016/S0145-2134(02)00317-4
- King, A., Wardecker, B. M., & Edelstein, R. S. (2015). Personal mastery buffers the effects of childhood sexual abuse on women’s health and family functioning. *Journal of Family Violence*, 30, 887–897. doi:10.1007/s10896-015-9728-4
- King, M., & McDonald, E. (1992). Homosexuals who are twins: A study of 46 probands. *The British Journal of Psychiatry*, 160, 407–409. doi:10.1192/bjp.160.3.407
- Kinsey, A. C., Reichert, P., Cauldwell, D. O., & Mozes, E. B. (1955). The causes of homosexuality: A symposium. *Sexology*, 21, 558–562.
- Klein, F. (1990). The need to view sexual orientation as a multivariable dynamic process: A theoretical perspective. In D. P. McWhirter, S. A. Sanders, & J. M. Reinisch (Eds.), *Homosexuality/heterosexuality: Concepts of sexual orientation* (pp. 277–282). New York, NY: Oxford University Press.
- Kleinbaum, D. G., Kupper, L. L., Nizam, A., & Rosenberg, E. S. (2014). *Applied regression analysis and other multivariate methods* (5th ed.). Boston, MA: Cengage Learning.
- M.M., L.W., J.S., B.K., S.D., M.S., ... L.P. (2008, November 5). How long is it ok for siblings to sleep in the same room? Retrieved from <https://www.mamapedia.com/article/how-long-is-it-ok-for-siblings-to-sleep-in-the-same-room>
- Maricel, T., Shannon, J., & Heather, C. (2010, March 22). Are your twins sleeping together or separately? [Online forum comments by 43 parents]. Retrieved from <https://www.circleofmoms.com/twins/are-your-twins-sleeping-together-or-separately-507315>
- Mendel, M. P. (1995). *The male survivor*. Thousand Oaks, CA: Sage.
- O’Keefe, S. L., Beard, K. W., Swindell, S., Stroebe, S. S., Griffee, K., & Young, D. H. (2014). Sister-brother incest: Data from anonymous computer-assisted self-interviews. *Sexual Addiction & Compulsivity*, 21, 1–38. doi:10.1080/10720162.2013.877410
- Offord, D. R., & Kraemer, H. C. (2000). Risk factors and prevention. *Evidence-Based Mental Health*, 3, 30–71. doi:10.1136/ebmh.3.3.70
- Pfaus, J. G., Kippin, T. E., Coria-Avila, G. A., Gelez, H., Afonso, V. M., Ismail, N., & Parada, M. (2012). Who, what, where, when (and maybe even why)? How the experience of sexual reward connects sexual desire, preference and performance. *Archives of Sexual Behavior*, 41, 31–62. doi:10.1007/s10508-012-9935-5
- Reynolds, M. A., Herbenick, D. L., & Bancroft, J. (2003). The nature of childhood sexual experiences: Two studies 50 years apart. In Bancroft (Ed.), *Sexual development in childhood* (pp. 134–155). Bloomington, IN: Indiana University Press.
- Rice, G., Anderson, C., Risch, N., & Ebers, G. (1999). Male homosexuality: Absence of linkage to microsatellite markers at Xq28. *Science*, 284, 665–667. doi:http://dx.doi.org/10.1126/science.284.5414.665

- Robinett, S. R. (2012). *Covert behaviors occurring in childhood and adolescence: Predictors of adult sexual orientation and sexual identity* (Theses, Dissertations and Capstones). Paper 338. Retrieved from <http://mds.marshall.edu/etd/338>
- Rosencrans, B. (1997). *The last secret: Daughters sexually abused by mothers*. Brandon, VT: Safer Society Press.
- Ruddy, E. Z. (2018, April 25). Coed baths: When does it go from cute to creepy? Retrieved from <https://www.parenting.com/blogs/true-mom-confessions/coed-baths-when-does-it-go-cute-creepy>
- Sanders, A. R., Martin, E. R., Beecham, G. W., Guo, S., Dawood, K., Rieger, G., & Bailey, J. M. (2015). Genome-wide scan demonstrates significant linkage for male sexual orientation. *Psychological Medicine*, 45, 1379–1388. doi:10.1017/S0033291714002451
- Seki, M., Ihara, Y., & Aoki, K. (2012). Homogamy and imprinting-like effect on mate choice preference for body height in the current Japanese population. *Annals of Human Biology*, 39, 28–35. doi:10.3109/03014460.2011.635695
- Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston, MA: Houghton Mifflin Company.
- Sheinberg, M., & Fraekel, P. (2001). *The relational trauma of incest*. New York, NY: The Guilford Press.
- Simari, C. G., & Baskin, D. (1984). Incestuous experiences within lesbian and male homosexual populations: A preliminary study. *Child Psychiatry Quarterly*, 17, 21–40.
- Simpson, J. A., & Rholes, W. S. (1998). Attachment in adulthood. In J. A. Simpson & W. S. Rholes (Eds.), *Attachment theory and close relationships* (pp. 3–21). New York, NY: Guilford Press.
- Storms, M. D. (1980). Theories of sexual orientation. *Journal of Personality and Social Psychology*, 38, 783–792. doi:10.1037/0022-3514.38.5.783
- Storms, M. D. (1981). A theory of erotic orientation development. *Psychological Review*, 88, 340–353. doi:10.1037/0033-295X.88.4.340
- Stroebe, S. S., O’Keefe, S. L., Beard, K. W., Kuo, S., Swindell, S., & Kommor, M. J. (2012). Father-daughter incest: Data from an anonymous computerized survey. *Journal of Child Sexual Abuse*, 21, 176–199. doi:10.1080/10538712.2012.654007
- Stroebe, S. S., O’Keefe, S. L., Beard, K. W., Kuo, S., Swindell, S., & Sroufe, W. (2013a). Brother-sister incest: Data from anonymous computer assisted self interviews. *Journal of Child Sexual Abuse*, 22, 1–22, 2013. doi:10.1080/10538712.2013.743952
- Stroebe, S. S., O’Keefe, S. L., Griffiee, K., Kuo, S., Beard, K. W., & Kommor, M. J. (2013b). Sister-sister incest: Data from an anonymous computerized survey. *Journal of Child Sexual Abuse*, 22, 695–719. doi:10.1080/10538712.2013.811140
- Susser, M. W. (1991). What is a cause and how do we know one? A grammar for pragmatic epidemiology. *American Journal of Epidemiology*, 133, 635–648. doi:10.1093/oxfordjournals.aje.a115939
- Talanroo0807, PDMcKay, Natalie5, Waitking ForMyRuca, Moma2aj&ej,...Everleighh. (2009, November 2). When are siblings too old to bath together? Retrieved from [https://community.babycenter.com/post/a17738645/when\\_are\\_siblings\\_too\\_old\\_to\\_bath\\_together](https://community.babycenter.com/post/a17738645/when_are_siblings_too_old_to_bath_together)
- Thorpe, K., Rutter, M., & Greenwood, R. (2003). Twins as a natural experiment to study the causes of mild language delay: II: Family interaction risk factors. *Journal of Child Psychology and Psychiatry*, 44, 342–355. doi:10.1111/jcpp.2003.44.issue-3
- Twiniversity. (2016, February 25). Bathtime for two: Tips to make bathing twins easier. Retrieved from <https://www.twiniversity.com/2016/02/bathtimefortwotipstomakebathingtwineasier/>
- Uylings, H. B. M. (2006). Development of the human cortex and the concept of “critical” or “sensitive” periods. *Language Learning*, 56, 59–90. doi:10.1111/j.1467-9922.2006.00355.x
- Van Wyk, P. H., & Geist, C. S. (1984). Psychosocial development of heterosexual, bisexual, and homosexual behavior. *Archives of Sexual Behavior*, 13, 505–544. doi:<http://dx.doi.org/10.1007/BF01542088>
- Vukovic, J., Boothroyd, L. G., Meins, E., & Burt, D. M. (2015). Concurrent parent–Child relationship quality is associated with an imprinting-like effect in children’s facial preferences. *Evolution and Human Behavior*, 36, 331–336. doi:10.1016/j.evolhumbehav.2015.03.004
- Whalen, R. E., Geary, D. C., & Johnson, F. (1990). Models of sexuality. In D. P. McWhirter, S. A. Sanders, & J. M. Reinisch (Eds.), *Homosexuality/heterosexuality: Concepts of sexual orientation* (pp. 61–70). New York, NY: Oxford University Press.
- Yates, A. (1982). Children eroticized by incest. *American Journal of Psychiatry*, 139, 482–485. doi:10.1176/ajp.139.4.482
- Your twins’ bath time. (2015, February 27). Retrieved from <https://www.whattoexpect.com/first-year/baby-care/your-twins-bath-time.aspx>
- Zucker, K. J. (2003). The politics and science of “reparative therapy”. *Archives of Sexual Behavior*, 32, 399–402. doi:10.1023/A:1025691310172

## Appendix A.

Items from the CASI program S-SAPE1©S-SAPE, LLC reproduced by permission of S-SAPE, LLC, 2002, P.O. Box 11081, Charleston, WV 25339 appear within this appendix in quotation marks. To reuse items, permission must be obtained from the rights holder.

**Sexual behavior screen.** The screen showed each *behavior* item, showing also whether it was voluntary or coerced. The age of the respondent at the time, sex of the partner, and the age-differential category were also shown. The *behavior* items were presented in a hierarchically structured multi-tiered format.

**Items for behaviors during sex with partners.** B183 and B216 below are second-tier screening questions that allowed access to third-tier questions only if they were answered affirmatively. B183 and B216, below, are shown as examples that described CSA by an adult male.

B183. “Your age range: 1–17 years; Behavior: Sexual experimentation of any kind with a male age 18 or older and more than 4 years older than yourself. Give your best guess for numbers—don’t get hung up on being precise!”

B216. “Your age range: 1–17 years; Behavior: Coerced sexual situations of any kind with a male age 18 or older and more than 4 years older than yourself. Give your best guess for numbers—don’t get hung up on being precise!”

Four age-differential categories were presented to the participants in the following order: (a) The partner was within 4 years of the respondent’s age, (b) The partner was more than 4 years older but under 18, (c) The partner was more than 4 years older and over 18 (as shown in items 1 and 2), and (d) The partner was more than 4 years younger. Paired with four partner age differentials and both sexes, the derived items form 16 analogous items that describe sexual behaviors that occurred before study participants reached 18. By inserting of 18–99 for “Your age range,” “age 18 or older” for the partner’s age, and both male and female sexes, the items analogous to B183 and B216 each describe sexual behaviors of participants as adults with other adults.

**Sexual behavior sub-items.** The following actual prompts were used in the sexual behavior

screen to obtain the data used in sub-item variables.

- (a) “Did you ever engage in this behavior in this age range?” (No/Yes coded 0/1)
- (b) “Number of partners:”
- (c) “On about how many occasions did you engage in this behavior?”
- (d) and
- (e) “What were the earliest and latest ages in the ‘(applicable age range)’ age interval that you engaged in this behavior?”
- (f) “Was mother involved” or “Was father involved” These questions were only asked when the partner described in the item was more than four years older and over age 18 and of the female sex (for mother) or the male sex (for father), respectively. (No/Yes coded 0/1)
- (g) “Was sister involved?” (for female partners) or “Was brother involved?” (for male partners) was asked for all partner-age categories. (No/Yes coded 0/1)

**The male sexual orientation scale (MSOS) and the female sexual orientation scale (FSOS).** The items of the MSOS and the FSOS are all based on items and behaviors from S-SAPE1©S-SAPE, LLC 2002, P.O. Box 11081, Charleston, WV 25339. The range of the possible scores on both scales runs from a minimum of zero to a maximum of 12. Higher scores on the MSOS indicate a higher orientation toward sex with males. Higher scores on the FSOS indicate a higher orientation toward sex with females. Based on the data from the current study, the alphas of the MSOS were .959 and .710 in the male and female participants, respectively. The alphas of the FSOS were .843 and .857 in the male and female participants, respectively.

The FSOS and MSOS scales used in this paper, by Stroebe et al. (2013b), and by Beard et al. (2013), and Beard et al. (2015)) provide orthogonal measures of sexual orientation (Beard et al., 2013; Bickham et al., 2007; O’Keefe et al., 2014; Robinett, 2012; Storms, 1980; Stroebe et al., 2013; Whalen et al., 1990). What is meant by “orthogonal” is that the orientations toward sex with same-sex partners and opposite-sex partners were analyzed as independent variables that could be represented graphically on orthogonal coordinates.

Both scales were designed to be continuous scales with possible scores of 0–12 based on twelve items that described a wide range of overt and covert sexual behaviors (Beard et al., 2013,



2015; Stroebe et al., 2013). The items were selected based on the view of behavioral sexual orientation as a multivariable dynamic process, as envisioned by Klein (1990). They were covert in that the scale items described overt or covert behaviors rather than a self-identified sexual orientation. Furthermore, the scale items were, in most instances, not contiguous with each other. Instead, they were designed to look like they were semi-randomized among multiple unrelated items and not to appear to be part of a scale. The items for the two scales are described in Appendix B, with the brief paraphrased wording describing that for the FSOS. As can be seen in Appendix B, the items for the two scales are parallel, but each of the 12 items for the two scales reflects either a female-oriented or a male-oriented behavior for the FSOS or MSOS, respectively. The items below tap into sexual behaviors with partners (E320, E330, P17, P27, S21, and S92), fantasy behaviors while with a sexual partner (P26), fantasy behaviors while masturbating (P28), sex of content of sexual dreams (P31), sex of the physical images used while masturbating (E315 and E316), sex of most effective voyeuristic focus (P21, S57, and S93), sex of most effective sexually arousing picture (P23), and sex of residential partner (P39).

Four item pairs (item numbers 1, 2, 11, and 12 in the left hand column of Appendix B) (S21, B315, S57, and B320 in the FSOS) or (S92, B316, S95, and B330, in the MSOS) can be scored as “1” in both the MSOS and the female sexual orientation scale (FSOS) because different items are used in the two scales. The eight other items can only be scored as “1” on either the MSOS or the FSOS, but not in both scales. Those later eight choices were presented as competing superlatives by basing them on multiple choice items as illustrated by the different choice entered following the underscore (e.g., P17\_1 vs P17\_2 for item 3 in Appendix B) and also by the coding statements below. As a result, a participant with a (maximal) score of 12 on one of the two scales could achieve (at most) a score of four on the other scale. Simultaneous scores of “0” (asexual) or “6” (evenly balanced bisexual) are possible on both scales. The FSOS and MSOS scales can assign non-zero scores to participants who have never been sexually active with a partner of either sex based on their answers to items that do not involve behaviors with actual partners. The FSOS and MSOS scales take no account of an individual’s self-identified sexual

orientation, a different parameter also ascertained by the S-SAPE1 survey program. The item numbers beginning with “E” (ever) were encountered in the sexual behavior screen, followed by the “Preference” (“P”) items presented with multiple choices, which were in turn followed by the statement (“S”) items presented agree/disagree. Multiple levels of screening items that served as gatekeepers (with implementation by the computer code in the sexual behavior screen) allowed participants to skip subsequent items based on their earlier answers to the screening items. The actual items appear below in the order that the participant encountered them during study participation. The items shown were preceded and followed by many other items that were not part of the FSOS or MSOS scales. For example, E12 and E13 were not part of either the FSOS or the MSOS, but they are presented in Appendix A with the other “E” variables because they were the basis of other results related to masturbation before reaching age 18. Missing numbers reflect intervening items not used in the FSOS or MSOS scales.

E12 “Your age range: 1 17 years; Behavior: (Self) masturbation involving stimulating yourself while looking at pictures or statues of adult women. Give your best guess for numbers don’t get hung up on being precise!”

E13 “Your age range: 1 17 years; Behavior: (Self) masturbation involving stimulating yourself while looking at pictures or statues of adult men. Give your best guess for numbers don’t get hung up on being precise!”

E315 “Your age range: 18–99 years; Behavior: (Self) masturbation involving stimulating yourself while looking at pictures or statues of adult women. Give your best guess for numbers don’t get hung up on being precise!”

E316 was identical to E315 except for substitution of the word “men” for the word “women.”

E320 “Your age range: 18–99 years; Behavior: Sexual relations of any kind with a female age 18 or older. Give your best guess for numbers don’t get hung up on being precise!”

E330 was identical to E320 except for replacement of the word “female” by “male.”

E12-E330, above, were coded “1” if participants had engaged in the behavior and “0” if they had not.

P17 “My favorite type of sex partner is (or would be): (1) a female (2) a male (3) this question is not applicable to me since I have never had a sex partner, and I have never thought about having a sex partner.”

P21 “When I am watching people on the street from a sexual point of view, my eye is most likely to be caught by a: (1) female adult (2) male adult (3) female child (4) male child (5) This question is not applicable to me since I never watch people on the street from a sexual point of view.”

P23 “If I were to select a pornographic picture for a scientific study that I would find sexually arousing, I would select a picture of a: (1) female adult (2) male adult (3) female child (4) male child (5) This question is not applicable to me since I would never look at a pornographic picture even for a scientific study.”

P26 “When I am with my favorite sex partner and I choose to have a sexual fantasy, I find that I can reach orgasm most easily when: (1) I concentrate on a sexual fantasy involving an adult female partner (2) I concentrate on a sexual fantasy involving an adult male partner (3) I concentrate on a sexual fantasy involving a female child (4) I concentrate on a sexual fantasy involving a male child (5) This question is not applicable to me because I have never had an orgasm with my favorite sex partner with a fantasy.”

P27 “My favorite type of sex partner is (or would be): (1) an adult female (2) an adult male (3) a female child (4) a male child (5) This question is not applicable to me since I have never had a sex partner or thought about having a sex partner of any of these types.”

P28 “When I masturbate and choose to have a fantasy, I find that I can reach orgasm most easily: (1) when I concentrate on a sexual fantasy involving an adult female partner (2) when I concentrate on a sexual fantasy involving an adult male partner (3) when I concentrate on a sexual fantasy involving a female partner who is a child (4) when I concentrate on a sexual fantasy involving a male partner who is a child

(5) This question is not applicable to me since I have never masturbated with a fantasy.”

P31 “When I wake up with a sexual dream and sexual arousal, I usually find that I have been dreaming about a sexual experience with a: (1) female adult (2) male adult (3) female child (4) male child (5) I have never been aware of having a sexual dream of any type.”

For P17 through P31 above in the FSOS, answer 1 was recoded to 1 and all other answers were recoded to “0”. For P17 through P31 above in the MSOS, answer 2 was recoded to 1 all other answers were recoded to “0”.

P39 “The best way to describe my current living arrangement is: (1) I am living with a female to whom I am legally married. (2) I am living with a male to whom I am legally married. (3) I am living with a female long term partner to whom I am not legally married. (4) I am living with a male long term partner to whom I am not legally married. (5) I am living by myself or with someone to whom I am not married and do not have a sexual relationship with.”

For P39 in the FSOS, answers 1 and 3 were recoded to 1 and all other answers were recoded to “0”. For P39 in the MSOS, answers 2 and 4 were recoded to 1 and all other answers were recoded to “0”.

S21 I have cheated on my spouse or long term partner by having sex with women during our relationship.

S57 I have sometimes found myself going out of my way to try to view more of a woman’s body than she would approve of if she knew that I was looking.

S92 Worded identically to S21 except for substitution of “men” for “women”.

S93 Worded identically to S57 except for substitution of “man’s” for “woman’s”.

S21-S93, above were coded “1” for agree and “0” for disagree.

**Self-identified sexual orientation.** We used item P94 “The best way to describe how open and honest I am about my sexual preference

is: (1) All my friends and family know that I am straight, and that is what I am. (2) All my friends and family know that I am gay, lesbian, bisexual, or transgendered, and that is what I am. (3) Some of my friends or family still think that I am straight, but actually I know that I am really gay, lesbian, bisexual, or transgendered. (4) My friends and family

mostly think that I am straight, but I am really mixed up about whether I am straight or gay, lesbian, bisexual, or transgendered. (5) I have no sexual preference, and I have never engaged in any sort of sex with a partner." The data of participants who selected choices "2" or "3" were recoded to "1." All other answers were recoded to "0".

## Appendix B

The alphas (Cronbach) for the FSOS were .857 and .841 in females and males, respectively. The alphas for the MSOS were .711 and .958 in females and males, respectively. <sup>1</sup>The number of potential choices from which the participants were able to select their answer. The two-choice items were presented agree/disagree (or yes/no for behavior participation), and the MSOS and FSOS items were different items. The three-choice items offered adult male or female choices scored 0/1 and presented a third choice denying that they were living with a sex partner or had any interest in partner sex scored "0". The five-choice items offered adult male or female choices (scored 0/1) and in addition they offered male children, female children, and a fifth choice denying that they had such an experience or interest (with

the latter three all scored "0"). <sup>2</sup>The percent are for those among the 1,556 male participants agreeing with the statement, engaging in the behavior, or selecting the choice. The corresponding percent for "not" can be found by subtraction. <sup>3</sup>The percent are for those among the 2,828 female participants agreeing with the statement, engaging in the behavior, or selecting the choice. <sup>4</sup>For the MSOS substitute "male" or "men" for "female" or "women", respectively. <sup>5</sup>For the MSOS substitute "male." The order in which participant encountered the items making up the scale was as follows. The "E" items were encountered in the sexual behavior screen, followed by the "P" "Preference" items presented with multiple choices, followed by the "S" statement items presented agree/disagree. For the "P" items, the numbers following the underscore indicate the choice or choices recoded to "1" for scoring. All other choices were recoded to "0."



**Appendix B. Components for FSOS and MSOS adult sexual orientation scales, reliability, and the frequency of answers among the participants**

	Components worded for FSOS	---Items---			---Males---			---Females---		
		FSOS	MSOS	Choices <sup>1</sup>	FSOS % yes <sup>2</sup>	MSOS % yes <sup>2</sup>	FSOS % yes <sup>3</sup>	MSOS % yes <sup>3</sup>		
1	Has masturbated while looking at images of adult women <sup>3</sup>	E315	E316	2	73.3	11.8		23.0		
2	Engaged in sexual relations of any kind with an adult female <sup>4</sup>	E320	E330	2	75.7	9.9	14.3	82.8		
3	Favorite type of sex partner is a female <sup>4</sup>	P17_1	P17_2	3	89.5	7.8	4.7	91.5		
4	When watching people on the street, his eye is most likely to be caught by an adult female <sup>4</sup>	P21_1	P21_2	5	87.0	8.2	9.3	79.9		
5	Most sexually arousing picture: female <sup>4</sup> adult	P23_1	P23_2	5	89.1	8.2	20.7	65.1		
6	Sexual fantasy involving an adult female <sup>4</sup> partner is the fantasy topic that best facilitates orgasm while with a favorite partner	P26_1	P26_2	5	67.6	6.9	8.9	52.3		
7	Favorite type of sex partner is an adult female <sup>4</sup>	P27_1	P27_2	5	88.9	7.6	5.3	90.8		
8	Sexual fantasy involving an adult female <sup>4</sup> partner is the fantasy topic that best facilitates orgasm while masturbating	P28_1	P28_2	5	83.8	8.4	11.7	55.0		
9	Sexual dreams are usually about experiences with a female <sup>4</sup> adult	P31_1	P31_2	5	87.6	8.2	6.6	79.2		
10	Currently living with a female long term partner <sup>5</sup>	P39_13	P39_24	3	23.0	2.0	1.8	25.2		
11	Cheated on her spouse or long-term partner by having sex with women <sup>4</sup>	S21	S92	2	20.0	6.3	3.1	12.8		
12	Has engaged in voyeurism directed at women <sup>4</sup>	S57	S95	2	51.3	9.3	9.4	22.9		



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