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Pocket ACE: Neglect of Child Sexual Abuse Survivors in the ACEs Study Questionnaire

A thesis

presented to

the faculty of the Department of Psychology

East Tennessee State University

In partial fulfillment

of the requirements for the degree

Master of Arts in Clinical Psychology

by

Robyn A. Dolson

May 2019

Dr. Diana Morelen, Chair

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Dr. Julia Dodd

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Trauma

ABSTRACT

Pocket ACE: Neglect of Child Sexual Abuse Survivors in the ACEs Study Questionnaire

by

Robyn A. Dolson

In 1998, a seminal study on adverse childhood experiences (ACEs) and subsequent health risks catapulted ACEs and the study questionnaire into the zeitgeist. However, its childhood sexual abuse (CSA) item is problematic as it requires the perpetrator have been 5-years or older than the victim. To assess whether some survivors' CSA is not identified by the current item, whether their exclusion prevents access to services requiring a four-threshold ACE score, and how their health outcomes compared to other CSA groups and controls, an international sample of 974 women completed an online survey assessing their current health and CSA history using the original item and an experimental item without the 5-year modifier. Results indicated many CSA survivors are not identified by a 5-year modifier, exclusion has service implications for some, and on most variables, they had increased adverse health outcomes compared to controls. Means of assessing CSA must be thoughtfully revised.

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CHAPTER 1

INTRODUCTION

A Brief Introduction to ACES

Twenty years ago, a joint research effort by Kaiser Permanente and the Centers for Disease Control (CDC) set out to streamline the conceptualization of negative childhood experiences and their relationships to adverse health outcomes in adulthood (Felitti et al., 1998). Their effort hypothesized that the number of stressful events experienced in childhood, or as they would come to be known, “adverse childhood experiences” or “ACEs,” would be positively correlated with poorer physical and mental health outcomes (Felitti et al., 1998). To assess ACEs, the ACE Study Questionnaire was created. Originally a 17-item measure, its most recent iteration has been consolidated into 10 items (Redding, Felitti, & Anda, n.d.). This 10-item version is the original 17-item version verbatim but uses “ORs” to combine what was once two items into one. A score of four on the ACE Study Questionnaire emerged as the threshold for predictably negative outcomes, with a graded increase in risk corresponding with each endorsement past four (Felitti et al., 1998). From the ACEs data, Felitti and colleagues (1998) concluded that exposure to these adverse experiences could impair social, emotional, and cognitive development. In turn, deficits in social, emotional, and/or cognitive functioning could facilitate the adoption of risky behaviors that heighten susceptibility to disease and social problems, creating a pathway from ACEs to risk for premature mortality (see Figure 1) (Felitti et al., 1998).

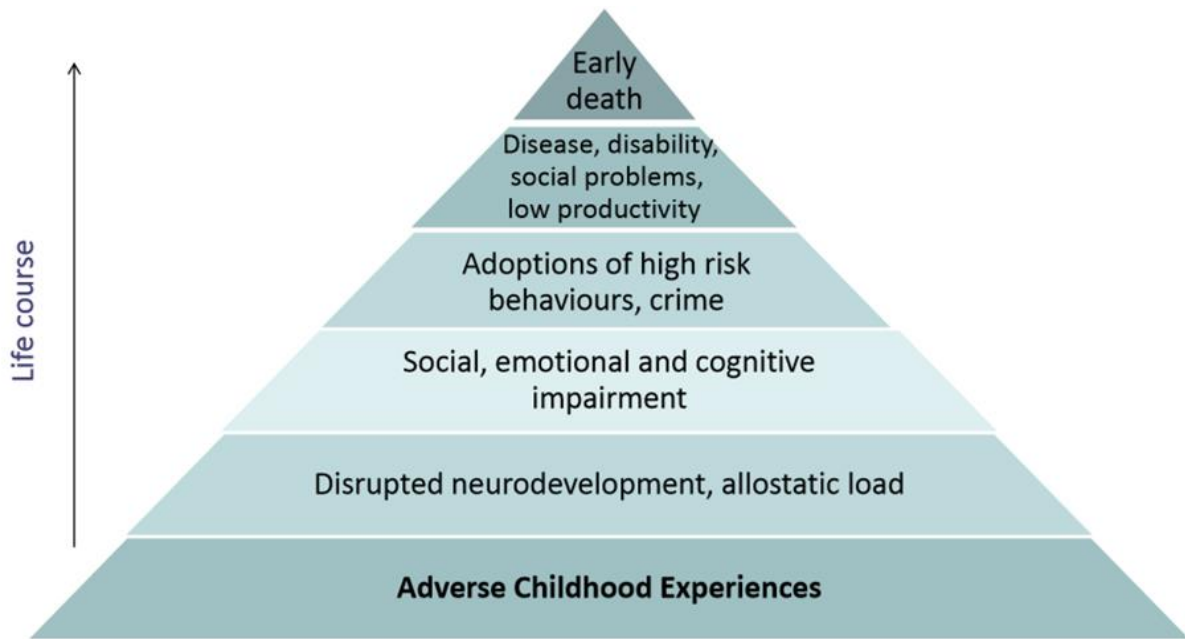


Figure 1. Proposed mechanism for ACEs exposure and early mortality. Reprinted from Adverse Childhood Experiences, In *Peopletoo*, June 14, 2018., Retrieved March 8, 2019, from <https://www.peopletoo.co.uk/adverse-childhood-experiences-aces/>.

Twenty years since the term “ACEs” was coined to encapsulate this relationship between early risk factors and later negative outcomes, the impact of trauma and stress on human health has become increasingly understood and the role of these experiences in early life, readily studied. At the heart of this research influx is the ACEs Study Questionnaire; with so many clinical and research implications tied to it, it is essential to better understand its psychometric properties and their possible impact on its current uses. Broadly, our study aims to evaluate whether the wording assessing a particular ACE, childhood sexual abuse (CSA), on the ACE Study Questionnaire prevents the identification of some survivors whose sexual abuse experiences may not have aligned with the wording of the item, what implications this has for this group accessing services, and whether this potentially missed group has comparably poorer health outcomes compared to other CSA-endorsing-groups and those who have never experienced CSA.

ACEs Threshold and Health Outcomes

Felitti and colleagues (1998) found four ACE item endorsements to be an important threshold of ill effects. Additionally, they observed a graded response of ACE exposure for mental and physical health outcomes assessed by self-report and chart review.

Health outcomes were assessed via chart review and amalgamated items drawn from national measures at the time. The mental health outcome of anxiety was assessed using an item from the Behavioral Risk Factor Survey which asked respondents how often in the past 30 days they had felt anxious and depression was assessed using items from the Diagnostic Interview Schedule of the National Institute of Mental Health based on the DSM-III (Felitti et al., 1998). Participants perceptions of their own health was also gathered; this was assessed by asking participants how healthy they believed themselves to be and providing a Likert response scale.

Chart review, general health screening, and items from the Third National Health and Nutrition Examination Survey were used to assess smoking, suicidality, obesity, sedentary lifestyle, cancer, diabetes, substance abuse, risky sexual behavior, stroke, hepatitis, jaundice, and heart disease (Felitti et al., 1998). These, in addition to all other physical and mental health outcome variables used in the ACE study were selected because they were the leading causes of death in the US at the time rather than being based on empirical theory (Felitti et al., 1998).

However, empirical research on the physical and psychological outcomes of trauma offer retrospective scientific support for the variables used in the original ACE study. For example, McEwen's Allostatic Load Theory posits that following harm, an organism attempts to protect itself, which inadvertently creates a dysregulation in stress processing systems (McEwen, 2007). This dysregulation results in several psychobiological shifts including heightened activation in the Limbic-Hypothalamic-Pituitary-Adrenal (LHPA) Axis (De Bellis & Zisk, 2014). In turn, this

LHPA activation results in elevated levels of corticotrophin releasing hormone (CRH), thereby increasing the production of cortisol, and in some cases, cerebrospinal fluid (De Bellis & Zisk, 2014). While this stress response is temporarily adaptive as it increases vigilance for potential threats, long term processing under these high internal stress conditions increases the likelihood of mental and physical illnesses via glucocorticoid induced genetic alteration, neuro-anatomical changes, and cortisol induced suppression of the immune system (De Bellis & Zisk, 2014). Additionally, studies using alternative questionnaires to the ACE Study Questionnaire have been able to replicate the positive relationship of childhood trauma exposure with poor mental and physical health outcomes (Boudewyn & Liem, 1995; Hillberg, Hamilton-Giachritsis, & Dixon, 2011; Kendler et al., 2000; Molnar, Buka, & Kessler, 2001; Springer, Sheridan, Kuo, & Carnes, 2003).

Current Implications of ACEs

The ACE study is now used to inform psychological research, public health policy, trauma informed training, and program funding and its questionnaire is often used as the method of assessment (National Center for Injury Prevention and Control & Division of Violence Prevention, 2016). A brief search of “Adverse Childhood Experiences” on Google Scholar yields over 681,000 results from psychology, medical, nursing, counseling, and other journals. Formal ACEs master trainer programs costing 1,500 dollars a person are now offered throughout the United States, often covered by tax dollars through state non-profits, grants, and health initiatives (Sickler, 2017). Additionally, over 64% of states use the ACE Study Questionnaire as part of an ongoing CDC program called the Behavioral Risk Factor Surveillance System (BRFSS; National Center for Injury Prevention and Control & Division of Violence Prevention, 2016).

These states also use the BRFSS information to inform their public programs and appropriation of funding (Centers for Disease Control, 2015a, 2015b, 2015c).

Critiques of the ACE Study Questionnaire

With so much money and time allocated to ACEs-based practice, policy, and research that was borne from the original study and questionnaire, it is requisite to critically evaluate its merits and investigate whether any improvements are warranted. The ACE Study Questionnaire was designed by aggregating questions from several published sources (Felitti et al., 1998). Initial item and factor analyses were never completed prior to the administration of the ACE Questionnaire in the original study (Felitti et al., 1998). Since its creation, basic psychometric analyses by others have called into question the proposed seven factors in the original study which posited two super-factors: One, a super-factor of abuse with three sub-factors and the other, a super-factor of household dysfunction with four sub-factors (Felitti et al., 1998; Ford et al., 2014). A factor analysis by Ford and colleagues (2014) found evidence for three factors that they determined to be physical/emotional abuse, sexual abuse, and household dysfunction. Given these findings, Ford and colleagues (2014) recommended three subscale scores for the ACEs. Unfortunately, factor analysis does not speak to the quality of the items nor does it address any of the numerous other criticisms of the original ACEs study that have emerged since its publication. Some of these have centered on assumption of a dual parent household, equal weighting of each ACE regardless of type or characteristics, lack of initial theoretical or empirical grounding, and inadvertent measurement of poverty. Further, any psychometric validation established by Ford and his colleagues (2014) is undermined by a statement from Sparrow Consulting (Redding et al., n.d.). Through an official partnership with the ACE study principle investigators, Dr. Felitti and Dr. Adna, this consulting firm conducts ACEs research

and offers training and implementation consulting services for the ACEs Study Questionnaire (Redding et al., n.d.). Sparrow Consulting recommends that any objections to the wording of questions be modified by the participant when answering but does not stipulate that the participant inform the researcher of the alteration (Redding et al., n.d.). If these alterations are not being systematically recorded or controlled for, any reported reliability and validity based on the measure as printed are fatally hindered. A full evaluation of these critiques is beyond the scope of this article; instead, the focus of this study lies with the wording of the sexual abuse question which uses a 5-year modifier to narrowly define sexual assault and in doing so neglects any abuse perpetrated by someone less than five years older than the victim thereby missing all peer assaults, most assaults perpetrated by a juvenile, and many sibling assaults.

Basis for the 5-Year Modifier

The ACEs Study Questionnaire's CSA item specifically asks, "Did an adult or person at least 5-years older than you ever a) touch or fondle you or have you touch their body in a sexual way? *Or* b) try to or actually have oral, anal, or vaginal sex with you?" (Felitti et al., 1998). Felitti and colleagues cite a study by Wyatt (1985) as support for the use of the modifier "by someone at least 5-years older than you." Though Wyatt (1985) does use this wording, she also stipulates from the outset of her article that any non-consenting sexual contact between peers who do not meet this 5-year modifier should be considered sexual abuse. Given her operational definition of abuse, it is unclear why Felitti and colleagues (1998) cited Wyatt's paper as precedent for the 5-year modifier. The 5-year modifier is now widely used to CSA most often when the ACE Study Questionnaire is used but it has also diffused through the literature to appear on additional CSA assessments (Coffey, Leitenberg, Henning, Turner, & Bennett, 1996; Fuller-Thomson, Bejan, Hunter, Grundland, & Brennenstuhl, 2012; Gilbert, 1994). The true

genesis of the 5-year modifier, however, does not stem from any of the studies cited by Felitti and colleagues as rationale for its use. Rather, the true origin predates Wyatt (1985).

The modifier was put forth in the late 70's and early 80's in the form of an opinion expressed by sociologist and prominent sexual abuse researcher, David Finkelhor. In a 1984 critique of a CSA prevalence study, Finkelhor and Hotaling noted their disagreement with the study's definition of sexual abuse and offered their own. They defined CSA as sexual contact between much older persons and children (Finkelhor & Hotaling, 1984). For children 12 and under, this meant a perpetrator 5 years or older (Finkelhor & Hotaling, 1984). For children 13 and over, this meant a perpetrator 10 years or older (Finkelhor, 1979; Finkelhor & Hotaling, 1984). They argued a large age discrepancy met legal statutes in some states at the time (Finkelhor & Hotaling, 1984). While this may have aligned with contemporary law, the age criteria for the victim and perpetrator to constitute abuse is stated merely as an opinion (Finkelhor, 1979; Finkelhor & Hotaling, 1984). There is no citation or justification provided beyond preference and the authors acknowledge it as such (Finkelhor & Hotaling, 1984). Under their specification, a middle schooler having sex with a 22-year-old would not qualify as sexual abuse, consensual or not. Other work around this time by Finkelhor suggests that he conceived of sexual contact without the age discrepancy as healthy exploration or play behavior (Finkelhor, 1979). Although likely reflective of popular opinion of the time, unwanted sexual contact between peers as play or exploration is now anachronistic.

Yet, identification of childhood sexual abuse is often still assessed and classified using this dated criteria. Further, the idea that abuse only exists in the presence of an age discrepancy has persisted outside of academia, as evidenced by victims not perceiving unwanted sexual contact perpetrated by a child as abuse (Allen, Tellez, Wevodau, Woods, & Percosky, 2014).

Despite not labeling it as such, the negative outcomes typically associated with CSA and perpetrators that are five or more years older still present in CSA where the perpetrators are not five or more years older (Allen et al., 2014). Specifically, in a sample of college students who experienced CSA that were divided into groups by perpetrator age- child, teen, or adult, there were no significant differences for anxiety, depression, or sexual functioning, nor any significant differences for PTSD symptoms between perpetrator age groupings, even after controlling for psychological abuse (Allen et al., 2014). This suggests that regardless of whether unwanted sexual contact is perpetrated by someone less than 5-years older than the victim is labeled as abuse, curiosity, or play, the negative ramifications are tantamount.

Despite Finkelhor discriminating his age cut offs differently for those 12 and under from those 13 and over, once his ideas filtered through multiple publications, researchers retained only his 5-year modifier and began generalizing it to anyone under 18. While a 5-year modifier is more attuned to contemporary lay and legal conceptualizations of abuse than his initial recommendation for a 10-year modifier for survivors 13 and older, by generalizing the 5-year modifier, the ACEs Study Questionnaire and subsequent studies have fundamentally altered the very source they use as the basis. Additionally, Finkelhor himself has updated his conception of abuse to no longer require a 5-year modifier though other studies and questionnaires have not followed suit in amending their assessment wording (Finkelhor, Shattuck, Turner, & Hamby, 2014).

Theory for Child Sexual Abuse Without a 5-Year Age Gap

Many theories for CSA are based on research with perpetrators who would meet the 5-year modifier like adult perpetrators (Finkelhor, 1984; Hall & Hirschman, 1991; Marshall & Barbaree, 1990). However, some of the theoretical basis for this offending can also translate to

perpetrators who do not meet the 5-year modifier. Of the most popular explanatory models for CSA, Marshall and Barbaree's (1990) Integrated Theory of the Etiology of Sexual Offending is the most easily translated to perpetrators who do not meet the 5-year modifier. Integrated Theory conceptualizes the perpetration of abuse as a convergence of four factors: Biological, developmental, socio-cultural, and transitory situational factors (Marshall & Barbaree, 1990).

Biological. The biological factor contends that humans are oriented toward sex and aggression, perhaps even before they are cognizant of sex or aggression, and only learn to control them through experience in the world (Marshall & Barbaree, 1990). However, a young offender, as would be the case for those who are less than five years or older than their child victims, may not have been taught to control these aggressive proclivities yet or may not have had enough sexual experience yet to have practiced controlling aggression within a sexual context.

Developmental. The second factor, developmental, holds that disturbances in normal social and cognitive development due to abuse or neglect, may prevent children or adults from forming healthy connections with peers (Marshall & Barbaree, 1990). This may encourage them to seek out inappropriate relationships with parties similar in age or younger that are less likely to reject them or are unable to do so successfully. While disturbances in development do matter, when considering young perpetrators, it is also important to consider normative development. Given the underdeveloped frontal lobes of the young brain, impulse inhibition and future planning that would enable delay of gratification or conceptualization of long-term consequences are severely limited even in the best of circumstances (Romine & Reynolds, 2005). Further, the sexual aggressions posited by the biological factor of this model are supported developmentally

via Social Learning Theory which accounts for even the youngest offender's ability to learn and display aggressions (Bandura, 1978).

Socio-cultural. The socio-cultural factor pertains to ideas of gender and media encouragement of sex and violence (Marshall & Barbaree, 1990). Young perpetrators may not be fully aware of threats against their masculinity, but are likely aware that power and strength are good things to have and exposure to media that portrays this power and strength as coming from violence or violent sexual acts elucidates how even the youngest perpetrators can be molded by this factor (Marshall & Barbaree, 1990).

Transitory Situational. Finally, transitory situational factors pertain to optimal opportunities that can arise to entice a predisposed individual to act out their sexual aggressions (Marshall & Barbaree, 1990). Opportunities to be alone with a peer are pervasive for teens and children, perhaps even more-so than would be possible for an adult perpetrator and child. Unsupervised play time, partner projects, parties, and baby-sitting all provide these isolated opportunities. In adolescence, new experiences with alcohol may also serve as a transitory situation conducive to assault (Marshall & Barbaree, 1990).

Empirical Basis for Child Sexual Abuse Without a 5-year Age Gap

The Integrated Theory of the Etiology of Sexual Offending provides a means of conceptualizing CSA perpetrated by those close in age to their victims and its similarities to the well-established concept of CSA perpetrated by those five or more years older than their victims. Although age of perpetrator is not commonly assessed or systemically studied, several works suggest CSA perpetrated by those close in age to their victims is often just as damaging as CSA perpetrated by those who are not.

Multiple studies helmed by Friedrich and colleagues first investigated the quantifiable possibility of CSA perpetrated by those close in age to their victims by studying child perpetrated childhood sexual abuse (CPCSA) and sought to establish prevalence rates and possible reasons (Friedrich, 1997; Friedrich, Grambsch, Broughton, Kuiper, & Beilke, 1991). Another study found the average age of child perpetrator was 6.7 to 10 years of age (Vizard, 2006). Collectively, these early works demonstrated sexual perpetrators are not exclusively adults and that these juvenile perpetrators often target peers or younger siblings and the reason most likely stems from the developmental and transitory factors outlined in the Integrated Theory of the Etiology of Sexual Offending (Friedrich, 1997; Marshall & Barbaree, 1990).

Following the validation that perpetrators of sexual abuse can be children and teens, more recent research with survivors of CSA has made a concerted effort to differentiate perpetrator age and include child and teen as perpetrator categories. One study aggregated data from three phone surveys conducted in the United States over the past 15 years resulting in a sample of 2,293 teenagers (Finkelhor et al., 2014). Females reported lifetime prevalence rates of CSA totaling 26.60% while males reported lifetime prevalence rates of CSA totaling 5.10% (Finkelhor et al., 2014). For both female and male respondents, lifetime prevalence rates of sexual abuse exclusively by juvenile perpetrators (17.80%, F, and 3.10%, M) were higher than lifetime prevalence rates of sexual abuse exclusively by adult perpetrators (11.20%, F, and 1.90%, M) (Finkelhor et al., 2014). Further, they found that risk for sexual abuse increased as respondents entered later adolescence (Finkelhor et al., 2014). An older study attempting to construct a model of women's vulnerability to sexual victimization substantiates this with the finding that adolescence is the time of highest risk in a women's life for sexual assault regardless of whether she experienced sexual abuse prior to this period (Humphrey & White, 2000). Another study in a

metropolitan area of Michigan sampled 1,086 students in grades ranging from seventh to twelfth, asking specifically about their experiences with peers through an online survey disseminated by the school district (Young, Grey, & Boyd, 2009). They found a sexual assault prevalence of over 50% for high school girls with the majority of these being perpetrated by friends, closely followed by acquaintances, and romantic partners, and a majority of assaults having occurred on school grounds (Young et al., 2009). These findings suggest not only is late adolescence the highest risk period but also that the assaults during this period are most commonly peer on peer and will thus be missed by the 5-year modifier.

Findings drawn from studies with participants in early and middle childhood have similarly found the age gap between perpetrator and victim is most commonly inside of five years. In the majority of studies that discriminated their findings into perpetrator age, the average age of the perpetrator was 11.7 years old, with victim age averaging around 8 years old; this is only a 3 year gap and thus would not qualify for an endorsement of sexual abuse on the ACE Study Questionnaire because of its 5-year modifier (Shaw, Lewis, Loeb, Rosado, & Rodriguez, 2000). A study by Rao (2012) paired the perpetrator's age with the victim's age and found perpetrators aged 4-12 years had victims that were aged 2-12 years, perpetrators 13-15 years had victims that were aged 4-12 years, and perpetrators aged 16-19 years had victims that were aged 11-16 years. The available research suggests non-sibling perpetrators, largely belong to the same peer group as their victim regardless of whether they are in elementary, middle, or high school (Finkelhor et al., 2014; Humphrey & White, 2000; Rao, 2012; Young et al., 2009). Additionally, as so few studies that are publishing prevalence rates on CSA meaningfully discriminate perpetrator and victim age, the findings discussed are potentially an under-representation of the true prevalence of CSA that would not meet the 5 year-modifier. Thus, while the 5-year modifier

on the ACE Questionnaire can detect child, sibling, or peer perpetrated sexual abuse depending on the age of the perpetrator and the victim, it is dependent on the perpetrator being at least 5-years older than the victim and it is not sufficiently sensitive enough to capture the peer on peer assault or narrow age gap abuse that characterizes a sizable portion of sexual abuse before age 18 regardless of whether the abuse is occurring in childhood or adolescence.

Implications of Missing CSA Without a 5-Year Age Gap

Once prevalence and characteristics of CSA perpetrated by those less than 5-years older than their victims was substantiated as a legitimate phenomenon, studies began to investigate the outcomes of this experience of CSA. To date, these investigations have included clinical and college samples but would benefit from representation of community sampling to increase generalizability (Allen et al., 2014; Shaw et al., 2000; Sperry & Gilbert, 2005). Some of the early studies failed to divide perpetrators into meaningfully discriminative age groupings, while others were stymied by missing mental health outcome data and use of an unpublished measure (Shaw et al., 2000; Sperry & Gilbert, 2005). Later studies addressed these weaknesses and replicated findings that CSA perpetrated by children and teens produced comparably elevated rates of depression, anxiety, and problems with sexual functioning as those perpetrated by adults (Allen et al., 2014). Interestingly, Allen et al. (2014) also found CSA perpetrated by children and teens was less likely to be identified as abuse by the victim but this did not prevent the ill effects of trauma from presenting. Despite these early limitations and the comparatively paltry literature on CSA that would not the 5-year modifier, negative somatic and mental health outcomes do appear comparable to CSA that would meet the 5-year modifier (Allen et al., 2014; Felitti et al., 1998; Shaw et al., 2000; Sperry & Gilbert, 2005). Necessarily, these efforts, just as those with a 5-year modifier rely on retrospective self-report. While it is important to hold this in mind, retrospective

self-reports have demonstrated acceptable reliability, even when compared to informant report, or objective behavioral reports (Bifulco, Brown, Lillie, & Jarvis, 1997; Frick, 2012; Pinto, Correia, & Maia, 2014).

The literature evaluating CSA perpetrated by young offenders and peers has focused on mental health to the detriment of overlooking physical health in assessments, discussions, and comparisons of health outcomes. Given the parallel findings for mental health outcomes between those perpetrated by children and teens and those perpetrated by adults as well as the connection between mental and physical health, it is reasonable to believe that physical health outcomes would also be equivalently poor (Allen et al., 2014; Kendler et al., 2000; Molnar et al., 2001; Shaw et al., 2000; Sperry & Gilbert, 2005). This is particularly supported by studies that have noted a relationship between trauma and physical health outcomes and that used measures without the 5-year modifier (Kendler et al., 2000; Molnar et al., 2001). The present study will include both physical and mental health outcome measures congruent with the original ACEs study to add a more comprehensive picture of health outcomes for those whose CSA does not meet the 5-year modifier.

Given the origin of the 5-year modifier and the dual theoretical and empirical support for the existence of CSA perpetrated by children, siblings, and close peers, there is little compelling argument to be made to suggest abuse by someone 5-years or older would result in more need or consequence than abuse by someone less than 5-years or older. Even arguments of victim-perpetrator closeness do not adequately address differential treatment of these CSA groups as a perpetrator in a caregiving role is not an analogue for closeness of relationship particularly when CSA encompasses older children who are likely to have developmentally appropriate closer relationships to peers than family during this period (Brown & Larson, 2009; Edwards, Freyd,

Dube, Anda, & Felitti, 2012; Yancey & Hansen, 2010). Further, much of the literature to support this argument does not assess victims' perceptions of degree of closeness nor does it regularly include perpetrators under 5-years older than the victim (Yancey & Hansen, 2010). As such, survivors of CSA perpetrated by children, close peers, or siblings, are equally critical to identify and serve as those whose CSA was perpetrated by someone 5-years older than them. Yet, this vulnerable group may be barred access to services provided by state programs in which a score threshold of four or more ACEs must be met because their CSA experience does not adhere to a seemingly arbitrary 5-year modifier.

Study Aims and Hypotheses

The original ACE study and its questionnaire were instrumental in the conceptualization of diverse childhood adversities and establishing the importance of prevention and treatment for high ACE populations. With the immense resources currently funneled into ACEs and programs rooted in it, it is in the best interest of the vulnerable populations served by these programs to continue investigating ACEs and the means by which ACEs are assessed. This means continually reflecting critically and doing all that can be done to ensure that those who are at risk for poor physical and mental health outcomes produced by ACEs are able to receive services, particularly if access or priority is predicated on meeting threshold as some of the state programs now dictate. Given the limited yet consonant research on negative outcomes for CSA perpetrated by young offenders, siblings, and peers, it is essential for research to better understand whether the 5-year modifier on the sexual abuse item excludes survivors thereby lowering their ACE score and potentially reducing their access to services.

In accordance with this need, the primary aim of this study is to assess whether removing the 5-year modifier captures more individuals affected by CSA than the original item. Based on

the literature, we hypothesize that more individuals will endorse CSA with the 5-year modifier removed than the original item.

As a minimum ACE score is sometimes necessary to qualify for services and referrals, this study's secondary aim is to assess whether the group missed by the 5-year modifier would qualify for services if identified. We hypothesize that without the 5-year modifier, more individuals will meet the ACE service threshold score of four.

The tertiary aim of this study is to evaluate whether individuals endorsing CSA without the 5-year modifier score comparably on measures of psychological and physical health as those who endorse CSA with the 5-year modifier. Based on the literature, we hypothesize that those endorsing CSA without the 5-year modifier will score comparably on measures of psychological and physical health as those endorsing CSA with the 5-year modifier.

The quaternary aim of this study is to evaluate whether CSA endorsement across multiple groups will score comparably poorer on health outcomes than those who have never experienced CSA. Based on the literature that has established a link between poorer outcomes for CSA (without distinguishing groups) versus no CSA, we hypothesize both CSA endorsing groups will score poorer on measures of psychological and physical health than individuals who do not endorse CSA under any wording.

CHAPTER 2

METHODS

Participants

A purposive sample of women aged 18-50 were recruited via posts published on Reddit threads pertaining specifically to parenthood, pregnancy, health, and trauma. Of the 1,323 to click the survey link, 974 women (mean age = 30.46, SD = 4.79, range: 18-50) completed the online battery through the measures necessary to assign an appropriate CSA grouping. Participants were notably diverse with respondents representing 39 countries across five continents.

Measures

Traumatic experiences.

Adverse childhood experiences. The Adverse Childhood Experiences (ACE) Study Questionnaire is a 10-item survey used to measure exposure to difficult or traumatic events in childhood (Felitti et al., 1998). Participants indicate “yes” or “no” to whether they experienced any of the items prior to the age of 18. As discussed above, items are summed with higher scores indicating more adverse experiences and four representing the threshold for marked subsequent increased risk (Felitti et al., 1998). As outlined in the Critiques of the ACE Study Questionnaire section, psychometric evaluations of the ACE Study Questionnaire are limited; no comprehensive analysis of its psychometric properties has been published to date, but available research does suggest the current factor structure may not be mathematically optimal (Ford et al., 2014). Other studies have worked to establish reliability and validity outside of factor analysis for the ACE Study Questionnaire. While these studies have found good internal consistency ($\alpha = .88$) and convergent validity with the Adult Attachment Interview, test-retest reliability has

been modest for the full measure ($r = .71$) and poor for some subscales ($r = .52$) (Murphy et al., 2014; Zanotti et al., 2018). Consistent with previous reliability findings, our study found acceptable internal consistency for the ACEs ($\alpha = 0.75$).

Experimental CSA item with 5-year modifier removed. To assess the function of the 5-year modifier on the CSA item, the central question of this investigation, participants were asked later in the assessment battery a variant of the original CSA item of the ACEs Study Questionnaire with the 5-year older modifier removed transforming the question from “ Before the age 18, did an adult or person at least 5-years older than you...touch or fondle you or have you touch their body in a sexual way? *Or* ever try to or actually have oral, anal, or vaginal sex with you?” to “Before the age 18, did anyone ever forcibly or coercively (whether you realized it then or at any point after) touch or fondle you or have you touch their body in a sexual way? *Or* ever forcibly or coercively (whether you realized it then or at any point after) attempt or actually have oral, anal, or vaginal intercourse with you?” and are similarly provided a “yes” or “no” as possible responses. Ideally, the experimental item would merely have the 5-year modifier removed. However, the original item implies lack of consent with the 5-year modifier negating the need for verbiage around consent. Thus, simply removing the 5-year modifier would necessitate endorsement even in the case of consensual sexual contact prior to 18 years of age. Accordingly, language explicitly detailing force and coercion was necessary. The verbiage regarding point of realization was added because Allen and colleagues (2014) found those sexually assaulted by children and teens often did not label their experience abuse despite force or coercion being used. Internal consistency for the ACEs Study Questionnaire with experimental CSA item instead of the original was found to be acceptable within our sample ($\alpha = 0.74$).

While survivors of child, peer, and sibling perpetrated CSA are the group most likely captured by the experimental item, some cases of adult perpetrated CSA could also meet inclusion. For example, a sexual assault perpetrated by a 20-year old against a 16-year old would be captured by the experimental item as there is only a 4-year age gap, however the perpetrator is an adult. To adequately reflect this broader inclusion and provide a short hand of reference, the population encapsulated by the experimental item proposed in this study will be termed NoModCSA, so called to reflect all experiences of CSA only captured without the 5-year modifier (NoMod = no 5-year modifier). Relatedly, while survivors of adult perpetrated CSA are the group most likely captured by the original item, some cases of child, peer, or sibling perpetrated CSA could also meet the stipulations of the 5-year modifier provided a 5-year age gap exists. For example, a sexual assault perpetrated by a 12-year old against a 7-year old is captured by the original item even though the perpetrator is a child. To adequately reflect this broader inclusion and provide a short hand of reference, the population encapsulated by the original item will be termed ModCSA so called to reflect all experiences of CSA captured by the 5-year modifier (Mod = with 5-year modifier). A quick reference of these groupings is provided in Table 1.

Table 1

Summary of CSA Group Membership Characteristics

Group Name	Group Description	CSA Item Endorsement	
		Original Item	Experimental Item
ModCSA	Perpetrator(s) \geq 5-years older (Identifiable with the 5-year modifier)	Yes	Yes
NoModCSA	Perpetrator(s) $<$ 5 years older (Not identifiable with the 5-year modifier)	No	Yes
NoCSA	No sexual abuse in childhood (Identifiable with or without the 5-year modifier)	No	No
ModOnlyCSA	Confused by item difference or “consensual” experience with person(s) \geq 5 years older	Yes	No

Health outcomes.***Mental health.***

Depression. The Patient Health Questionnaire-9 (PHQ-9), a self-administered version of the PRIME-MD’s depression module was used to assess presence and severity of depression (Kroenke, Spitzer, & Williams, 2001). Participants select their experience from “0” (not at all) to “3” (nearly every day) for each of the nine items which correspond to the nine DSM-V criteria for Depression (Kroenke et al., 2001). Items are summed with higher scores indicating more severe depression (Kroenke & Spitzer, 2002). Scores of 5, 10, 15, and 20 represent the cut scores for mild, moderate, moderate-severe, and severe depression (Kroenke & Spitzer, 2002). The PHQ-9 possesses a sensitivity and specificity of 88% for scores above 10, excellent internal consistency ($\alpha = 0.89$), and good test-retest reliability ($r = .84$; Kroenke et al., 2001). A study using a sample demographically similar to our own, found excellent test-retest reliability (ICC =

0.98) and good internal consistency ($\alpha = 0.84$; Woldetensay et al., 2018). Criterion validity was established with a diagnostic interview (Kroenke et al., 2001). Further, construct validity was demonstrated with positive correlations to disability days ($r = 0.39$) and the Short Form-20 ($r = 0.73$) (Kroenke et al., 2001). Consistent with previous reliability findings, our study found excellent internal consistency for the PHQ-9 ($\alpha = 0.89$).

Anxiety. The Generalized Anxiety Disorder-7 (GAD-7), a self-administered version of the PRIME-MD's anxiety module, was used to assess presence and severity of anxiety (Spitzer, Kroenke, Williams, & Löwe, 2006). Participants select their experience from "0" (not at all) to "3" (nearly every day) for each of the seven items which correspond to the seven DSM-V criteria for Generalized Anxiety Disorder (Spitzer et al., 2006). Items are summed with higher scores indicating more severe anxiety (Spitzer et al., 2006). Scores of 5, 10, 15, and 20 represent the cut scores for mild, moderate, moderate-severe, and severe anxiety (Jordan, Shedden-Mora, & Löwe, 2017). Using a Classical Test Theory method of calculating reliability, the GAD-7 has achieved a reliability score of 91% indicating good reliability and validity but Item Response Theory analysis does suggest the first four items should be weighted more heavily than the last three (Jordan et al., 2017). Previous studies have also demonstrated acceptable internal consistency ($\alpha = 0.89$; 0.92) and test-retest reliability (ICC = .083) (Löwe et al., 2008; Spitzer et al., 2006). The GAD-7 has also established acceptable validity as it was positively correlated with both the Beck Anxiety Inventory ($r = .72$) and the anxiety subscale of the Symptom Checklist-90 ($r = .74$) and negatively correlated with a measure of self-esteem ($r = -.46$) in large samples (Löwe et al., 2008; Spitzer et al., 2006). The present study adheres to the weighted scoring recommendations of Jordan and colleagues (2017). See the Treatment of Variables

section for a detailed description of this scoring procedure. Consistent with previous reliability findings, our study found acceptable internal consistency for the GAD-7 ($\alpha = 0.91$).

Physical health.

Somatic symptom burden. The Somatic Symptom Checklist (SSS-8) was used to assess objective physical health. It is a list of eight physical symptoms including gastrointestinal difficulties, pain, fatigue, and cardiopulmonary aspects of general somatic symptom burden (Gierk et al., 2014). Participants responded to each item by rating the frequency of their experience with each symptom during the past seven days, ranging from “0” (not at all) to “4” (very much) (Gierk et al., 2014). Items are summed for a total score. Scores of 0-3 indicate little to no somatic burden, 4-7 low burden, 8-11 medium burden, 12-15 high burden, and 16-32 very high burden (Gierk et al., 2014). Psychometric evaluations conducted by the creators of the SSS-8 using a German sample have found acceptable internal consistency ($\alpha = .76$ to $.081$) and good indicators of validity as SSS-8 scores were predictive of health care utilization in the previous 12 month period and a one point increase on the SSS-8 was found to equate to a 3% increase in health care use (Gierk et al., 2014, 2015). They have also established construct validity comparing the SSS-8 with another measure of somatic burden, The Patient Health Questionnaire-15 (PHQ-15) ($r = .81$) (Gierk et al., 2015). Later studies in the United States by other researchers found similar internal consistency ($\alpha = 0.72$) and construct validity with the PHQ-15 ($r = .79$) but test-retest reliability remains unevaluated (Toussaint, Kroenke, Baye, & Lourens, 2017). Consistent with previous reliability findings, our study found acceptable internal consistency for the SSS-8 ($\alpha = 0.75$).

Perceived/Self-rated health. Perceived health was rated on a five-point Likert response scale to the question, “How would you rate your health in general?” with a “1” indicating poor

health and a “5” indicating excellent health. Historically, studies examining the use of a single item self-rated health measure found poor predictive validity for a range of samples with exception of middle aged male populations (Idler & Angel, 1990). However, newer studies have been able to demonstrate good predictive validity and an increase in the accuracy with which people evaluate and report their perceived health (DeSalvo, Fan, McDonell, & Fihn, 2005; Idler & Angel, 1990; Kaplan, Barell, & Lusky, 1988; Schnittker & Bacak, 2014). Additionally, though use of self-rated health as a proxy for objective health is discouraged, use of self-rated health as a measure of perceived health, as it is used in the present study and in Felitti’s original work, has gained support since the publication of the original ACE study (Garbarski, 2016).

Sexual health.

Sexual functioning. The Female Sexual Functioning Index (FSFI) is a 19-item measure with a five-point Likert response scale ranging from “1” (almost never or never/very dissatisfied) to “5” (almost always or always/very satisfied) but some items offer the option of “0” to indicate a respondent has not had sex within the questionnaire’s one month window. The FSFI is scored in accordance with its published protocol (Rosen et al., 2000). A total for each subscale is calculated and multiplied by a weighting factor ranging from .30 to .60 then all subscales are summed resulting in a minimum score of 2 and a maximum score of 36 with higher scores indicating better sexual functioning (Rosen et al., 2000). A cut score of 26.55 serves as the distinction between sexual function and dysfunction (Wiegel, Meston, & Rosen, 2005). The Female Sexual Functioning Index has a specificity of 70%, a sensitivity of 88%, and across multiple studies has demonstrated acceptable internal consistency ($\alpha = 0.93 - 0.97$) and a good whole-measure test-retest reliability ($r = 0.88$) (Rosen et al., 2000; Wiegel et al., 2005). Construct validity has been established through significant mean differences on scores produced

by healthy controls and scores produced by individuals with Female Sexual Arousal Disorder ($p < 0.001$) (Rosen et al., 2000). Consistent with previous reliability findings, our study found acceptable internal consistency for the FSFI ($\alpha = 0.97$)

Substance use.

Current alcohol use. A five item survey, the Alcohol Use Disorders Identification Test-5 (AUDIT-5) was used to assess alcohol consumption and consequences (Saunders, Aasland, Babor, de la Fuente, & Grant, 1993). Participants responded to frequency of use, consequences of use, sense of control, and others' perceptions of their use within the last year on a five-point Likert scale. Though the response wording to each item varies, "0" indicates the least amount of use/impairment/concern and "5" indicates the most amount of use/impairment/concern. Scores are summed with scores above 2 indicating problematic drinking, scores above 6 indicating alcohol use disorders, and scores above 10 indicating alcohol dependence (de Meneses-Gaya, Zuardi, Loureiro, & Crippa, 2009). Though the AUDIT-10 has been shown to be valid and reliable, there is limited psychometric data on the AUDIT-5 and inquiry has been focused on Area Under the Curve Analysis (AUC) which has shown a sensitivity of 75%, specificity of 97%, and positive predictive value of 83% (de Meneses-Gaya et al., 2009; Kim et al., 2013; Saunders et al., 1993). As is common for brief measures with few items, internal consistency for the Audit-5 did not demonstrate acceptable reliability in our sample ($\alpha = 0.63$). Given our study design, we were not able to use alternative means of establishing reliability such as AUC analysis.

Current tobacco use. Participants indicated current tobacco use by responding "0" (not at all), "1" (somedays), and "3" (every day) to the question, "Do you now smoke cigarettes every

day, some days, or not at all?” Those responding “1” and “2” were grouped into current smokers and those responding “0” were grouped as current non-smokers.

Current substance use. Substance abuse was assessed by asking, “Do you currently use any illegal drugs, such as marijuana, cocaine, methamphetamine, opioids, stimulants, or narcotics, including prescription medication for which you do not have a prescription?” and offering a dichotomous choice of “0” indicating no and “1” indicating yes.

Procedures

Surveys were created on REDCap and posted to Reddit. Reddit is an internet hosting platform that serves as “the front page of the internet” by facilitating posts and discussion within a global community of users across all topics and interests. Each topic, interest group, or category hosting content of a similar theme is called a subreddit. The survey was posted to 45 subreddits pertaining to trauma, infertility, minority concerns, and medical conditions under the title, “Women’s Reproductive Health and Stress Study- research participation requested.” The recruitment post outlined eligibility and explained the purpose of the study was to understand connection between life experiences and certain health outcomes. The post also provided trigger warnings, incentive information, originating institution, a link to the survey, and resources should anyone currently be in crises or feel distressed by their responses. Depending on subreddit allowances, the survey was posted one to two times during the active study period. Upon completion, participants were offered the opportunity to enter their identifying information into a drawing for a \$75.00 Amazon gift card. Survey links were deactivated, ending data collection, after a four-month period of time during the spring and summer of 2018.

Statistical Analysis

Treatment of variables. The responses to the different sexual abuse items were coded into four CSA response groups. For quick reference of group names and characteristics, please see Table 1. Those who endorsed the original item with the 5-year modifier comprise the ModCSA group. Those who endorsed the experimental item without the 5-year modifier comprise the NoModCSA group. Those who did not endorse either iteration of the CSA item comprise the NoCSA group and those who endorsed the original item but did not endorse the experimental item comprise the ModOnlyCSA group. Individuals in the ModOnlyCSA either misunderstood the differences in the items or had sexual contact with someone 5-years or older than them but it was not forced or coerced so they were unable to endorse the experimental item as it explicitly uses this language to communicate lack of consent rather than implying lack of consent with an age modifier like the original item does.

A summative full measure score was computed for the SSS-8, AUDIT-5, and PHQ-9 of the health outcomes. The FSFI was totaled using the methods outlined in its authors' scoring protocol (Rosen et al., 2000). In accordance with IRT and CART analyses by Jordan and colleagues (2017), the GAD-7 was scored with more weight given to the first four items than the last three as they have shown to have more predictive validity for anxiety. Each item was multiplied by its designated weight 2.12, 3.42, 2.76, 2.12, 1.24, 1.32, 1.94, respectively and then totaled together resulting in a minimum score of 0 and a maximum score of 44.76. Adjusted thresholds are 10.66 for mild anxiety, 21.31 for moderate anxiety, and 31.97 for severe anxiety.

Two versions of a summative score for ACEs were also computed for each participant. One calculated their total out of 10 using the original item and one calculated their total out of 10

using the experimental item. The smoking frequency item was transformed into current smoker/non-smoker as outlined in measures.

Hypothesis 1. Frequencies for ModCSA and NoModCSA groups were computed to assess whether there were more CSA survivors identified when the 5-year modifier is removed.

Hypothesis 2. To determine whether the removal of the modifier contributes meaningfully to participants achieving an ACE score of four or higher, two total ACE scores were computed for each participant. One was summed using the original item with the 5-year modifier and one was summed using the experimental item sans the 5-year modifier. Frequencies of the two versions were computed and compared.

Hypothesis 3 and 4. To investigate how CSA endorsing groups score in relation to each other as well as how these groups compare to NoCSA on the health outcome variables, two MANOVAs, two ANOVAs, and two logistic regressions were computed. All analyses used the CSA grouping variable (ModCSA, NoModCSA, NoCSA, and ModOnlyCSA) as the predictor variable. It was anticipated that the ModOnlyCSA group would be small but research suggests even small or incomplete groups should be included to preserve the quality and ethics of conclusions and their removal does not substantially improve power (Biemann & Heidemeier, 2012). Prior to computing the MANOVAs, assumptions of a normal distribution, linear variables, homogeneity of variances and covariances were assessed. For continuous outcomes, MANOVA was used when there were multiple dependent variables within a specific category (i.e., mental health, somatic health). Two separate univariate ANOVAs were conducted using problematic drinking and sexual functioning as the respective outcome variables because the former is the only continuous externalizing variable and the latter is a composite of psychological and physical factors which cannot easily be teased apart. Logistic regression was

computed for dichotomous health outcomes, specifically evaluating whether CSA grouping is predictive of current smoking and illicit drug use.

Post hoc tests. All tests utilizing mean level differences are reported with their respective and appropriate effect sizes. The Benjamini-Hochberg Procedure was used to minimize Type 1 errors for multiple comparisons by controlling the false discovery rate rather than traditional Family Wise Error Rate procedures which minimize Type 2 error rates. Controlling the false discovery rate using the Benjamini-Hochberg Procedure was selected because in this study an accidental Type 1 error would allow people to access mental health services they may not actually have needed, but that is preferable to an accidental Type 2 error in this study which would keep people from accessing services they truly need. This is particularly important because the population potentially being kept from services via overcontrolled Type 2 error rates already have three ACEs and thus are already at an increased risk for adverse outcomes. Further, accessing services and therapy regardless of number of ACEs is not likely to cause harm, rather it is likely to be innocuous or helpful. Accordingly, the Benjamini Hochberg Procedure balances the need to correct for multiple comparisons with the naturalistic consequences of this study.

A Priori Power Analysis

Calculations using the Gpower computer program and effect sizes from a similar study by Allen and colleagues (2014) examining CSA versus no CSA as well as the effect of perpetrator age and health outcomes in adulthood indicate a total sample of 116 participants will be necessary to detect the effect of juvenile perpetrated CSA on mental and physical health outcomes using MANOVA with 80% power and an alpha error rate of .05. Using a similar procedure with reported effects from CSA and substance abuse studies, a total sample of 53 would be needed to detect a medium effect at 80% power in a logistic regression analysis (Felitti

et al., 1998; Kendler et al., 2000). To detect an effect in an ANOVA for alcohol abuse, using reported effects from CSA and substance abuse studies, a total sample of 144 would be needed to detect a medium effect at 80% power (Felitti et al., 1998; Kendler et al., 2000).

CHAPTER 3

RESULTS

Demographics

The sample predominately identified as white ($n = 870, 89.69\%$), cis-gendered females ($n = 955, 98.04\%$) currently residing in the United States ($n = 744, 76.62\%$). The majority were heterosexual ($n = 755, 77.52\%$) and married ($n = 753, 77.39\%$) with an average age of 30.46 years ($SD = 4.79$). While all wealth and educational strata were represented in the sample, a slight majority were members of households earning an annual income between 100,000 and 200,000 dollars ($n = 367, 38.84\%$) and have earned Bachelor's degrees ($n = 383, 39.53\%$). An overwhelming majority of the sample were non-smokers ($n = 904, 95.46\%$), did not engage in substance use ($n = 852, 90.45\%$), and had not experienced sexual abuse as a child ($n = 700, 72.46\%$). The overall health of the sample was punctuated by mild depression ($M = 7.61, SD = 6.02$), mild anxiety ($M = 15.37, SD = 12.60$), moderate somatic symptom burden ($M = 8.24, SD = 5.44$), risky drinking ($M = 3.15, SD = 4.49$), and a just below threshold average for sexual dysfunction ($M = 24.26, SD = 9.55$). See Table 2 for complete demographics by total sample and group.

Table 2

Demographics for Full Sample and by Childhood Sexual Abuse Experience

Characteristic	Full Sample (N = 974)	Group Membership			
		ModOnlyCSA (N = 131)	NoModCSA (N = 118)	NoCSA (N = 700)	ModOnlyCSA (N = 17)
Age, M (SD)	30.46 (4.79)	30.42 (5.71)	30.14 (5.61)	30.54 (4.46)	29.29 (4.61)
Gender					
Female	955 (98.05%)	124 (94.66%)	116 (98.31%)	691 (98.71%)	17 (100%)
Trans Woman	6 (.62%)	2 (1.53%)	0 (0%)	4 (.57%)	0 (0%)
Gender Fluid	11 (1.13%)	4 (3.05%)	2 (1.69%)	5 (.71%)	0 (0%)
Other	1 (.20%)	1 (.76%)	0 (0%)	0 (0%)	0 (0%)
Race					
White	870 (89.69%)	114 (87.69%)	112 (94.92%)	621 (89.10%)	16 (94.12%)

Asian	29 (2.99%)	5 (3.85%)	0 (0%)	24 (3.44%)	0 (0%)
Latino/a	22 (2.27%)	5 (3.85%)	2 (1.70%)	15 (2.15%)	0 (0%)
Black	6 (.62%)	0 (0%)	1 (.85%)	4 (.57%)	1 (5.88%)
Caribbean	2 (.21%)	0 (0%)	0 (0%)	2 (.29%)	0 (0%)
Native Amer.	2 (.21%)	0 (0%)	0 (0%)	2 (.29%)	0 (0%)
Multi-Ethnic	34 (3.51%)	6 (4.62%)	2 (1.69%)	25 (3.59%)	0 (0%)
Other	5 (.52%)	0 (0%)	1 (.85%)	4 (.57%)	0 (0%)
Sexual Orientation					
Straight	755 (77.52%)	75 (57.25%)	81 (68.65%)	579 (82.71%)	14 (82.35%)
Gay	1 (.10%)	0 (0%)	0 (0%)	1 (.14%)	0 (0%)
Lesbian	17 (1.75%)	4 (3.05%)	3 (2.54%)	10 (1.43%)	0 (0%)
Bisexual	132 (13.55%)	37 (28.24%)	21 (17.80%)	72 (10.30%)	1 (5.88%)
Pansexual	31 (3.18%)	9 (6.87%)	6 (5.08%)	14 (2.00%)	2 (11.76%)
Asexual	9 (.92%)	3 (2.30%)	1 (.85%)	5 (.71%)	0 (0%)
Queer	14 (1.44%)	1 (.76%)	2 (1.70%)	10 (1.43%)	0 (0%)
Questioning	11 (1.13%)	1 (.76%)	4 (3.34%)	6 (.86%)	0 (0%)
Other	4 (.41%)	1 (.76%)	0 (0%)	3 (.43%)	0 (0%)
Relationship Status					
Married	753 (77.39%)	81 (62.31%)	82 (69.50%)	569 (81.29%)	14 (82.35%)
Engaged	61 (6.27%)	14 (10.77%)	8 (6.78%)	38 (5.43%)	1 (5.88%)
Dating	73 (7.50%)	17 (13.08%)	15 (12.71%)	41 (5.86%)	0 (0%)
Single	49 (5.04%)	11 (8.46%)	7 (5.93%)	30 (4.29%)	0 (0%)
Divorced	5 (.51%)	2 (1.54%)	1 (.85%)	1 (.14%)	1 (5.89%)
Widowed	1 (.10%)	0 (0%)	0 (0%)	1 (.14%)	0 (0%)
Other	31 (3.19%)	5 (3.85%)	5 (4.24%)	20 (2.86%)	1 (5.88%)
US Resident	744 (76.62%)	98 (75.38%)	82 (69.50%)	545 (78.08%)	13 (76.47%)
Highest Education Completed					
High School	32 (3.30%)	9 (6.92%)	7 (5.93%)	16 (2.30%)	0 (0%)
Some College	111 (11.46%)	23 (17.70%)	16 (13.56%)	63 (9.05%)	8 (47.06%)
Associate's	43 (4.44%)	9 (6.92%)	9 (7.63%)	22 (3.16%)	2 (11.76%)
Bachelor's	383 (39.53%)	51 (39.23%)	51 (43.22%)	275 (39.51%)	3 (17.65%)
Master's	268 (27.66%)	25 (19.23%)	25 (19.50%)	214 (30.75%)	3 (17.65%)
Doctoral	73 (7.53%)	8 (6.15%)	6 (5.08%)	58 (8.33%)	1 (5.88%)
Professional	59 (6.09%)	5 (3.85%)	6 (5.08%)	48 (6.90%)	0 (0%)
Annual Household Income					
< \$15,000	22 (2.33%)	7 (5.56%)	8 (6.90%)	7 (1.03%)	0 (0%)
\$15,001-\$30,000	63 (6.67%)	19 (15.08%)	7 (6.03%)	33 (4.85%)	2 (13.33%)
\$30,001-\$60,000	157 (16.61%)	30 (23.81%)	22 (18.97%)	98 (14.41%)	5 (33.33%)
\$60,001-100,000	245 (25.93%)	25 (19.84%)	27 (23.28%)	185 (27.21%)	6 (40.00%)
\$100,001-\$200,000	367 (38.84%)	36 (28.57%)	41 (35.34%)	286 (42.06%)	2 (13.33%)
>\$200,000	91 (9.63%)	9 (7.14%)	11 (9.48%)	71 (10.44%)	0 (0%)

Prevalence and Characteristics of Childhood Sexual Abuse

Of 974 participants, 249 (25.56%) endorsed sexual abuse occurring at least once during their first 18 years of life. Of the 249 who experienced sexual abuse, 52.61% (131 participants) experienced CSA from a perpetrator 5-years or older than them (ModCSA group) while an almost equal number, 47.39% (118 participants), experienced CSA from a perpetrator less than 5-years older than them (NoModCSA group). Of these 118 participants in the NoModCSA group, 14 (11.86%), met the threshold of 4 when given the experimental item rather than the original item. See Figure 2 for prevalence rates by CSA groups. A fourth group (ModOnlyCSA) did emerge that represented individuals that either had consensual sexual contact with individuals 5-years or older than them or those who were confused by the experimental item. This group was large enough ($n = 17$) that it was included in analyses but was too small for anything to reach significance.

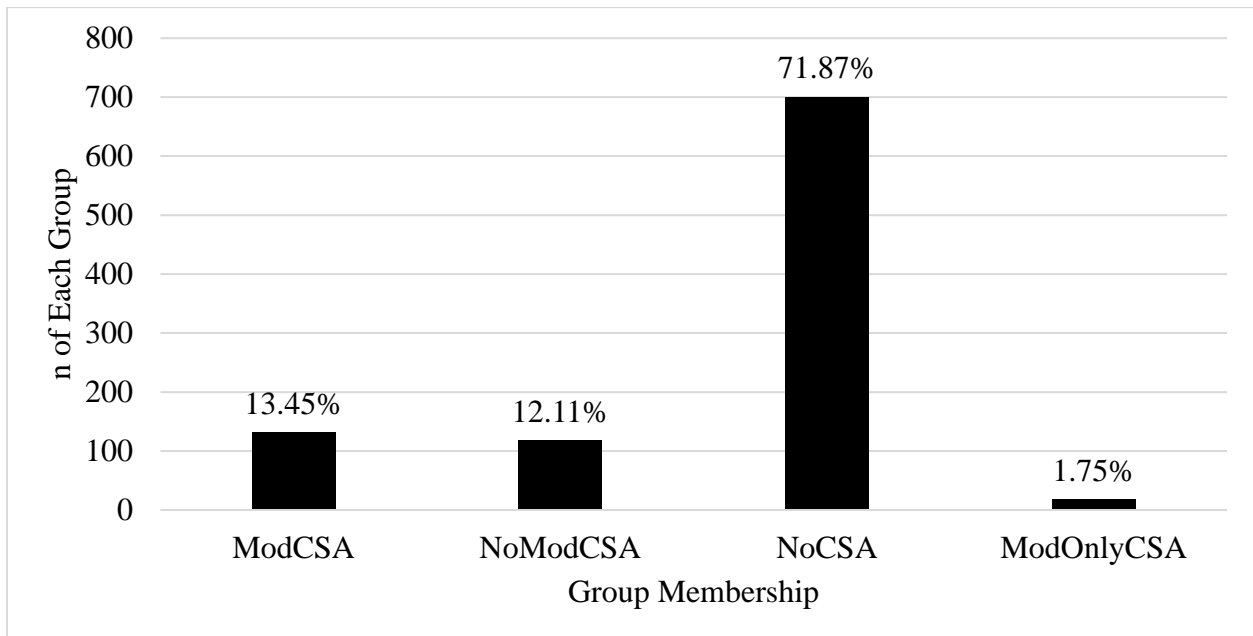


Figure 2. Number of participants by sexual abuse group

Health Outcomes

Mental health. A MANOVA using depression and anxiety scales as outcome variables was performed examining whether mental health outcomes vary by CSA group designation. Results were significant ($V = .037, p < .001$) with differences observed on both outcome variables: depression ($F(3,896) = 10.03, p < .001, \eta^2 = .032$) and anxiety ($F(3,896) = 8.65, p < .001, \eta^2 = .026$). Taken together, this model accounted for .16 of the total variance in mental health outcomes for survivors of CSA.

Contrast analyses to identify which groups significantly differed from one another on the outcome of depression revealed significantly higher scores for both ModCSA ($t = 4.73, p < .001, d = 0.44$) and NoModCSA ($t = 3.44, p = .002, d = 0.34$) groups compared to the NoCSA group and no difference in scores between the ModCSA group and NoModCSA group. Contrast analyses to identify which groups significantly differed from one another on the outcome of anxiety revealed significantly higher scores for ModCSA ($t = 4.68, p < .001, d = 0.44$) compared to the NoCSA group. Though, the NoModCSA group also initially showed substantially higher scores than the NoCSA group, this finding disappeared after correcting for multiple comparisons. No difference in scores between the ModCSA group, NoModCSA group, and ModOnlyCSA groups were found for either mental health outcome. See Table 3 for a summary of ANOVA results.

Table 3

Group Differences for Mental and Physical Health Outcomes

<i>Outcome</i>	Group Membership				F	η^2
	ModCSA	NoModCSA	NoCSA	ModOnlyCSA		
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>		
Depression	9.71 (6.69) _a	9.06 (6.71) _a	6.96 (5.65) _b	7.94 (6.05) _{ab}	10.03**	.032
Anxiety	19.93 (13.94) _a	16.77 (12.82) _{ab}	14.22 (11.94) _b	16.06 (16.79) _{ab}	7.65**	.026
Somat. Burden	9.94 (6.76) _a	9.43 (5.29) _a	7.64 (5.04) _b	9.94 (5.86) _{ab}	9.93**	.030
Perc. Health	3.15 (0.98) _a	3.16 (0.98) _a	3.41 (.87) _b	3.06 (1.09) _{ab}	5.44*	.018
Sexual Funct.	24.35 (9.44) _a	24.15 (10.26) _a	24.34 (9.44) _a	22.56 (10.03) _a	.20	.001
Alcohol Use	3.43 (4.87) _a	3.14 (4.60) _a	3.06 (4.36) _a	4.69 (5.84) _a	.86	.003

Note. Values with the same subscript did not differ. Somat. Burden = Somatic Burden. Perc. Health = Perceived/Self-Rated Health. Sexual Funct. = Sexual Functioning.

** $p < .001$. * $p = .003$

Physical health. Another MANOVA using somatic symptom burden and perceived health as outcomes variables was performed examining whether physical health outcomes vary by group designation. Results were significant ($V = .035$, $p < .001$) with differences observed on both outcome variables: somatic symptom burden ($F(3, 935) = 9.93$, $p < .001$, $\eta^2 = .030$) and perceived health ($F(3, 935) = 5.44$, $p = .003$, $\eta^2 = .018$).

Contrast analyses to identify which groups significantly differed from one another on the outcome of somatic symptom burden revealed significantly higher scores for both ModCSA ($t = 4.45$, $p < .001$, $d = 0.39$) and NoModCSA ($t = 3.34$, $p = .003$, $d = 0.35$) groups compared to the NoCSA group and no difference in scores between the ModCSA group, the NoModCSA group, and the ModOnlyCSA group. Contrast analyses to identify which groups significantly differed from one another on the outcome variable of perceived health revealed significantly lower scores

for both ModCSA ($t = -3.06, p = .007, d = 0.28$) and NoModCSA ($t = -2.86, p = .012, d = 0.27$) compared to the NoCSA group. No difference in scores between the ModCSA group, NoModCSA group, and ModOnlyCSA groups were found for either physical health outcome. See Table 3 for a summary of ANOVA results.

Sexual health. An ANOVA for sexual functioning did not reveal any variation across groups for this health outcome. See Table 3 for a summary of ANOVA results.

Substance use. An ANOVA for alcohol use did not reveal any variation across groups for use of this substance. See Table 3 for summary of ANOVA results. A logistic regression model was fit to the variables of CSA grouping and tobacco use to determine whether CSA group designation was predictive of tobacco use. Odd ratios were computed using NoCSA as a reference group. Compared to the NoCSA group, members of the ModCSA group were 2.87 times more likely to be current smokers, members of the NoModCSA were 1.93 times more likely to be current smokers, and members of the ModOnlyCSA were 4.00 times more likely to be current smokers. As the confidence intervals for all groups except ModCSA encompassed 1, it is not surprising that only ModCSA membership was significantly predictive of current tobacco use ($p = .006$). See Table 4 for summary of the logistic regression results.

Table 4

Odds Ratios for Current Smoking and Substance Use Comparing CSA groups to No CSA

<i>Outcome</i>	Group Membership		
	ModCSA OR (95% CI)	NoModCSA OR (95% CI)	ModOnlyCSA OR (95% CI)
Current Smoker	2.87 ^{**} (1.31-5.96)	1.92 (.75 – 4.41)	4.00 (.61 – 15.38)
Current Sub. Use	2.77 [*] (1.60-4.69)	1.55 (.79-2.87)	1.64 (.25 - 6.03)

Notes. NoCSA is used as the referent. Current Sub. Use = Current Substance Use.
^{**} $p < .001$, ^{*} $p = .006$.

A logistic regression model was fit to the variables of CSA grouping and substance use to determine whether CSA group designation was predictive of substance use. Odds ratios were computed using NoCSA as a reference group. Compared to the NoCSA group, members of the ModCSA group were 2.77 times more likely to endorse substance use, members of the NoModCSA group were 1.55 times more likely to be substance users, and members of the ModOnlyCSA group were 1.64 times more likely to be substance users. As with tobacco use, only ModCSA has confidence intervals that did not encompass one and thus only ModCSA was significantly predictive of substance use ($p < .001$). Using ModCSA as a reference group, there was no significantly higher likelihood that a member of the ModCSA group would use substances than a member of the NoModCSA group or ModOnlyCSA group. See Table 4 for summary of the logistic regression results.

Corrections for multiple comparisons. The Benjamini Hochberg procedure was used to correct for multiple comparisons, 38 in total. Of these only one significant unadjusted p-value fell out of significance. All reported p-values are adjusted.

CHAPTER 4

DISCUSSION

The present study's aims were four-fold:

1. To assess whether a group of CSA survivors whose experiences do not fit the current and most common means of assessing CSA (the 5-year modifier) are excluded in ACE assessment.
2. To assess whether this exclusion has implications for this group gaining access to services that are predicated on a four-threshold ACE score.
3. To assess whether this excluded group has similarly poor mental and physical health outcomes compared to other CSA groups whose experiences are included by the 5-year modifier.
4. To assess whether all CSA endorsing groups produce poorer health outcomes than those who have never experienced CSA.

Group Membership and Prevalence

As hypothesized, a group of CSA survivors whose CSA experiences can be characterized as involving non-consensual contact with someone less than five years older than them, likely perpetrated by children, peers, or siblings (NoModCSA group) was missed by the wording of the ACE Study Questionnaire's original CSA item. The NoModCSA group was comprised of 118 individuals making it nearly the same size as the 131 individuals whose CSA experiences are captured by the 5-year modifier (ModCSA). When combined, these survivors produce a prevalence rate of 25.56%, indicating about 1 in 4 women within our sample have experienced CSA. This is nearly identical to the 26.60% prevalence rate reported for female endorsement of

CSA by Finkelhor and colleagues (2014) in a study using a CSA item with similar wording, including removal of the 5 year modifier, to our experimental item.

Regarding prevalence rates by CSA group designation, the ModCSA group (identifiable with the 5-year modifier) and the NoModCSA group (missed by the 5-year modifier) were nearly equal in our sample (13.45%, 12.11%, respectively). This similarity between the ModCSA group (13.45%) and the NoModCSA group (12.11%) is in contrast to Finkelhor and colleagues' (2014) finding that reported abuse by juvenile perpetrators (12.10-17.8%) was more common than abuse by adult perpetrators (6.10-11.2%). Two additional studies reported CSA prevalence rates by a juvenile perpetrator for female victims to be 18.60% and 21.00% (Bifulco et al., 1997; Rao, 2012). These discrepancies may be due to the limited ability to draw direct comparisons between our prevalence rates and previous research given the differences in group creation characteristics. While our study designates CSA groups by those identifiable and not identifiable by a 5-year modifier rather than perpetrator age, many of the previous studies that have included perpetrators other than adults report their results by broad groupings of perpetrator age (juvenile vs. adult). As previously discussed, NoModCSA and ModCSA are not perfect analogues of juvenile and adult perpetrated CSA but NoModCSA does primarily capture juvenile, close peer, and close sibling perpetrated CSA while ModCSA does primarily capture adult or non-close peer/sibling perpetrated CSA. Despite limited direct comparison, comparisons to studies using juvenile and adult designators can still be beneficial in contextualizing our study's prevalence rates.

Additional challenges in comparing past prevalence rates to each other as well as to our own results is the general minimal uniformity in assessment of CSA across studies like assessing CSA prior to certain ages, inconsistent reporting by specific gender or total sample, different definitions of age categories (e.g., juvenile as 19 vs. 18), and use of broad category versus

specific perpetrator age ranges. Illustrative of this, Allen and colleagues (2014) reported a prevalence of 36.15% for CSA among college students, specifying juvenile perpetrator rates of 22.16%, and adult perpetrator rates of 14.00%. However, they only assessed for CSA prior to the age of 12 rather than 18 and prevalence rates were not reported separately by participant gender. Similarly, though the original ACEs study reported 22.00% prevalence for endorsement of CSA, direct comparison is difficult as their estimate included men and excluded those with a perpetrator within 5-years of the victim's age (Felitti et al., 1998). Unsurprisingly, our rates most closely resemble Finklehor et al. (2014), whose method of assessment was most similar to our own but the literature itself represents an array of rates in which ours falls toward the mean, suggesting the present findings are generally commensurate with past research.

Health Outcomes

Overall, comparisons of health outcomes for individuals who never experienced CSA (NoCSA) versus varying groups of those who had experienced CSA (ModCSA, NoModCSA, ModOnlyCSA) revealed poorer outcomes for CSA groups than the NoCSA group for the majority of assessed variables. Further, no appreciable differences were found between those identified by a 5-year modifier and those not. Prior to discussing these results in depth by health domain (i.e., mental health, physical health, sexual health, substance use), it warrants reiterating what was mentioned in the results regarding the ModOnlyCSA group. The ModOnlyCSA group did have means across variables that were higher than the NoCSA group but as this group was so small ($n = 17$), none of these differences were large enough to demonstrate significance. Accordingly, though ModOnlyCSA was included in analyses and included in test corrections, discussion of health outcomes heavily centers on ModCSA, NoModCSA, and NoCSA groups.

Mental health. In line with both previous research and present hypotheses, mental health outcomes in general were poorer for those who have experienced CSA regardless of CSA group designation compared to the NoCSA group. Analyses for depression revealed increased severity of depression symptoms for both the ModCSA and NoModCSA groups (mild to moderately depressed) compared to the NoCSA group (not depressed). Comparisons between CSA endorsing groups indicated no significant differences in their depression scores.

Differences between CSA endorsing groups and the NoCSA group suggest those who have experienced CSA are more likely to be depressed than those who have not. Considering the proposed mechanism of ACE exposure's effect on future health outcomes (see Figure 1), our finding that CSA survivors have detectable and more severe depression than the NoCSA group may be accounted for by social, emotional, and cognitive impairment during important developmental periods (Caston & Mauss, 2011; De Bellis & Zisk, 2014; Felitti et al., 1998; Gariépy, Honkaniemi, & Quesnel-Vallée, 2016; McEwen, 2007). Emotional and behavioral ramifications of CSA could result in difficulty appropriately expressing affection to peers, social withdrawal, acting out, sexually abusing others, or difficulties emotionally regulating from hyperarousal in the LHPA may hinder the formation of social support systems and solidification of emotion regulation skills, both of which serve as protective factors against depression (Caston & Mauss, 2011; De Bellis & Zisk, 2014; Felitti et al., 1998; Friedrich, 1997; Gariépy et al., 2016; Marshall & Barbaree, 1990; McEwen, 2007). A number of studies have also linked CSA and depression (e.g., Allen et al., 2014) which further support this finding.

Coupled with this CSA versus no CSA finding, a lack of difference among CSA groups suggests that it is the experience of sexual trauma broadly, rather than the age gap specifically that exerts more influence on depression severity. The proposed method of ACE effect (see

Figure 1) represents an equifinality framework of childhood adversity which posits that multiple events or causes can still result in the same outcome. For example, a child whose parents are physically abusive may end up engaging in substance use as an adult but a child whose parents regularly engaged in substance use may also end up engaging in substance use as an adult- different precipitating factors but the same outcome. Thus, the mechanism of effect may not only represent each ACE exposure resulting in the same outcome but also different characteristics of a single ACE (CSA) resulting in the same outcome. Of all outcomes assessed in the present study, depression demonstrated the largest effect size, consistent with past research that has documented that CSA substantially increases depression risk (Allen et al., 2014; Felitti et al., 1998).

Analyses for anxiety revealed that only the ModCSA group (moderately anxious) had significantly higher scores than the NoCSA group (mildly anxious). Comparisons between CSA endorsing groups indicated no significant differences in their anxiety scores. A difference found only between the ModCSA group and the NoCSA group may suggest there is something differentially important about the 5-year modifier for anxiety specifically given both the ModCSA and NoModCSA group were significantly elevated on the other internalizing mental health variable, depression, compared to controls. One difference between the ModCSA and NoModCSA that may account for their differential comparison to controls for anxiety is that ModCSA is the only group that can encompass a parent or adult caregiver as an abuser. This may be important for a number of reasons. Some studies suggest differences in perpetrator characteristics interact differently in the epigenetic sequelae of response to trauma, while others suggest abusers in a caregiving role start abusing children at younger ages and for longer periods of time (De Bellis, Spratt, & Hooper, 2011; Yancey & Hansen, 2010). Because depression and

anxiety possess differences in their neuroanatomical, neurochemical, and biomarker pathophysiology, earlier exposure to abuse may coincide with a sensitive period for chemical systems that play a key role in anxiety like Gaba and noradrenergic systems (Andersen et al., 2008; Barchas & Altemus, 1999b, 1999a; De Bellis et al., 2011; De Bellis & Zisk, 2014; Maron & Nutt, 2017). Additionally, prolonged activation of these system as can be anticipated when a child continues to rely on their abuser which may also result in higher anxiety via more severe dysregulation or neuroanatomical changes (Andersen et al., 2008; Barchas & Altemus, 1999b, 1999a; De Bellis et al., 2011; De Bellis & Zisk, 2014; Maron & Nutt, 2017).

Another reason the inclusion of a perpetrator in a caregiving role may account for differences in anxiety is how this influences attributions about abuse. For example, disruptions in attachment relationships may result in a belief that the world is not safe or predictable in addition to feelings of shame and guilt whereas those in the NoModCSA who are not being sexually victimized by their adult caregivers, may only experience ruminations like guilt and blame that account for their elevated depression but not their elevated anxiety compared to controls (Daigneault, Tourigny, & Hébert, 2006; De Bellis et al., 2011; Feiring & Cleland, 2007). As discussed in relation to depression, the mechanism of effect for ACEs on health outcomes adheres to an equifinality model meaning differences may occur along any strata of the pyramid. Thus, while all roads lead up, it may be that at the level of ACE exposure, those whose CSA perpetrator was 5-years or older than them sent them on one track up along the mechanism while those whose perpetrator was less than 5-years or older than them set them on another.

An alternative explanation may pertain to the age of the perpetrators in the NoModCSA group. Results from Allen and colleagues (2014) had been used to inform the hypothesis that all CSA endorsing groups would be higher than the NoCSA group. However, in reexamining their

findings, they report significantly higher anxiety scores for their teen perpetrator group compared to their no CSA group but did not find this group difference when the perpetrator was a child. Our study's NoModCSA group endorsement allowed inclusion of both child and teen perpetrated CSA. Given Allen's findings, it is possible our NoModCSA group is composed of more child perpetrated abuse rather than teens which would put our findings in line with theirs (Allen et al., 2014).

In light of ModCSA being the only CSA group to score significantly higher than NoCSA, a lack of difference among CSA endorsing groups does not allow interpretations similar to those made for depression. Though a lack of difference between CSA group finding was hypothesized, it is counter to previous research done by Allen and colleagues who found increased anxiety scores for those abused by a teen compared to those abused by an adult (2014). This may be due to a difference in measure used because Allen and colleagues (2014) assessed anxiety using the anxiety subscale of The Trauma Checklist 40 rather than the GAD-7 used in our study.

Additionally, the discrepancy with past research may also be due to a timing bias; when looking at the pattern of their results, the group abused by a teenager was significantly higher than any others, across all constructs (Allen et al., 2014). As they took their sample from undergraduate students with a mean age of 22.8, it is possible that those experiencing abuse by a teenager experienced this more proximally to the time of assessment and thus had elevated scores due to fresher trauma while the present study had a sample mean age around 30, allowing more temporal distance between sexual abuse experiences and self-report. Collectively, findings for depression and anxiety indicate comparably poor mental health outcomes when comparing CSA groups to each other but not when comparing to controls. Whether a CSA survivor experiences

clinically significant anxiety and depression or just depression may be impacted by the age of the perpetrator.

Physical health. As hypothesized and supported by previous literature, physical health outcomes were also poorer for those who had experienced CSA than those who had not (Felitti et al., 1998; Hillberg et al., 2011). Analyses for somatic symptoms revealed increased burden for both ModCSA and NoModCSA groups (moderate burden) compared to NoCSA (low burden). Comparisons among CSA endorsing groups indicated no significant differences in their somatic symptom burden scores.

Differences between CSA endorsing groups and the NoCSA group suggest those who have experienced CSA have higher somatic symptom burdens than those who were never abused. This finding, including the effect size, is also in agreement with a meta-analysis of physical health outcomes and CSA (Hillberg et al., 2011). Studies accounting for the mechanism of effect for ACEs (see Figure 1) suggest this equifinality finding may be the result of cortisol induced immune suppression, adoption of maladaptive coping skills like risk adoption behaviors as a means of coping with higher perceived stress, and social determinants of health like poverty related health care access issues or higher body weight because quality food is not affordable (McEwen, 2007; Monnat & Chandler, 2015; Nurius, Green, Logan-Greene, Longhi, & Song, 2016; Yoshikawa, Aber, & Beardslee, 2012). Additional studies have found adult health behaviors and mental health difficulties link ACE exposure to poor physical health outcomes, particularly CSA to obesity and diabetes (Monnat & Chandler, 2015; Nurius et al., 2016). Research has posited that this particular connection may be related to feelings of shame or guilt, vegetative symptoms of depression, serve as an adaptive means of perceived protection, or may be due to reduced metabolic activity due to overproduction of cortisol (De Bellis & Zisk, 2014;

Gustafson & Sarwer, 2004; McEwen, 2007). As feelings of shame and guilt and decreased activity are often central to depression, the parallel findings of somatic burden and depression is logical (American Psychiatric Association, 2013). Additionally, Figure 1 shows poor physical health outcomes closer to the top of the pyramid which corresponds to being both later in the mechanism of effect and later in the lifespan, as this effect occurs further down the mechanism, a diffusion of impact may be why the effect size for somatic symptom burden was slightly lower than mental health outcomes. This is particularly salient for depression which encompasses shame, guilt, inactivity, sleep disturbances, increased proinflammatory cytokine production, and social isolation, all of which are hypothesized to contribute to these poor health outcomes (Kiecolt-Glaser & Glaser, 2002; Monnat & Chandler, 2015; Moussavi et al., 2007; Nurius et al., 2016).

Coupled with this CSA versus no CSA finding, a lack of difference among CSA endorsing groups suggests that it is the experience of sexual trauma broadly rather than the age gap specifically that exerts more influence on somatic symptom burden. Findings from Hillberg and colleagues (2011) also supports this result as they found no significant differences between CSA groups for physical health outcomes, though the groupings they used were not the same as our groupings. Findings for physical health were not limited to specific physical symptoms.

Analyses for self-rated health also revealed lower ratings of perceived health for both the ModCSA and NoModCSA groups (fair to good) compared to the NoCSA group (good to very good). Comparisons among CSA endorsing groups indicated no significant differences in perceptions of their health. Differences between CSA endorsing groups and the NoCSA group indicate those who have experienced CSA perceive themselves as less healthy than those who have not experienced CSA. Their perceived health appraisal seems to be an accurate reflection

given their increased somatic symptom burden as indicated by high SSS-8 totals. This finding represents a convergence of previous research that has demonstrated links between ACE and poorer perceived health broadly, as well as sexual trauma and lower perceived health (Felitti et al., 1998; Hillberg et al., 2011).

Coupled with this CSA versus no CSA finding, a lack of difference among CSA groups again suggests that it is the experience of sexual trauma broadly rather than the age gap specifically that exerts more influence on perceptions of health. The effect for perceived health was the smallest effect in the study to still maintain significance. As noted by previous research on self-rated health, this makes sense as the vaguarity of the language used to assess this construct leaves it up to the participant to determine what to include in their appraisal of their health (e.g., Physical vs. mental, inclusion of past health events, idiosyncratic weighting of one criteria over another) (DeSalvo et al., 2005; Garbarski, 2016; Schnittker & Bacak, 2014). As the sample is largely in their late 20s and early 30s, it is not surprising that all groups rated themselves in the “good health” range and a larger effect may be found for samples with an older mean age. This possibility is supported by past research showing that perceived health items may be more sensitive in elderly populations (Idler & Angel, 1990; Kaplan et al., 1988)). Collectively, findings for somatic symptom burden and perceived health indicate comparably poor physical health outcomes for those who have experienced CSA regardless of their specific CSA experience.

Sexual health. Contrary to hypothesis and previous research, sexual functioning was not found to significantly differ across groups (Allen et al., 2014; Felitti et al., 1998). A lack of significant findings may be due to a restricted range in sexual functioning unique to our sample. Scores across all groups were so low that each was within a few points of the clinical cut score

for sexual dysfunction. These indiscriminate, low scores are likely related to the large number of participants who reported being pregnant ($N = 111$, 11.4%) and those actively trying to conceive ($N = 487$, 50%). This is a sizable portion of the sample though not wholly unexpected given the specific Reddit threads in which the survey was posted (e.g., parenting, infertility). Of those trying to conceive, many participants in this sample reported attempts to conceive adversely impacting their sex lives or currently undergoing In vitro Fertilization which requires narrow windows of sexual activity. Others reported past or recent miscarriages as also adversely impacting their sex lives. These experiences would not only impact satisfaction scales of the FSFI, it would also lower their total sexual functioning scores as abstinence during the prior four weeks regardless of reason decreases the total FSFI score.

Previous research linking CSA to decreased sexual functioning had a sample of undergraduates in their early 20s that were likely not trying to conceive at the same high rates found in our sample (Allen et al., 2014). Additionally, they used a sexual dysfunction questionnaire of their own design that is not appended to their publication, rendering it very difficult to determine how similar their measure was to the FSFI used in our study (Allen et al., 2014). Ultimately, we did not find a significant effect for sexual functioning, however, it may be due to floor effects from the unique demographic composition of our study and measure scoring protocols rather than a true lack of effect.

Substance use. Substance use resulted in some findings that were in line with our hypotheses and previous research and others that were not. Contrary to hypotheses and literature base, amount of alcohol use was not found to significantly differ between groups (Felitti et al., 1998; Kendler et al., 2000). A lack of significant findings may be due to a restricted range in

drinking unique to our sample. Scores across all groups were elevated and each group had a mean value within the risky drinking range.

An inability to replicate previous findings for alcohol consumption and CSA may also be due to measurement differences. Felitti assessed alcoholism with a single, face-valid item and Kendler did not describe how they assessed alcohol consumption (Felitti et al., 1998; Kendler et al., 2000). Further, both Felitti and Kendler only differentiated between alcohol dependence and no alcohol dependence whereas our study treated consumption continuously using a multi-item measure (Felitti et al., 1998; Kendler et al., 2000). The dichotomous, categorical methods by which alcohol was assessed in these studies naturally restricts the range of their findings (Felitti et al., 1998; Kendler et al., 2000). Given the way these studies have assessed alcohol consumption, it is possible an effect would be found if a large enough number of individuals fell into an alcohol dependence category to make a comparison to those who did not. When groups were conflated to solely compare CSA to NoCSA, still no statistically significant differences were found.

Considering the unique demographics of our sample, prevalence rates for alcohol consumption among reproductive aged women, largely trying to conceive or whom were already pregnant was investigated. A study assessing alcohol consumption and pregnancy intention found on average, women were having two drinks a week (Pryor, Patrick, Sundermann, Wu, & Hartmann, 2017). This amount of consumption is not considered risky. However, a sizable portion of the sample (20% of women who were trying to conceive and 24% of women who were not) were consuming more than five drinks a week, an amount considered risky. Further, they found 10% of women who intended to conceive and did conceive maintained this amount of drinking through the first trimester (Pryor et al., 2017). These findings suggest risky drinking is

not anomalous among women who are pregnant or trying to conceive but risky drinking is not the norm. As risky drinking was the mean level of consumption for our sample, it is notably higher than Pryor and colleagues' (2017) reported mean level of two drinks. Ultimately, the present study did not find a significant effect for CSA and alcohol consumption. With our sample having a markedly high level of consumption, it is possible, the relationship between CSA and disordered drinking is camouflaged by a restricted, elevated range across each group regardless of CSA exposure. Despite not replicating the positive findings of previous studies that assessed alcohol dichotomously in terms of classifiable disorder, our assessment of alcohol intake as continuous reflects CSA's relationship with a spectrum of alcohol consumption.

As hypothesized and supported by the literature, CSA did predict current tobacco use (Felitti et al., 1998; Kendler et al., 2000). Analysis of current smoking status revealed an increased likelihood of being a current smoker among CSA groups compared to the NoCSA group though, only ModCSA's increased likelihood reached significance. Comparisons among CSA endorsing groups indicated no significant increases in the likelihood of being a current smoker. Differences between CSA endorsing groups and the NoCSA group suggest those who have experienced CSA, particularly within the ModCSA group are more likely to currently use tobacco. This may mirror findings of the singularly significant ModCSA anxiety scores because smoking is often used as a mediant for anxiety. Additionally, the lack of a more substantial increased risk may be counter to previous research due to the artifact of time. Previous research establishing a link between CSA or ACEs and smoking was conducted 19 and 21 years ago, respectively (Felitti et al., 1998; Kendler et al., 2000). As the ills of smoking have come to be well known within the public and regulation of cigarettes have increased, it is possible, not enough people are currently choosing to smoke, particularly while trying to become pregnant or

are pregnant. This is further supported by our sample's prevalence of current smoking (4.54%) aligning with prevalence rates for current smokers (2.1% - 6.4%) among another population of reproductive aged women largely attempting to become pregnant (Pryor et al., 2017). A lack of difference among CSA groups may suggest that it is the experience of sexual trauma broadly rather than the age gap specifically that exerts more influence on current tobacco use or merely reflect prevalence of smoking too low to appreciate any difference in use between groups based on a single characteristic.

As hypothesized and supported by the literature, CSA did predict current drug use but contrary to hypotheses, it was only significant for ModCSA (Felitti et al., 1998; Kendler et al., 2000). Analysis of current substance use reviewed an increased likelihood of current use among CSA endorsing groups compared to the NoCSA group, though this was only significant for the ModCSA group. Comparisons among CSA endorsing groups indicated no significantly increased likelihood of current use. Differences between CSA endorsing groups and the NoCSA group suggest those who have experienced CSA are more likely to be engaged in current drug use. The mechanism of effect pyramid (Figure 1) accounts for this across multiple strata including impaired cognitive ability which may impede long term understanding of their immediate choice, impulse control, adoption of risk behaviors, or even the need to relax given the high state of arousal with increased allostatic load (De Bellis & Zisk, 2014; McEwen, 2007). The singular significance of the ModCSA group and its overlapping pattern of findings with current tobacco use may not be coincidental. Smoking and substance abuse comorbidity rates are exceedingly high (Morisano, Bacher, Audrain-McGovern, & George, 2009). A proposed reason for this is smoking is more socially acceptable, can be done in public without consequence, and staves off cravings for harder substances when they cannot be accessed (Morisano et al., 2009).

A lack of difference among CSA groups in isolation may suggest that it is the experience of sexual trauma broadly rather than the age gap specifically that exerts more influence on current substance use however, as ModCSA, was the only group to be at a statistically significant increased likelihood of use compared to no CSA, this cannot be concluded. Interestingly, drug use across past studies evaluating the relationship between ACEs exposure or CSA and health outcomes tends to hold one of the largest effects yet for our study this effect was small (Felitti et al., 1998; Kendler et al., 2000). The most likely reason our sample did not yield the same magnitude of effect or reach significance for every CSA group may be due to the high ratio of women attempting to become pregnant or actively trying to conceive in our sample. Though the nature of our sample does not ensure drug use would be lower, it likely contributes to our lower than average prevalence rate of drug use (9.55% in total sample). For example, previous research with reproductive aged women found 6% of pregnant women report illicit use while 13% of non-pregnant women report illicit use (McHugh, Wigderson, & Greenfield, 2014). Another study with a similar sample also found lower rates of substance use for those who intended their pregnancies (3.9%) versus those who did not (12.7%) (Pryor et al., 2017). Collectively, findings for alcohol consumption, tobacco use, and drug use indicate comparably poor substance use outcomes when comparing CSA groups to each other, but when comparing to controls, only the ModCSA group demonstrated significantly increased likelihoods of being a current smoker or drug user. This may be related to the elevation of anxiety for ModCSA as drug and tobacco use may reflect means of self medicating the anxiety rather than direct results of CSA.

Based on the present findings, all CSA experiences can manifest in adulthood as poorer mental health (depression) and physical health (higher somatic symptom burden, perceived poor health) while some CSA experiences are more likely to also manifest as poorer mental health

(anxiety) and increased likelihood for substance use (smoking, drug use). The outcomes that were not found to be significantly different between CSA groups and the NoCSA group (sexual functioning, alcohol) may reflect weightier contributions to these variables by factors outside of CSA like genetics, culture, fertility, or emotion regulation. For all variables, there was a lack of statistically significant difference between CSA endorsing groups. If the CDC, state agencies, or community programs have determined the group currently granted access to services (ModCSA) should be allowed these then there is a logical disconnect if a group facing comparable negative outcomes (NoModCSA), should not be provided access to these same services and referrals.

Implications

As discussed in the introduction, the CDC uses the ACEs questionnaire to determine need for mental health funding and public programs to meet these needs, rendering the implications for this study substantial. If our prevalence rate of juvenile perpetrated CSA (12.10%) and rate of those achieving an ACE score of four following removal of the 5-year modifier (11.86%) are extrapolated to the world's population of 3.806 billion women, then 460,623,589 women's experiences of CSA are presently missed under the 5-year modifier and 54,650,256 women would meet the threshold of 4 ACE exposures thereby qualifying for services. Given this, the CDC, affiliated state level departments, and similarly modeled international analogs are grossly underestimating the number of programs and individuals in need of services by excluding nearly 55 million women worldwide and nearly 18 million women domestically. Additionally, given our health outcome findings, these 55 million women globally and 18 million women in the US are not only potentially barred from accessing mental health care services, they are likely to not be provided adequate health counseling concerning their increased risks for physical health issues as they would not be perceived as meeting the 4

threshold that a growing number of agencies and publicly funded programs are using to determine whether a patient will be referred for additional services. Even one missed survivor is too many but these findings are more akin to a call to action to thoughtfully consider and empirically engage in improvement efforts for the ways CSA is evaluated.

Limitations

While these findings highlight a clear need to update the language around sexual assault and abuse to be more inclusive, this study is not without limitation. Though the use of an online survey platform encourages disclosure, it can be vulnerable to other potential threats to validity like multitasking or random responding due to disinterest, drinking, or fatigue. Online administration also does not allow for outside corroboration of self report like an additional chart review as used by Felitti and colleagues (1998) could furnish.

As previously discussed, a lack of consent is implied with the 5-year modifier, which negates any need to add language around consent. However, when assessing without the 5-year modifier, language specifying lack of consent is necessary. Because of this, an item without a 5-year modifier cannot be a verbatim translation of the ACEs CSA item. Though this may dilute comparisons to some extent, the wide variety of wording and permutations of CSA items in the literature, prevents this limitation from being catastrophic (Allen et al., 2014; Bifulco et al., 1997; Edwards et al., 2012; Felitti et al., 1998; Finkelhor et al., 2014; Kendler et al., 2000; Molnar et al., 2001; Rao, 2012; Wyatt, 1985; Young AM et al., 2009). Additionally, in analyses, other ACE exposures were not controlled for which limits the ability to tease apart which findings are the product of total ACE exposure and which are specifically accounted for by CSA.

The use of the AUDIT 5 to measure problematic alcohol use further presents a limitation. Despite the original AUDIT and many of its briefer versions being psychometrically valid and

reliable, the AUDIT 5 is the least studied of the AUDIT measures and thus provides less inscrutable psychometric support. Perhaps unsurprisingly, the AUDIT-5 failed to demonstrate acceptable internal consistency for our sample.

Finally, the threads in which this study was posted on Reddit poses a limitation of narrow sampling. As much of the sample was pregnant, struggling to become pregnant, using IVF, or already a parent, the sample understandably pulls for less substance and tobacco, as well as poorer sexual functioning which may provide an obscured picture that cannot be generalized to a population not facing these challenges. However, given societal expectation, fertility and childrearing are likely to be struggles and transitions that most women, regardless of age can relate to.

Strengths

Despite these limitations, this study also offers several points of strengths. Much of the research including the original ACE study was published before newer measures like the GAD-7 and PHQ-9, now widely used, had been released. Because of this some of the data from these older studies was derived from measures that are now less commonly used or by chart reviews. As the present study uses these newer measures, the present results may be more easily or directly compared to future research. Further, for the studies that do use one of these updated measures, the GAD-7 specifically, have not used statistically optimal scoring practices that provide the proper item weighting and totaling. By assessing outcomes using these contemporary, psychometrically validated measures and scoring guidelines, present findings and conclusions are strengthened by the inclusion of psychometrically sound measures.

As the survey was hosted online, anonymity was guaranteed, promoting honest reporting of the sensitive topics inherent in ACE research and outcome behaviors sensitive to social

desirability effects like drug use and heavy drinking. Another strength lies in the demographic composition of this study. To the best of our knowledge, it is the only study to include a large, international sample looking at ACE exposure and subsequent health outcomes and one of few to assess a population at an average age around 30 which allows ample time to have elapsed since ACE exposure, providing the temporal opportunity for subsequent health difficulties to develop and present. Though the field has much to learn about the complex relationship between ACE exposure and subsequent health outcomes, the current study offers novel and significant contribution to this discussion.

Future Directions

Future research should aim to replicate these results in a more inclusive sample with participants who identify as male and participants who are not currently interested in pregnancy and/or parenting. This may also facilitate positive findings for smoking, drinking, anxiety, and sexual functioning which may have been limited by the restriction of range in these behaviors given the unique nature of our infertility-focused sample. This study has empirically demonstrated a clear shortcoming in the use of the original CSA item in the ACE Study Questionnaire and the significant implications related to under identification of CSA survivors due to the 5-year modifier. Future research should either aim to improve the psychometrics of the ACE Study Questionnaire or to create a new measure of ACEs based on empirically informed best practices to serve as a gold standard measure. Of note, within the citations for this study alone, there are more than nine means of assessing CSA represented across more than five age spans and there are presently four widely used, different measures that include a 5-year modifier (Allen et al., 2014; Bifulco et al., 1997; Edwards et al., 2012; Felitti et al., 1998; Finkelhor et al., 2014; Kendler et al., 2000; Molnar et al., 2001; Rao, 2012; Wyatt, 1985; Young AM et al.,

2009). Additionally, while some measures do exist that use more inclusive language like The Sexual and Physical Abuse Questionnaire (SPAQ), they do not assess the full range of ACEs and thus may not share the same relationship with health outcomes demonstrated by the original ACEs study (Felitti et al., 1998; Molnar et al., 2001). Thus, considering the lack of consensus within psychological research on which tool to use to assess CSA as well as our findings and previous research, a measure that includes a range of ACE exposures and includes a CSA item without a 5-year modifier assessing exposure up to 18 should be a priority for the sake of research cohesion and translational applications.

CHAPTER 5

CONCLUSION

A 5-year modifier on perpetrator age does not adequately reflect the breadth of CSA experiences. Consequently, the 5-year modifier excludes some CSA survivors, resulting in the potential the possibility of missing out on services or referrals despite comparably poor mental and physical health outcomes to survivors whose perpetrator was at least five years older than they were. Thus, the 5-year modifier sends an inaccurate, albeit unintentional, message that an age gap of 5-years is necessary for forced or coerced sexual experiences to be abuse thereby prioritizing an age gap over consent. The present study firmly contends a 5-year age difference makes no appreciable difference in poor outcomes for a survivor of CSA and that CSA regardless of perpetrator age does make a substantial difference in many health outcomes compared to controls.

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