

ADVERSE CHILDHOOD EXPERIENCES AND SEXUAL RISK BEHAVIOR
IN FEMALE YOUTH:
EXAMINING THE MEDIATING ROLE OF EXTERNALIZING BEHAVIORS AND
SUBSTANCE USE AND THE MODERATING ROLE OF RESISTANCE TO PEER
INFLUENCE AND PARENT SUPPORT

by

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A DISSERTATION

Presented to the Department of Counseling Psychology and Human Services
and the Division of Graduate Studies of the University of Oregon
in partial fulfillment of the requirements
for the degree of
Doctor of Philosophy

September 2021

DISSERTATION APPROVAL PAGE

Student: Rachel A. Kovensky

Title: Adverse Childhood Experiences and Sexual Risk Behavior in Female Youth:
Examining the Mediating Role of Externalizing Behaviors and Substance Use and the
Moderating Role of Resistance to Peer Influence and Parent Support

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Degree awarded September 2021

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DISSERTATION ABSTRACT

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Title: Adverse Childhood Experiences and Sexual Risk Behavior in Female Youth: Examining the Mediating Role of Externalizing Behaviors and Substance Use and the Moderating Role of Resistance to Peer Influence and Parent Support

Sexual risk behavior in adolescence can result in serious health consequences that persist across the lifespan, particularly for female youth. While experiences of early adversity have been linked with engagement in sexual risk behavior later in life, little research has examined pathways that may help to explain this association nor modifiable factors that may help to buffer against the direct risk conferred by adverse childhood experiences (ACEs) on adolescent sexual risk-taking. To address this gap, the present study examined substance use and externalizing behaviors as two possible pathways through which ACEs might exert influence on sexual risk behavior in female youth. The present study also tested whether the association between ACEs and sexual risk behavior in female youth depended on youth-reported levels of resistance to peer influence and parent support. I examined data from 122 adolescent females, ages 13-18, who were involved in the juvenile justice system or receiving social supports from local agencies and schools. Female youth were asked to report their exposure to ACEs, engagement in substance use and sexual risk behavior, and overall degree of resistance to peer influence and parent support. Caregivers were asked to report on youth's externalizing behaviors. Findings suggest that increased exposure to ACEs may place female youth at heightened

risk for externalizing behaviors and substance use and that higher ACEs may indirectly increase sexual risk-taking in female youth through substance use. Additionally, findings indicate that ACEs, in the context of low parent support, are significantly linked with increased sexual risk-taking in female youth. Conversely, among youth reporting average to high levels of parent support, the association between ACEs and sexual risk behavior was not significant, suggesting the protective role of parent support. Interventions aimed at preventing or decreasing substance use may be particularly important in reducing sexual risk behavior among at-risk female youth. Further, female youth with low levels of parent support may particularly benefit from interventions that seek to improve the parent-youth relationship as a means to prevent sexual risk-taking in female youth exposed to early adversity.

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Clark, M., Buchanan, R., Kovensky, R., & Leve, L. D. (2018). Partner influences on young women's risky drug and sexual behavior. *Reproductive Health, 15*(1), 156. doi: 10.1186/s12978-018-0598-0

ACKNOWLEDGEMENTS

I wish to gratefully acknowledge my advisor, Dr. Leslie Leve, for her guidance, support, and mentorship both in the preparation of this manuscript and throughout the duration of graduate school. Special thanks are also due to Dr. Atika Khurana, Dr. Emily Tanner-Smith, and Dr. Jennifer Pfeifer for sharing their time, expertise, and support throughout the dissertation process.

I also wish to thank Dr. Leslie Leve for the opportunity to work as a research assistant in her lab at the Prevention Science Institute. Through this experience, I had the privilege of working on the Safe, Healthy, Adolescent Relationships, & Peers (SHARP) Study, recruiting and completing assessments with the youth and caregivers whose participation made the present dissertation possible. I extend gratitude to the SHARP Study participants and the community partners who were integral in helping to refer youth and caregivers to the study, including the Department of Youth Services, Ophelia's Place, Kelly Middle School, First Place Family Center, the Brattain House, and the Boys and Girls Club of Emerald Valley. I also wish to thank the staff at the University of Oregon's Prevention Science Institute, including Sally Guyer, Alyssa Rayhel, Kelsey Van Brocklin, and Lizzy Utterback for their support and leadership.

My support system has also been a sustaining force as I have navigated the dissertation process. I would especially like to thank my partner, Nathan Keffer, for his dedication, unwavering support, and deep love. Special thanks are also due to Kelsey Kuperman for her encouragement, thoughtfulness, and persistent faith in me. Finally, I extend deep gratitude to the many supervisors, faculty and staff, friends, and student colleagues who have provided support and kindness throughout this process.

Dedicated to the mentors in my life who never gave up on me,
seeing in me what I was not yet able to see.

TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION.....	1
Adverse Childhood Experiences and Sexual Risk Behavior.....	3
ACEs and At-risk Female Youth.....	5
Externalizing Behaviors.....	6
Substance Use.....	9
Moderators of the Link between ACEs and Sexual Risk Behavior.....	11
Parent Support.....	11
Resistance to Peer Influences.....	12
The Current Study.....	13
II. METHOD.....	16
Participants.....	16
The Safe, Healthy, Adolescent Relationships, and Peers Study.....	17
Measures.....	18
III. ANALYTIC APPROACH.....	23
IV. RESULTS.....	27
Descriptive Statistics.....	27
Sequential Linear Regression Analyses.....	28
Mediation Analyses.....	30
Moderation Analyses.....	32
V. DISCUSSION.....	36
Summary of Results.....	36

Chapter	Page
ACEs and Sexual Risk Behavior.....	37
ACEs, Externalizing Behaviors, and Substance Use.....	38
Sexual Risk Behavior: The Role of Substance Use.....	39
ACEs and Sexual Risk: Substance Use as an Indirect Pathway.....	40
ACEs and Sexual Risk: The Moderating Role of Parent Support.....	44
Limitations.....	47
Implications for Prevention, Intervention, and Future Research.....	49
REFERENCES CITED.....	55

LIST OF FIGURES

Figure	Page
1. Theoretical mediation model of the relationship between adverse childhood experiences and sexual risk behavior.....	15
2. Theoretical moderation model of the relationship between adverse childhood experiences and sexual risk behavior.....	15
3. CONSORT diagram of study recruitment, eligibility, randomization procedure, and data collection at Time 1 (T1) and Time 2 (T2).....	18
4. SEM measurement and prediction paths with standardized path coefficients for mediation analyses.....	30
5. SEM measurement and prediction paths with standardized path coefficients for moderation analyses.....	32
6. Simple slopes of adverse childhood experiences on sexual risk behavior by level of parent support.....	34
7. Confidence interval and region of significance for the conditional effect of ACEs on sexual risk behavior as a function of parent support.	35

LIST OF TABLES

Table	Page
1. Analysis for potential differences in mean scores for predictor variables and covariates at T1 between sexual risk behavior (T2) responders and non-responders	24
2. Descriptive statistics and bivariate correlations between study variables using raw scores.....	28
3. Summary of sequential regression analysis for variables predicting sexual risk behavior in at-risk female youth.....	29
4. Mediation modeling estimates.....	32
5. Summary of SEM analysis examining the moderation of the effect of ACEs on sexual risk behavior by parent support and resistance to peer influence in female youth	33

CHAPTER I

INTRODUCTION

Sexual exploration is considered to be a normative aspect of adolescent development (Harden, 2014; Tolman and McClelland, 2012; Van de Bongardt, Yu, Dekovic, & Meeus; 2015), with 75% of youth reporting that they have had sex by the age of 19 (Liu, Hariri, Bradley, Gottlieb, Leichter, & Markowitz, 2015). Although adolescent sexuality is not inherently risky, youth who engage in health-risking sexual behavior (e.g., unprotected sex, sex with multiple partners, early sexual debut) are at heightened risk for facing long-term consequences that persist across the lifespan, such as contracting HIV or a sexually transmitted infection (STI) and unintended pregnancy. In fact, youth between the ages of 15-24 account for half of the 20 million STIs that are diagnosed annually in the United States, despite comprising only a quarter of the sexually active population (Centers for Disease Control [CDC], 2018a). Further, although the teen birth rate in the United States has been steadily declining in recent years, it remains higher than those found in much of the developed world (Guttmacher Institute, 2019). Additionally, of teen births in the United States, 75% are unintended (Mollborn, 2017).

Female youth and young women, due to a variety of biological and socio-cultural risk factors, are often at elevated risk for such consequences. For instance, while STI rates are relatively evenly distributed between male and female adolescents, female youth and young women often bear disproportionate health consequences related to STI contraction, including pelvic inflammatory disease, life-threatening ectopic pregnancy, and infertility (CDC, 2018b; Kearney & Levine, 2012). Additionally, within the context of teen pregnancy, female youth and women are often required to take on a majority of

unpaid child-rearing responsibilities and housework, resulting in reduced lifetime educational and occupational attainment (Jung & O'Brien, 2019). Further, female youth in the juvenile justice system and female youth with maltreatment histories are at elevated risk for engaging in sexual risk behavior and thereby incurring the aforementioned consequences (Leve, Van Ryzin, & Chamberlain, 2015; Wilson & Widom, 2008; Hahm, Lee, Ozonoff, & Van Wert, 2010). These findings underscore the need for research focused on understanding the pathways between early adversity and sexual risk and the factors that may help to disrupt this association in order to inform prevention efforts for at-risk female youth and young women.

Two pathways that might partially explain the relation between early adversity and sexual risk behavior in adolescence are the presence of externalizing behaviors and substance use, both of which have been linked to increased rates of sexual risk behavior. First, female youth may engage in sex to modulate difficult and heightened emotional states that often accompany externalizing behaviors and may select peers with similar symptomology who, in turn, reinforce and normalize sexual risk-taking (Fortuin, Van Geel, & Vedder, 2015; Weiss, Sullivan, & Tull, 2015). Second, female youth may use alcohol and other substances as a means to cope with or numb symptoms of psychopathology (e.g., anxiety, anger) associated with increased ACE exposure, which can subsequently impair their sexual decision-making and ability to use safe sex practices (DeBellis, 2001; Ritchwood, Ford, DeCoster, Sutton, & Lochman, 2015; Smith, 2019). While early adversity has been linked with disproportionately high rates of externalizing behaviors and substance use (Garrido, Weiler, & Taussig, 2018; Kjeldsen, Janson, Stoolmiller, Torgersen, & Mathiesen, 2014), very little research has examined the role

that these factors may have in explaining the association between early adversity and later sexual risk.

There is also a paucity of research examining moderators of the association between ACEs and sexual risk behavior, which is critical if we aim to identify modifiable factors that may help to buffer against the direct risk conferred by ACEs on adolescent sexual risk-taking. Further, while there is strong evidence to suggest that factors such as parent support and resistance to peer influence are protective against risk-taking behaviors in adolescence (Simons, Sutton, Simons, Gibbons, and Murry, 2016; Wolfe, Crooks, Chiodo, Hughes, & Ellis, 2012), little research has tested whether such protective factors buffer against the risk conferred by ACEs on adolescent sexual risk behavior.

To address these gaps in the literature, this dissertation will examine the association between early adversity and sexual risk behavior in adolescence and the mediating roles that externalizing behaviors and substance use may have in explaining this association, using a sample of 122 female youth who were either involved in the juvenile-justice system or receiving social supports through local community agencies and schools. I also examined parent support and resistance to peer influence as potential moderators of the direct association between ACEs and sexual risk behavior.

Adverse Childhood Experiences and Sexual Risk Behavior

In the past several decades, a large body of research has unequivocally established that exposure to early adversity confers risk for a range of poor physical, psychological, and behavioral health outcomes. In their seminal study on adverse childhood experiences (ACEs), Felitti and colleagues (1998) asked participants to endorse items measuring whether or not they had experienced childhood abuse (physical, sexual, emotional) and

household dysfunction (exposure to domestic violence, divorce, parent incarceration, addiction, or mental illness). Not only did their findings demonstrate that ACEs are common (even among a largely White, college-educated sample), but that there was a strong graded relationship between childhood adversity and increased risk for a myriad of poor health outcomes (e.g., cancer, heart disease, depression, etc.). Specifically, they found that as the number of experienced childhood adversities increased, so did the risk for developing later poor health outcomes. Their findings also illuminated that experiences of early adversity rarely exist in isolation, but rather, they co-occur and have a cumulative impact on the health and wellbeing of those affected. This finding underscores the need to move beyond a narrow focus on the impact of single-type trauma that had historically dominated the field (Dong et al., 2004; Hughes et al., 2017).

Building upon Felitti and colleagues' foundational study, research has also linked ACEs with a variety of health-risking behaviors (Bellis, Lowey, Leckenby, Hughes, & Harrison, 2014), including sexual risk behaviors and their consequences such as early sexual debut (Hillis et al., 2001), high lifetime number of sexual partners (Felitti, 1998), and contraction of sexually transmitted infections (Hillis, Anda, Felitti, Nordenberg & Marchbanks, 2000). In a recent meta-analysis, individuals with four or more ACEs were found to be over three times as likely to have multiple sexual partners and nearly six times as likely to be diagnosed with a STI than individuals reporting no ACEs (Hughes et al., 2017).

Despite these important advances in understanding the impact of early adversity, one limitation of ACEs research thus far has been the primary reliance on the retrospective accounts of adults, which rests on the accuracy of adult recall (Reuben et

al., 2016). Retrospective accounts of ACEs have been called into question due to concerns about the fallibility of adult memory, false reporting in order to avoid distress or embarrassment, and measurement bias (Colman et al., 2016). In fact, Colman and colleagues (2016), utilizing a longitudinal design with a large nationally representative Canadian sample ($n = 7,466$), found that the development of depressed mood, psychological distress, or chronic stress was significantly associated with the reporting of new experiences of childhood adversity that were not reported 12 years prior. They also found that adults who demonstrated a new sense of mastery in their lives were significantly less likely to report new forms of childhood adversity at the twelve-year follow-up assessment. These findings underscore the importance of prospective research with child and adolescent populations in order to better understand the role of ACEs on subsequent risk behavior and improve prevention and intervention efforts.

ACEs and At-risk Female Youth

The association between ACEs and risk behaviors during adolescence remains understudied, particularly for adolescent populations known to have higher rates of early adversity exposure (Garrido, Weiler, & Taussig, 2018). This scarcity of research is problematic given that such youth often suffer disproportionate negative outcomes associated with increased ACE exposure. For instance, youth involved in the juvenile justice system are at particularly heightened risk, with troublingly high rates of ACEs as compared to youth in the general population (Baglivio, Epps, Swartz, Sheer, & Hardt, 2014). Using a sample of 64,329 justice-involved youth in Florida, Baglivio et al. (2014) found such youth to be significantly more likely to have both ACE exposure (13 times less likely to report zero ACEs) and multiple ACE exposure (four times more likely to

report four or more ACEs) when compared to the predominately low-risk adult sample utilized in the original ACE study (Felitti et al., 1998). Additionally, female youth in the juvenile justice system were at particularly high risk, with significantly higher prevalence rates of each ACE for all 10 ACE indicators when compared to their male counterparts. It is not surprising, therefore, that female youth in the juvenile justice system also demonstrate disproportionate rates of sexual risk behavior (Leve, Van Ryzin, & Chamberlain, 2015). Given these findings, further research is needed not only on the link between ACEs and sexual risk behavior among at-risk female youth, but also on the mechanisms that might explain this association and factors that may help to buffer against the effects of early adversity on sexual risk behavior.

Externalizing Behaviors

One mechanism that might partially explain the association between adverse childhood experiences and sexual risk behavior in adolescence is youth's mental health functioning, specifically the presence of externalizing behaviors. Externalizing behaviors are outward-directed behaviors (e.g., defiance, aggression) that often result in distress and conflict with other people and contexts (Forns, Abad, & Kirchner, 2011). Incidence of such behaviors have been shown to be higher among children and youth exposed to maltreatment and other forms of early adversity (Greeson, Briggs, & Layne, 2014; Hunt, Slack, & Berger, 2017; Kjeldsen, Janson, Stoolmiller, Torgersen, & Mathiesen, 2014). Research has suggested that elevated rates of externalizing behaviors among youth exposed to early adversity may be indicative of disruptions in emotional processing and executive functioning, resulting from exposure to early threatening or deprived environments (Fisher & Pfeifer, 2011; Heleniak, Jenness, Vander-Stoep, McCauley, &

McLaughlin, 2015; McLaughlin, 2016; Miller et al., 2018; Weeland, Overbeek, DeCastro, & Matthys, 2015). For instance, in a recent fMRI study, Peverill, Sheridan, Busso, and McLaughlin (2019) asked adolescents ($n = 57$) with and without maltreatment histories to complete a passive emotional processing task in which they were exposed to negatively-valenced and neutral images. The researchers found that youth with maltreatment histories demonstrated greater negative connectivity between the ventromedial prefrontal cortex and amygdala (a brain network involved in emotion regulation) when presented with negative compared to neutral images. Additionally, they found that such negative functional connectivity was found to be significantly related to increased levels of externalizing behaviors both at the time of the study and two years later.

While the possible mechanisms linking ACEs with externalizing behaviors are beyond the scope of the present dissertation, these findings suggest that externalizing symptomology can be thought of as behavioral markers of possible deficits in regulatory processes acquired through exposure to early adversity (Perry, 2008). Re-conceptualizing externalizing behaviors as possible indicators of early adversity exposure rather than as automatic markers of “deviance” holds important clinical implications (Van Wert, Mishna, & Malti, 2016), particularly within trauma-informed approaches to intervention. Further, given that externalizing behaviors are often more readily observable (e.g., as compared to deficits in executive functioning) and capture a wider range of difficulties often faced by youth with ACE exposure (e.g., emotion dysregulation, impulsive behavior), these behaviors may also hold unique clinical utility, particularly within the

constrained contextual realities that are indicative of many youth service settings such as the juvenile justice system.

In addition to being associated with early adversity exposure, externalizing behaviors have also been linked to sexual risk-taking in adolescence, including early sexual debut, increased number of sexual partners, infrequent condom use, and HIV/STI contraction (Hessler & Katz, 2010; Skinner et al., 2015, Wu, McMahon, & Dodge, 2010). Youth with higher levels of externalizing symptomology may engage in sex as a means to cope with or alleviate intense or negative emotions that often accompany such behaviors (Orcutt, Cooper, & Garcia, 2005; Tull, Weiss, Adams, & Gratz, 2012; Weiss, Sullivan, & Tull, 2015). Further, research has shown that youth with externalizing behaviors tend to select peers with similar externalizing symptomology who, in turn, reinforce and contribute to the maintenance of such behaviors (Fortuin, Van Geel, & Vedder, 2015). Through the lens of social learning theory, such peer selection processes may contribute to selection of peers and sexual partners with similar externalizing behaviors and propensity for sexual risk engagement, thereby increasing the likelihood of youth emulating such behaviors (Clark, Buchanan, Kovensky, & Leve, 2018; Simons, Sutton, Simons, Gibbons, & Murry, 2016).

Although the direct relation between externalizing behaviors and sexual risk behavior is well established, far less research has examined externalizing behaviors as a possible pathway through which early adversity leads to sexual risk-taking in adolescence. In one study that examined this pathway, Jones and colleagues (2013) found an indirect association between childhood sexual abuse and adolescent sexual intercourse through externalizing behaviors in a diverse sample of 657 youth. Further, Voisin,

Hotton, and Neilands (2014) documented a mediating effect of externalizing aggressive behaviors on the association between exposure to community violence and sexual debut (but not HIV risk behaviors) in a sample of African American female adolescents. Finally, in a previous study, my colleagues and I examined the mediating role of externalizing behaviors on the association between ACEs and a composite measure of sexual engagement and risk in the same sample of female youth as is included in the current study, and found that externalizing behaviors partially mediated this relation (Kovensky, Anderson, & Leve, 2019). While these studies point to the importance of externalizing behaviors as a possible mechanism linking early adversity with later sexual risk, future research is needed that: (a) focuses on the impact of cumulative adversity versus single-type trauma and (b) examines specific sexual risk behaviors (e.g., unprotected sex, sex with multiple partners, early sexual debut) in particular as an outcome (versus sexual engagement indicative of normative adolescent development such as kissing or touching).

Substance Use

Another possible mechanism that might partially explain the association between adverse childhood experiences and sexual risk behavior in adolescence is substance use. Exposure to early adversity is a well-established risk factor for substance use in adolescence and young adulthood, including early initiation and development of a substance use disorder (Chatterjee et al., 2018; Duke, 2018; Garrido, Weiler, & Taussig, 2018; Shin, McDonald, & Conley, 2018; Wolitzky-Taylor et al., 2017). The developmental traumatology perspective can be used as a useful theoretical framework for understanding the link between exposure to early adversity and later substance use.

This perspective posits that youth may use substances as a means to cope with or alleviate symptoms of psychopathology (e.g., anxiety, aggression) that arise from disruptions to the stress response and regulatory systems connected with early adversity exposure (DeBellis, 2001; Smith, 2019). Substance use, in turn, has been shown to be associated with heightened risk for sexual risk behavior in adolescence (Rich, Robertson, & Wilson, 2014; Ritchwood, Ford, DeCoster, Sutton, & Lochman, 2015; Ritchwood, DeCoster, Metzger, Bolland, & Danielson, 2016), particularly for female youth due to biological (e.g., lower rates of gastric metabolism) and social (e.g., reduced power in relationships with older male partners) vulnerabilities.

Despite these well-established direct associations, surprisingly little research has examined the role substance use may play in explaining the association between ACEs and sexual risk behavior, particularly among female youth. In one study that examined this pathway in an ethnically-diverse sample of adolescents receiving substance use treatment, Oshri, Tubman, & Burnette (2012) found that the association between child maltreatment (sexual abuse, neglect) and sexual risk behaviors (e.g., sex while under the influence of alcohol/drugs, unprotected sex) was mediated by alcohol and drug abuse or dependence symptoms. Studies have also documented this pathway in adult samples, documenting the mediating role of alcohol and substance use in explaining the link between early adversity and sexual risk behaviors, including HIV/STI diagnosis (e.g., Walsh, Latzman, & Latzman, 2014; Brown et al., 2017). Although these studies suggest that substance use may be an important pathway linking early adversity with sexual risk behavior, there have been several recent longitudinal studies that did not find evidence for substance use as a mechanism between early adversity and sexual risk (Thompson et

al., 2017; Yoon, Voith, & Kobulsky, 2018). While the researchers pointed to the relatively low rates of substance use endorsement in their samples to explain why they may have failed to detect an effect, these mixed findings underscore the need for further research to help elucidate this possible pathway.

Moderators of the Link between ACEs and Sexual Risk Behavior

Alongside the importance of identifying pathways that may help to explain the link between ACEs and sexual risk behavior, there is also a paucity of research on protective factors that are modifiable and that may help to disrupt the direct risk conferred by ACEs on adolescent sexual risk engagement (Baglivio et al., 2015; Garrido, Weiler, & Taussig, 2018). Identifying such protective factors is critical for informing specific targets of intervention aimed at reducing sexual risk behavior in at-risk female youth. Through the lens of the bioecological model of human development (Bronfenbrenner & Morris, 2007), social contexts and interpersonal relationships have a profound impact on human behavior. This impact is particularly salient within the context of adolescent sexual development wherein salient relationships with parents and peers can have a significant impact on both normative and risky sexual behavior (Van de Bongardt, Yu, Dekovic, & Meeus, 2015).

Parent Support

Parent support is one social factor that may help to buffer against the impact of ACEs on sexual risk behavior. When examining proposed mechanisms of change among existing theories of how parenting influences youth's sexual risk engagement (e.g., parent management, harsh parenting, parent support), Simons, Sutton, Simons, Gibbons, and Murry (2016) found parent support to be the most influential parenting variable in

reducing youth sexual risk behavior. Indeed, research has shown that parent support is associated with later sexual debut, higher rates of contraceptive and condom use, and increased competence in sexual interactions (Caruthers, Van Ryzin, & Dishion, 2014; De Graaf, Vanwesenbeeck, Woertman, & Meeus, 2011; E Silva, Van de Bongardt, Van de Looij-Jansen, Wijtzes, & Raat, 2016). In a longitudinal study with nearly 1,000 ethnically-diverse adolescents, Caruthers, Van Ryzin, and Dishion (2014) found that improvements to family relationship quality when youth were 12-15 years old predicted lower rates of high-risk sexual behavior at age 22. Further, parent support has been shown to be a particularly salient protective factor for preventing sexual risk behavior in adolescent females (Kincaid, Jones, Sterrett, & McKee, 2012). Despite strong evidence that parent support plays an important role in preventing female youth's engagement in sexual risk behavior, there is a dearth of research examining whether or not parent support buffers against adolescent sexual risk-taking within the context of female youth's exposure to early adversity. Parent support has been found to moderate the association between ACEs and other risk behaviors in adolescence such as substance use (Brown & Shillington, 2017), but to our knowledge, no studies have examined the moderating effect of parent support on the relation between ACEs and sexual risk behavior, highlighting the need for research in this area.

Resistance to Peer Influences

Another social factor that has been implicated in adolescent sexual risk-taking is peer influence (Ambrosia et al., 2018; Suleiman & Deardorff, 2015). In a series of meta-analyses completed by Van de Bongardt, Reitz, Sandfort, and Dekovic (2015), adolescent perceptions that their peers approved of, were engaged in, and were pressuring them to

participate in sexual activity were found to be more likely to be sexually active. Further, youth who perceived their peers to be engaged in sexual risk behavior were also more likely to display such behaviors. In another study that used an experimental paradigm, Widman, Choukas-Bradley, Helms, and Prinstein (2016) found that 72% of female youth reported a higher likelihood of engaging in sexual risk behaviors when they believed peers could view their responses than when they thought their responses to the same sexual risk scenarios were being submitted privately. These studies demonstrate the salience that peer norms, beliefs, and behaviors hold within the context of adolescent sexual exploration and risk-taking, highlighting the need to examine resistance to peer influence as a possible modifiable protective factor. Research has demonstrated resistance to peer influence to be malleable to change through a variety of intervention approaches (Compton, Jackson, Dimmock, 2016; Norris, Hughes, Hecht, Peragallo, & Nickerson, 2013; Wolfe, Crooks, Chiodo, Hughes, & Ellis, 2012). Further, development of peer resistance skills has been shown to improve peer resistance self-efficacy in the context of sexual risk behavior (Norris, Hughes, Hect, & Peragallo, 2013) and reduce engagement in risk behavior such as tobacco use (Weichold, Tomasik, Silbereisen, & Spaeth, 2015) in adolescents. However, less research has examined whether building peer resistance skills is associated with less sexual risk-taking and to our knowledge, no studies have examined the moderating role of resistance to peer influence on the association between ACEs and sexual risk behavior, underscoring the need for research in this area.

Current Study

Using a sample of female youth who were involved in the juvenile-justice system

or who were receiving support services through schools or community agencies, this dissertation addresses the following research questions:

1. Are higher ACEs associated with higher levels of externalizing behaviors and substance use?
2. Are higher ACEs and higher externalizing behaviors and substance use reported at baseline associated with engagement in sexual risk behavior one year later?
3. Do externalizing behaviors and substance use partially mediate any identified association between ACEs reported at baseline and sexual risk behavior one year later?
4. Do parent support and resistance to peer influence reported at baseline moderate the relation between ACEs reported at baseline and sexual risk behavior one year later?

I hypothesized that higher ACEs would be associated with higher levels of externalizing behaviors and substance use (research question 1), that higher ACEs and more externalizing behaviors and substance use would be associated with increased engagement in later sexual risk behavior (research question 2), that externalizing behaviors and substance use would each partially mediate any identified association between ACEs and sexual risk behavior, indicating a possible pathway from early adversity to sexual risk behavior in adolescence (research question 3), and that ACEs would be associated with sexual risk behavior one year later among youth with low levels of parent support and resistance to peer influence, but not for youth with high levels of

parent support and resistance to peer influence (research question 4). See theoretical models of the relation between ACEs and sexual risk behavior, including theorized mediators (Figure 1) and moderators (Figure 2).

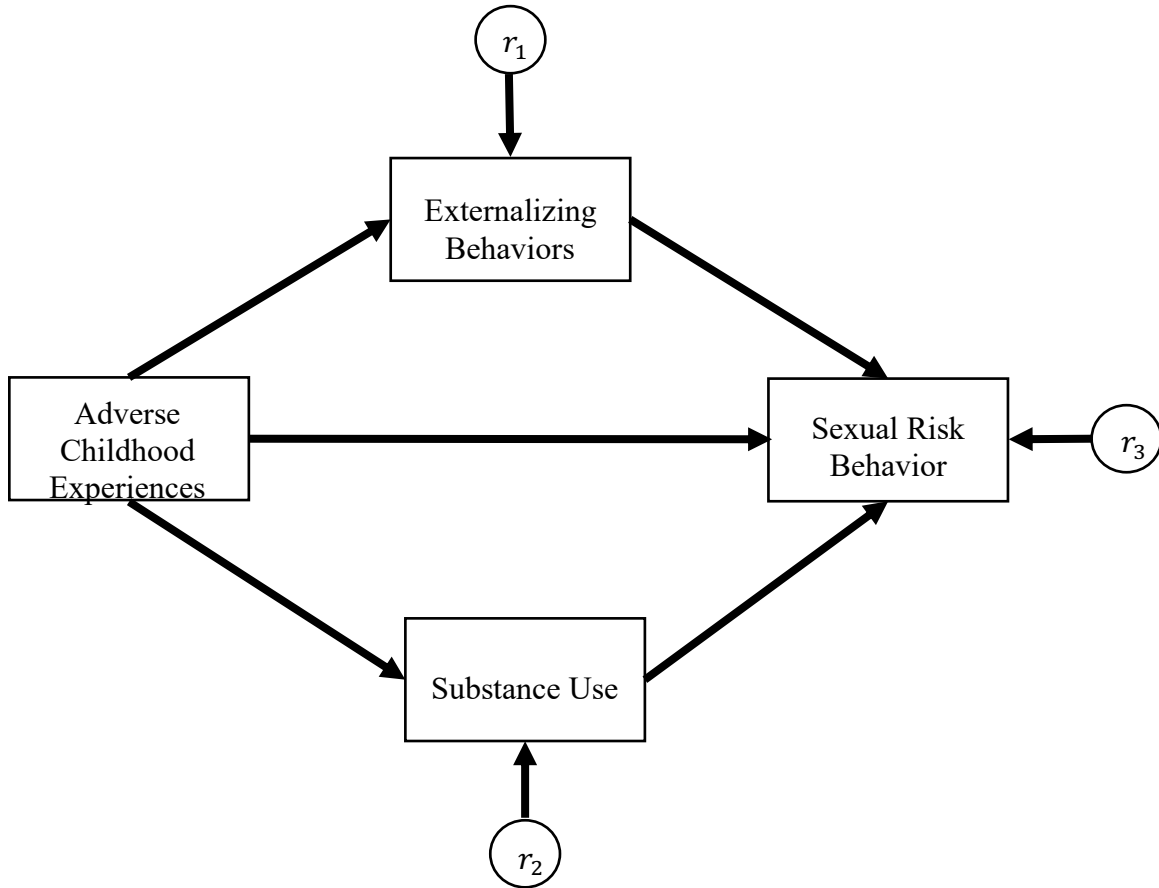


Figure 1. Theoretical mediation model of the relation between ACEs and sexual risk.

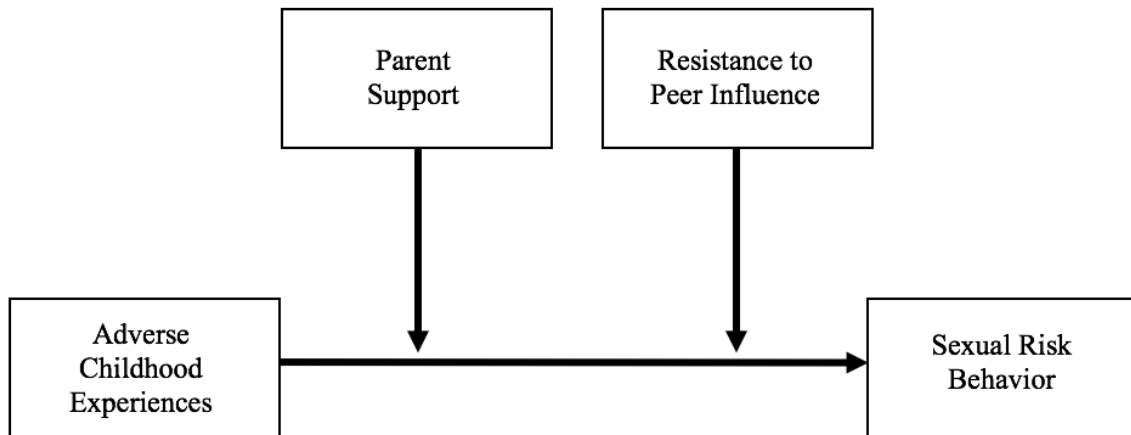


Figure 2. Theoretical moderation model of the relation between ACEs and sexual risk.

CHAPTER II

METHOD

Participants

Data were obtained from 122 adolescent female youth, ages 13-18 at study intake ($M = 15.4$; $SD = 1.48$), and their primary caregivers. All participants resided in a specific medium-sized county in the Pacific Northwest. Approximately two-thirds of the sample ($n = 76$) were recruited from the Department of Youth Services (DYS) and the remaining female youth were recruited from schools and community agencies serving adolescent females. Youth's age and other demographic information such as family income, parents' level of completed education, and family structure (single parent versus two parent households) were collected via self-report from female youths' caregivers. Additionally, youth were asked to report their own racial/ethnic identity. The majority of the sample comprised White youth (67.8%) with the remainder consisting of African Americans (7.4%), Biracial or Multiracial individuals (13.2%), and individuals belonging to other racial-ethnic backgrounds (6.6%), including Asian American (2.5%), Pacific Islander (1.7%), and Native American (2.5%). Approximately 5% of participants did not report or declined to provide their race. Additionally, when asked to identify their ethnicity, 12.4% of participants identified as Hispanic or Latina. Caregivers' report of highest level of education completed indicated that 10% of caregivers had not graduated from high school, 18.3% had a high school diploma or GED, 20.8% had attended some college, 17.5% had an associates or technical degree, and 33.4% had a bachelor's degree or higher. In addition, approximately one third of the caregivers reported annual household earnings under \$20,000, one third reported annual earnings between \$20,000 and

\$39,999, and the remaining third reported annual earnings of \$40,000 or higher. The majority of female youth were being cared for by biological parents (77.7%), with the remaining youth raised by relatives (7.5%), foster parents (5%), or adoptive parents (9.9%). Study inclusion criteria included: female youth between the ages of 13-18, living with a primary caregiver, and caregiver and youth proficiency in English or Spanish. Youth assent and caregiver informed consent were obtained prior to study participation and the study protocol was approved by the institutional review board at the first author's institution. Youth and their caregivers completed all measures on tablet computers provided to them by trained research interviewers during in-person interviews.

Safe, Healthy, Adolescent Relationships and Peers Study

The present study was conducted as part of a longitudinal randomized controlled trial (the Safe, Healthy, Adolescent Relationships, & Peers (SHARP) Study; NCT02420548), that included adolescent females and their caregivers. Once recruited and determined to be eligible for participation, youth and their caregivers were randomly assigned to either an intervention or control condition. Youth and caregivers in the intervention condition were invited to participate in a 14-week community-based intervention in which parents attended a weekly 90-minute skill-building group with other parents in the study and youth met weekly with an individual skills-coach for one hour. These intervention components were designed to reduce substance use, sexual risk behavior, and delinquency by increasing parent supervision, reinforcement, and limit-setting and improving female youth's refusal skills with peers, goal setting, and overall peer/partner relations. In-person assessments were completed with participants in both study conditions to obtain outcome measures at Time 1 (T1, prior to the intervention) and

Time 2 (T2, 12 months later). Study recruitment, eligibility determination, randomization procedure, and data collection at T1 and T2 are depicted in Figure 3.

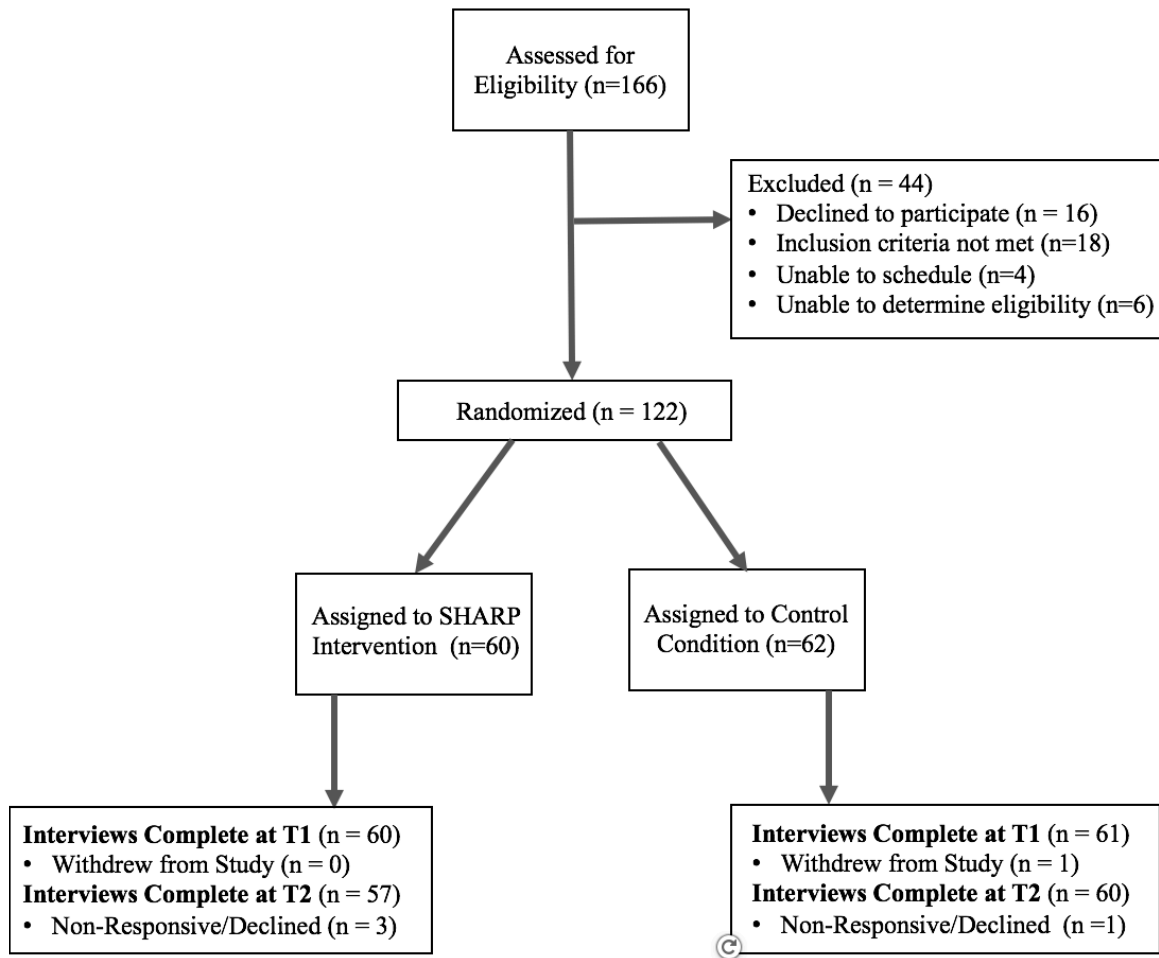


Figure 3. CONSORT diagram of study recruitment, eligibility, randomization procedure, and data collection at Time 1 (T1) and Time 2 (T2).

Measures

Seven measures were administered to collect information about ACEs, sexual risk behavior, externalizing behavior, substance use, parent support, resistance to peer influence, and our control variables, including age, treatment condition, and referral source.

Adverse childhood experiences screening tool (ACE-ST). The Adverse Childhood Experiences Screening Tool, a shortened version of the original ACEs measure developed by Felitti et al. (1998), consists of 10 items that measure childhood exposure to abuse (e.g., physical, sexual, and emotional), neglect (e.g., physical and emotional), and household dysfunction (e.g., parent divorce, substance abuse, mental illness, incarceration, or exposure to domestic violence). The ACE-ST has been found to demonstrate adequate internal consistency and good construct validity (Meinck & Steinert, 2015). For instance, Wingenfeld (2011) examined the psychometric properties of the ACE-ST in a German sample, finding evidence for good internal reliability ($\alpha = 0.76$) and concurrent validity ($r = .84$) between the ACEs screening tool and another validated self-report measure of early adversity, the Childhood Trauma Questionnaire (CTQ). In the present study, female youth were asked at the T1 interview to tally and sum the number of adverse childhood experiences to which they had been exposed, ranging from 0 (no ACEs) to 10 (had experienced all 10 forms of early adversity captured in this measure), and provide their total ACE score.

Sexual risk index. At the T2 interview, female youth completed the Sexual Experiences Survey (Capaldi et al., 2002), which served as our dependent measure of female youth's health-risking sexual behavior. The *Sexual Experiences Survey* was developed to measure sexual risk taking in adolescent samples (Capaldi, 2002). Capaldi and colleagues (2002) included items in this measure only if they demonstrated adequate internal consistency ($\alpha > .60$) and convergence with other indicators designed to capture the same construct (factor loading for a one-factor solution was .30 or higher). In the present study, 3 items of sexual risk behavior from this survey were standardized and

averaged to compute a Sexual Risk Index. This index includes female youth's number of sexual partners, use of safe sex practices, and engagement in sexual intercourse. The Sexual Risk Index demonstrated good internal reliability in the current sample ($\alpha = 0.83$).

Externalizing behavior. At the T1 interview, caregivers completed the externalizing subscale from the Child Behavior Checklist (CBCL), a standardized and widely-used measure of caregiver report of child behavior problems (Achenbach & Rescorla, 2001). The externalizing subscale consists of 35 items that measure rule-breaking and aggressive behavior. In response to brief statements of child externalizing behavior problems (e.g., argues a lot), caregivers were asked to provide responses on a Likert type scale indicating their level of agreement with how well each statement described their teen. Possible values were *Not True* (score = 0), *Somewhat or Sometimes True* (score = 1), or *Very True or Often True* (score = 2). Scores were summed to obtain a raw score. Internal reliability for the externalizing subscale was high ($\alpha = 0.94$).

Substance use. At the T1 interview, youth completed a 17-item questionnaire asking about their lifetime (e.g., ever used) and recent (last 6-months) substance use. In the present study, the lifetime substance use items from this questionnaire were utilized. Female youth were asked if they had ever used tobacco, alcohol, and other drugs, including marijuana, hallucinogens, inhalants, over-the-counter drugs, stimulants, opiates, depressants, club drugs, and/or prescription medications. Response categories were 0 = No and 1 = Yes for each substance, with total scores indicating the number of "yes" responses. Scores ranged from 0 to 11. This substance use index demonstrated good internal reliability in the current sample ($\alpha = 0.84$).

Parent support. At the T1 interview, youth completed the parent support subscale of the Monitor and Parent-Child Relationship Questionnaire (MPCR), a measure developed to assess degree of parent monitoring, attention, support, and communication (Capaldi & Patterson, 1989). Capaldi and colleagues (1989) included items in this measure only if they demonstrated adequate internal consistency ($\alpha > .60$) and convergence with other indicators designed to capture the same construct (factor loading for a one-factor solution was .30 or higher). Youth were asked to think about the caregiver to whom they felt the closest and respond to questions related to how supported they felt by that caregiver (e.g., I can count on him/her to help me out if I have some kind of problem). Youth responded on a Likert type with response items including, *All of the Time* (score = 1), *Most of the Time* (score = 2), *Some of the Time* (score = 3), and *Never* (score = 4). Items were reverse-scored, summed, and averaged to obtain a raw score for the subscale. Internal reliability for the parent support subscale was good ($\alpha = 0.87$) in the current sample.

Resistance to peer influence (RPI). At the T1 interview, youth completed the Resistance to Peer Influence (RPI), a validated measure which was developed to assess how autonomously adolescents behave during peer interactions (Steinberg & Monahan, 2007). Youth were first presented with a series of 10 conflicting descriptors (e.g., “some people think it’s more important to be an individual than to fit in with the crowd” and “other people think it is more important to fit in with the crowd than to stand out as an individual”) and were asked to select the descriptor that best described them. Once youth had selected a descriptor, they were instructed to indicate whether that was “sort of true” or “really true” for them. Items were summed and averaged with higher scores indicating

a greater resistance to peer influence. Internal reliability for the Resistance to Peer Influence measure was adequate ($\alpha = 0.69$) in the current sample.

Covariates. Youth's age, intervention condition, and referral source were accounted for as covariates in the present study. Caregivers were asked to confirm their youth's date of birth at the baseline interview which was used to calculate female youth's exact age. At recruitment, youth and their caregivers were randomly assigned to either an intervention or control condition and an intervention condition variable was created with the control condition coded as 1 and the intervention condition coded as 2. Finally, at recruitment, caregivers were asked to confirm whether they were referred to the study by the Department of Youth Services (DYS), indicating juvenile-justice involvement, or a community agency or school serving female youth. A referral source variable was created with community agency or school coded as 1 and DHS coded as 2.

CHAPTER III

ANALYTIC APPROACH

To test the mediation and moderation hypotheses, structural equation modeling was conducted in R Studio using the lavaan package (Gana & Broc, 2019) to test the possible indirect effects of ACEs on sexual risk behavior through externalizing behaviors and substance use and to determine whether the association between ACEs and sexual risk behavior depended on female youths' reported levels of parent support and resistance to peer influence. I evaluated the assumptions of multivariate normality and linearity, identifying violations of normality with significant positive skew and significant multivariate outliers present. All outliers were ultimately retained as no outliers exhibited undue influence on the model (Cook's $D < |1|$). To account for these non-normal data, maximum likelihood estimation with robust standard errors estimation (MLR) was utilized. Full Information Maximum Likelihood (FIML) was estimated to account for missing data in both the mediation and moderation models after assessing levels and patterns of missingness. For the mediation model, data were determined to be missing completely at random (MCAR) as evidenced by a non-significant Little's MCAR test ($\chi^2[17] = 17.06, p = .45$). In the moderation model, however, data were found to not be MCAR as evidenced by a significant Little's MCAR test ($\chi^2[39] = 57.73, p = .03$). Independent samples t-tests and chi-square tests were conducted to make between-group comparisons between sexual risk behavior (T2) for responders and non-responders for each predictor variable (T1) and all covariates (T1) in the model. Results are detailed in Table 1 and indicated statistically significant differences in resistance to peer influence (T1) scores between responders and non-responders on the sexual risk behavior (T2)

outcome variable. Specifically, non-responders reported significantly less resistance to peer influence (T1) when compared to responders on the sexual risk behavior (T2) outcome. No other statistically significant between group differences were observed.

Table 1

Analysis for potential differences in mean scores for predictor variables and covariates at T1 between sexual risk behavior (T2) responders and non-responders

	<i>M</i>	<i>SD</i>	<i>t</i> -value
ACEs (T1)			
SRB (T2) complete	2.98	2.24	1.27
SRB(T2) missing	3.85	3.00	
Parent support (T1)			
SRB (T2) complete	3.30	0.66	-1.53
SRB(T2) missing	2.98	0.87	
Peer resistance (T1)			
SRB (T2) complete	2.88	0.48	-5.15**
SRB (T2) missing	2.49	0.21	
Age			
SRB(T2) complete	15.36	1.52	1.03
SRB(T2) missing	15.72	1.14	
	Number Complete	Number Missing	χ^2 (df)
Intervention condition			
SRB(T2)	Control = 57 Intervention =51	Control = 5 Intervention =9	1.45(1)
Referral source			
SRB(T2)	Community= 41 DYS =67	Community = 4 DYS =10	0.47(1)

Note. ** $p < .01$

While FIML is not typically recommended when data are potentially not missing at random (NMAR), it is considered adequate to account for missing data when

missingness is moderate (< 25%, Buhi et al., 2008). Considering that $\leq 12\%$ of data were missing for all variables in the moderation model, FIML was used to account for missing data. Models accounted for the effects of all covariates, including age, intervention condition, and referral source, by regressing each study variable on these covariates and using the standardized residuals in subsequent analyses. This was done after models (which initially included direct paths from each of these covariates to sexual risk behavior) demonstrated poor fit to the data ($\chi^2(7) = 48.24, p < .001, CFI = 0.73, RMSEA = 0.22, SRMR = 0.13$). Given recommendations that SEM models adhere to a minimum ratio of 10 cases for every parameter being estimated (Kline, 2016, p. 16), this model would have required a sample size of 140 to meet this minimum ratio. Thus, in order to reduce the number of free parameters being estimated by the model (and achieve the 10:1 ratio), residualized scores were utilized to account for the effect of covariates rather than estimating their direct paths to sexual risk in the model.

Mediation analysis was conducted with a focus on indirect effects. As recommended by Hayes and Rockwood (2017), I evaluated mediation by testing the model displayed in Figure 1 directly, rather than following the causal steps approach recommended by Baron and Kenny (1986), which can lead researchers to unnecessarily forego testing of indirect effects in the absence of a direct effect between X and Y (Hayes, 2016). The causal steps approach has been further criticized for, (a) its reliance on the assumption that the sampling distribution of the indirect effect is normal and (b) its limited power to accurately detect indirect effects when compared to more modern inferential methods (Hayes, 2016). Bootstrapped confidence intervals have been argued to be a superior procedure for testing mediated pathways as they allow for irregularities

in the sampling distribution of the indirect effect and have been shown to be more highly powered and less prone to Type I and Type II errors (Hayes, 2016). Thus, in the present study, bias-corrected 95% confidence intervals and standard errors for all parameter estimates were produced using 5000 bootstrapped samples as is recommended (MacKinnon, 2008; Preacher & Hayes, 2008). Model fit was evaluated using fit indices that are in line with best practice (Byrne, 2011; McDonald & Ho, 2002) along with their recommended thresholds of a chi-square minimization p-value greater than .05, a comparative fit index (CFI) greater than .95, a root mean square error approximation (RMSEA) of less than .08, and a standardized root mean square residual (SRMR) of less than .06 (Hu & Bentler, 1999).

Moderation analysis was conducted, testing the theoretical model depicted in Figure 2. All predictors were mean-centered prior to creating interaction terms and to entering them into the model. Multi-collinearity was assessed and correlations between predictors were found to fall within acceptable limits ($r < .25$). ACEs, parent support, resistance to peer influence, ACEs x parent support, and ACEs x resistance to peer influence were simultaneously entered into the model, predicting sexual risk behavior. Simple slopes analysis was conducted to determine the nature of significant interaction effects and scores were plotted at the mean and at one standard deviation above and below the mean of parent support. Additionally, a 95% confidence interval for the simple slope of the significant conditional effect as a function of the moderator and the corresponding region of significance were calculated.

CHAPTER IV

RESULTS

Descriptive Statistics

Descriptive statistics and bivariate correlations were examined between all variables of interest using raw scores and are reported in Table 2. ACEs were positively and significantly correlated with externalizing behaviors, substance use, and sexual risk behavior. Externalizing behaviors and substance use were positively and significantly correlated and were also significantly correlated with sexual risk behavior such that female youth who demonstrated higher incidence of caregiver-reported externalizing behaviors and endorsed having used a higher number of substances also reported higher engagement in sexual risk behavior. Referral source was positively and significantly correlated with age, externalizing behaviors, substance use, and sexual risk behavior, with juvenile-justice referred youth being older, demonstrating higher incidence of externalizing behaviors, and endorsing higher rates of substance use and sexual risk behavior as compared to female youth who were referred by community agencies and schools. Age was also significantly correlated with substance use and sexual risk behavior, with older female youth reporting more engagement in such behaviors than younger youth. Intervention condition was significantly correlated with ACEs, with female youth in the intervention condition reporting a higher number of ACEs than youth in the control condition. Further, resistance to peer influence was negatively and significantly correlated with externalizing behaviors and youth-reported parent support was negatively and significantly correlated with ACEs, externalizing behaviors, and substance use.

Table 2

*Descriptive Statistics and Bivariate Correlations between Study Variables using Raw**Scores*

Variables	1	2	3	4	5	6	7	8
1. ACEs (T1)	–							
2. Externalizing (T1)	.34**	–						
3. Substance use (T1)	.41**	.36**	–					
4. Parent support (T1)	-.25**	-.22*	-.19*	–				
5. Peer resistance (T1)	-.08	-.27*	-.02	.07	–			
6. Sexual risk (T2)	.25**	.29**	.67**	-.14	-.02	–		
7. Age (T1)	.10	.17	.43**	.02	.08	.53**	–	
8. Condition (T1)	.19*	.04	.15	.00	.05	.06	.16	–
9. Referral source (T1)	.09	.32**	.38**	-.01	.06	.40**	.35**	-.10
<i>M</i>	3.08	13.12	2.60	3.26	2.84	.03	15.40	–
<i>SD</i>	1.48	11.27	2.46	0.69	0.48	.83	1.48	–
Min	0	0.00	0.00	1.50	1.00	-.70	13.02	–
Max	10	54.00	11.00	4.00	3.89	2.98	18.09	–

Note. * $p < .05$, ** $p < .01$

Sequential Linear Regression Analyses

To test the relationship between the independent variables (ACEs, externalizing behaviors, and substance use) and sexual risk behavior, I conducted a two-stage sequential linear regression as reported in Table 3. In step 1, I entered ACEs as a predictor of sexual risk behavior, controlling for the effects of age, condition, and referral

source. Results indicated a trend-level positive association between ACEs and sexual risk behavior, $b(SE) = 0.23(0.12)$, $p = .05$, 95% CI [-0.01, 0.46], uniquely accounting for 6% of the total variance, $\Delta R^2 = .06$, $\Delta F = 5.76(1, 105) = 5.76$, $p < .05$. In step 2, I entered externalizing behaviors and substance use as predictors of sexual risk behavior, controlling for the effects of ACEs, age, condition, and referral source. In this step, ACEs were no longer significantly associated with sexual risk behavior $b(SE) = 0.03(0.11)$, $p = .82$, 95% CI [-0.19, 0.25]. Further, externalizing behaviors were also not significantly associated with sexual risk behavior, $b(SE) = 0.07(0.11)$, $p = .52$, 95% CI [-0.14, 0.31]. Conversely, results indicated that substance use was positively and significantly associated with sexual risk behavior $b(SE) = 0.50(0.10)$, $p < .001$, 95% CI [0.29, 0.71]. Overall, our model accounted for 29% of the variance in sexual risk behavior, $R^2 = .29$, $F(3, 119) = 14.28$, $p < .001$.

Table 3

Summary of Sequential Regression Analysis for Variables Predicting Sexual Risk Behavior in At-risk Female Youth

Variable	Step 1		Step 2	
	$b(SE)$	95% CI	$b(SE)$	95% CI
ACEs	0.23 (0.12), $p = .05$	[-0.01, 0.46]	0.03(0.11), $p = .82$	[-0.19, 0.25]
Externalizing			0.07(0.11), $p = .52$	[-0.14, 0.31]
Substance use			0.50(0.10), $p < .001$	[0.29, 0.71]
R^2	.06		.29	
F for ΔR^2	5.76, $p < .05$		17.63, $p < .001$	

Mediation Analyses

The model evidenced adequate fit to the data, evidenced by a non-significant chi-square, $\chi^2(2) = 2.90, p = .09$ and other fit indices meeting desired thresholds (CFI = .97, SRMR = .04). The model did not meet the desired threshold for RMSEA (<.08) as recommended by Hu and Bentler (1999), with RMSEA = .13. Given that RMSEA has been shown to falsely indicate poor fit of properly specified models when sample size and degrees of freedom are small (Kenny, Kaniskan, & McCoach, 2015), the remaining fit indices that met desired thresholds (chi square, CFI, SRMR) were utilized to conclude that the model adequately fit the data and did not preclude interpretation of results. Results of the SEM measurement and prediction paths are shown in Figure 4 in the form of standardized betas.

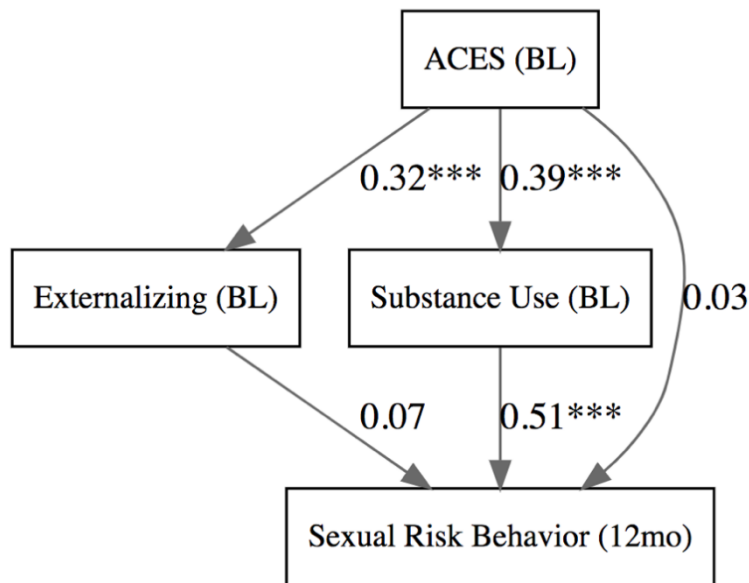


Figure 4. SEM measurement and prediction paths with standardized path coefficients. Note that, during estimation the standard errors and 95% bias-corrected confidence interval for the indirect effect was based on a bootstrapped sample with 5,000 draws.

In support of the mediation hypotheses, the model estimates demonstrated that the indirect effect of early adversity (ACEs) on sexual risk behavior through substance use was statistically different from zero, $p < .01$. ACEs were associated with increased youth-reported substance use ($b(SE) = 0.39(0.09)$, $p < .01$, 95% CI [0.21, 0.57]) and substance use was, in turn, associated with increased sexual risk behavior at T2 ($b(SE) = 0.50(0.10)$, $p < .01$, 95% CI [0.30, 0.70]) The unstandardized indirect effect for ACEs on sexual risk behavior through substance use was positive and significant ($b(SE)=0.20(0.06)$, $p < .01$, 95% CI [0.09, 0.35]. Holding ACEs constant and increasing substance use by 0.39 units (the direct effect of ACEs on substance use), we would expect to see a significant change in sexual risk behavior of 0.20 units, on average (the indirect effect estimate). Contrary to the second mediation hypothesis, model estimates demonstrated that the indirect effect of ACEs on sexual risk behavior through externalizing behaviors was not statistically different from zero. While ACEs were associated with increased incidence of parent-reported externalizing behaviors in female youth ($b(SE) = 0.32(0.09)$, $p < .01$, 95% CI [0.14, 0.50]) externalizing behaviors were not associated with later sexual risk behavior ($b(SE) = 0.07(0.11)$, $p > .05$, 95% CI [-0.13, 0.32]). The unstandardized indirect effect for ACEs on sexual risk behavior through externalizing behaviors was also not significant ($b(SE) = 0.02(0.04)$, $p = .51$, 95% CI [-0.05, 0.10]. Results are summarized in Table 4.

Table 4

Mediation Modeling Estimates

Parameter	<i>b</i>	<i>SE</i>	<i>Z</i>	95% Confidence Interval	
				Lower bound	Upper bound
Direct effects					
Sexual risk ~					
Externalizing	0.07	0.11	0.65	-0.13	0.32
Substance use	0.50**	0.10	4.82	0.30	0.70
ACEs	0.03	0.11	0.23	-0.19	0.25
Externalizing ~					
ACEs	0.32**	0.09	3.49	0.14	0.50
Substance use ~					
ACEs	0.39**	0.09	4.21	0.21	0.57
Indirect effects					
Externalizing (Ind1)	0.02	0.04	0.66	-0.05	0.10
Substance use (Ind2)	0.20**	0.06	3.12	0.09	0.35
Total effects	0.25*	0.12	2.14	0.02	0.47

* $p < 0.05$; ** $p < 0.01$

Moderation Analyses

Measurement and estimation paths for the moderation analysis are shown in Figure 5 in the form of standardized betas.

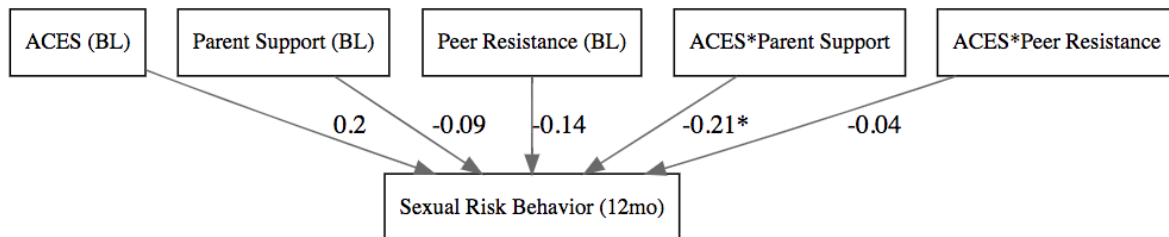


Figure 5. SEM measurement and prediction paths with standardized path coefficients for moderation analyses.

In partial support of the moderation hypotheses, the model estimates demonstrated that the interaction term between ACEs and parent support was statistically significant from zero ($b(SE) = -.24(0.11)$, $p < .05$, 95% CI [-0.46, -0.01]). Contrary to study hypotheses, the main effects of ACEs, parent support, and resistance to peer influence on sexual risk were not statistically significant. Further, the interaction term between ACEs and resistance to peer influence did not significantly predict sexual risk behavior. Fit statistics for the overall model predicting sexual risk behavior were statistically significant, $F(5,106) = 2.54$, $p < 0.05$, $R^2 = 0.13$. Results are summarized in Table 5.

Table 5

Summary of SEM Analysis Examining the Moderation of the Effect of ACEs on Sexual Risk Behavior by Parent Support and Resistance to Peer Influence in Female Youth

Parameter	<i>b</i>	<i>SE</i>	<i>Z</i>	95% Confidence Interval	
				Lower bound	Upper bound
ACEs	0.21	0.12	1.71	-0.03	0.45
Parent support	-0.09	0.10	-0.91	-0.28	0.10
Peer resistance	-0.14	0.10	-1.33	-0.34	0.07
ACEs x parent support	-0.24*	0.11	-2.07	-0.46	-0.01
ACEs x peer resistance	-0.04	0.09	-0.43	-0.20	-0.13

$R^2 = 0.13$, $MSE = 0.91$

$F(5,106) = 2.54^*$

As illustrated in Figure 6, simple effects analyses were conducted at lower and higher levels of parent support to determine the nature of the interaction on sexual risk

behavior. Tests of simple effects demonstrated that parent support moderated the relationship between ACEs and sexual risk behavior when youth reported lower levels of parent support ($b = .44, p < 0.01$). The simple regression slopes were not statistically significant at the mean ($b = 0.21, p = 0.08$) or at higher levels of youth-reported parent support ($b = -0.02, p = .91$).

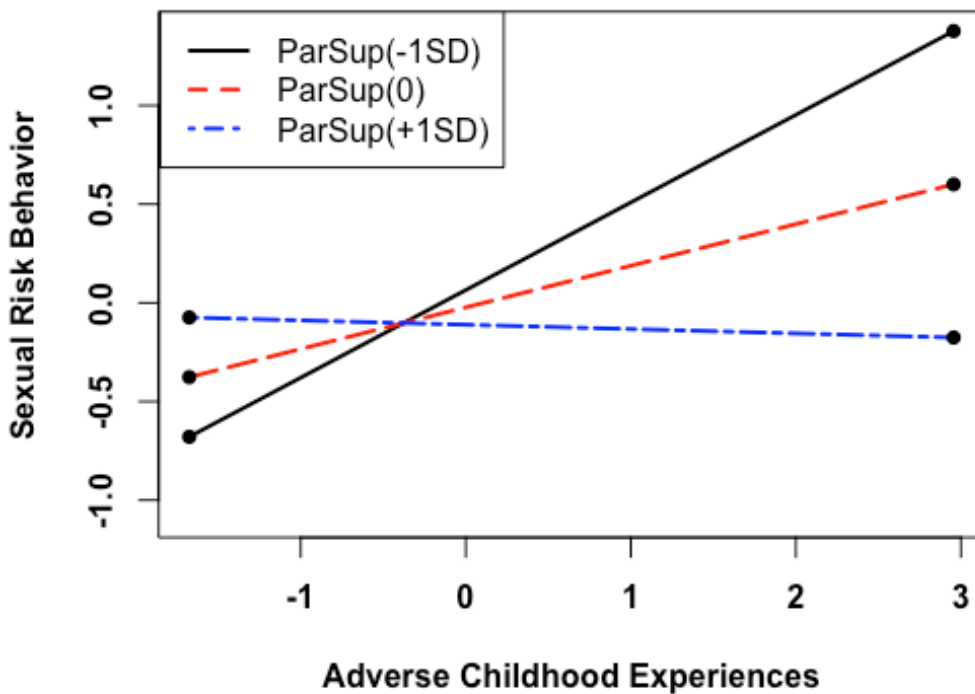


Figure 6. Simple slopes of adverse childhood experiences predicting sexual risk behavior for 1 SD below the mean of parent support, the mean of parent support, and 1 SD above the mean of parent support.

Additionally, the 95% confidence interval for the simple slope of the conditional effect of ACEs on sexual risk as a function of parent support and the corresponding region of significance were calculated as illustrated in Figure 7. As can be seen, the region of significance for the conditional effect of ACEs on sexual risk behavior is when parent support ≤ -0.11 . Thus, low parent support exacerbates the effect of ACEs on sexual risk behavior for female youth reporting below average levels of parent support.

At the mean and at higher levels of youth-reported parent support, this conditional effect is no longer statistically significant as is evidenced by the 95% confidence intervals containing zero above this point.

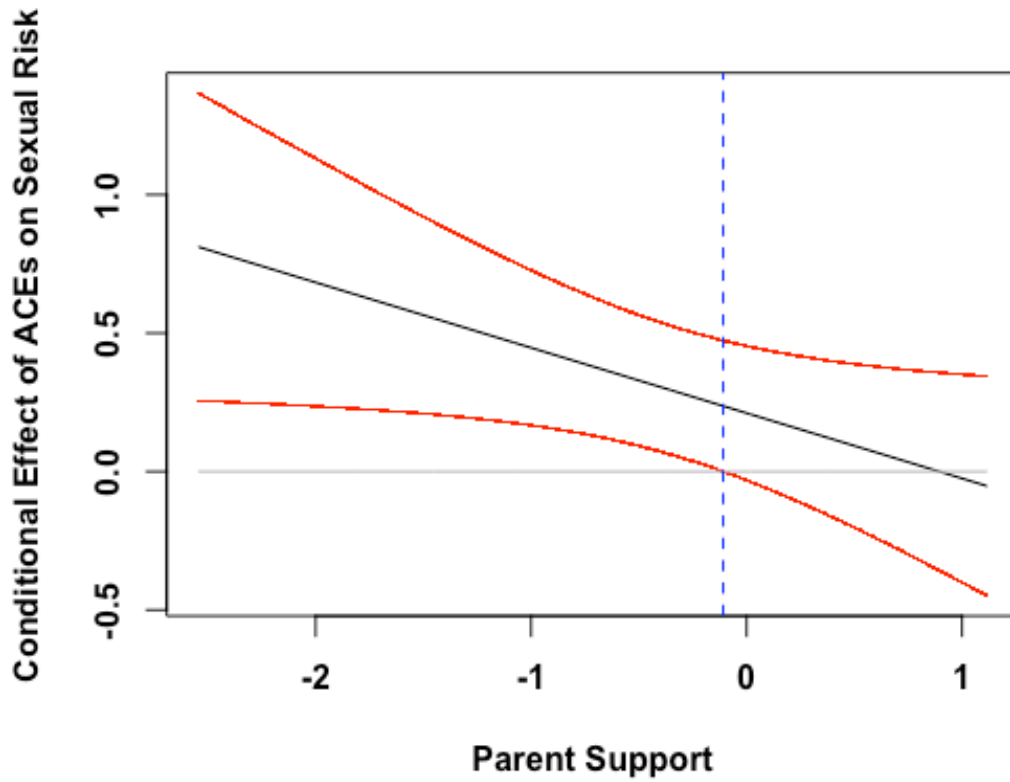


Figure 7. The conditional effect of ACEs on sexual risk behavior as a function of parent support.

CHAPTER V

DISCUSSION

Summary of Results

The present study provides empirical support for: (a) the positive association, albeit not statistically significant, between ACEs and sexual risk behavior, (b) the link between adverse childhood experiences and increased substance use and externalizing behaviors, (c) an indirect effect of ACEs on sexual risk behavior through substance use, and (d) the exacerbating role of low parent support on the association between ACEs and sexual risk behavior in female youth. In support of the first study hypothesis, there was a significant positive association between ACEs and externalizing behaviors and substance use, such that as the number of ACEs increased so did youths' incidence of externalizing behaviors and engagement in substance use. Additionally, in partial support of the second study hypothesis, substance use reported at T1 was associated with increased sexual risk behavior at T2. Contrary to the second hypothesis, externalizing behaviors reported at baseline were not found to be associated with sexual risk behavior reported one year later. Additionally, while a trend-level association between higher ACEs scores and increased sexual risk behavior was observed ($p = .05$), this association was not statistically significant. Further, the third study hypothesis was partially supported. While a significant indirect effect of ACEs on sexual risk behavior through substance use was documented, a significant indirect effect through externalizing behaviors was not observed. Finally, in partial support of the fourth study hypothesis, parent support was found to moderate the association between ACEs and sexual risk behavior, such that the relationship between ACEs and sexual risk behavior depended on the level of parent support youth were reporting. Specifically, the relationship between ACEs and sexual

risk behavior was positive and significant among female youth reporting low levels of parent support. Conversely, for youth reporting average to high levels of parent support, this relationship was not significant. Finally, contrary to our fourth study hypothesis, the interaction between ACEs and resistance to peer influence on sexual risk behavior was not statistically significant.

ACEs and Sexual Risk Behavior

In examining the hypothesized positive link between ACEs and sexual risk behavior, I found a positive, but not statistically significant, association ($p = .05$) between ACEs and sexual risk behavior after accounting for the effects of age, intervention condition, and referral source. Given that a large body of evidence exists for the link between ACEs and sexual risk behavior (Felitti et al., 1998; Hillis, Anda, Felitti, & Marchbanks, 2001; Hillis, Anda, Felitti, Nordenberg & Marchbanks, 2000; Hughes et al., 2017), it was surprising that the association between ACEs and sexual risk behavior, despite trending in the hypothesized direction, was not statistically significant in the present sample of female youth. One explanation for this contrary finding is the present study's small sample size in combination with relatively low rates of endorsed sexual risk behaviors (44% of female youth did not endorse any sexual risk involvement). These sample characteristics may have limited the power and variance in sexual risk behavior necessary to detect a link between ACEs and sexual risk engagement. It is important to note, however, that once the mediator variables (externalizing behaviors and substance use) were entered into the model, the association between ACEs and sexual risk behavior became highly non-significant ($p = .82$). This pattern of results suggests that rather than exerting direct influence on sexual risk behavior, early adversity may instead indirectly

influence sexual risk behavior through its effects on elevated substance use in female youth (as will be discussed later in this discussion).

ACEs, Externalizing Behaviors, and Substance Use

Along with a large body of research that has linked early adversity with externalizing behaviors (Brown & Shillington, 2017; Hunt, Slack, Berger, 2017; Muniz et al., 2019) and substance use (LeTendre & Reed, 2017; Mersky, Topitzes, & Reynolds, 2013; Norman, Byambaa, Butchart, Scott, & Vos, 2012) later in life, the present study provided further evidence that exposure to ACEs is associated with increased incidence of parent-reported externalizing behaviors and youth-reported substance use engagement. While these findings are not novel, it is important to note that much of the research in this area has focused on the impact of single type trauma which does not acknowledge the reality that childhood adversities often co-occur (Dong et al., 2004; Finkelhor et al., 2007) and have cumulative health consequences (Anda et al., 2006). Prior studies have also heavily relied on retrospective accounts of adults which, as previously discussed, may present concerns related to the accuracy of adult recall (Baldwin, Reuben, Newbury, & Danese, 2019; Colman et al., 2016; Reuben et al., 2016). Finally, little research has examined the relationship between ACEs and externalizing behaviors and substance use among adolescent female youth, particularly female youth with juvenile-justice involvement (Garrido, Weiler, & Taussig, 2018). The present study's findings contribute to the literature by providing evidence for the adverse consequences female youth who experience multiple forms of early adversity may face, particularly the heightened risk for substance use engagement and development of externalizing behaviors.

Sexual Risk Behavior: The Role of Substance Use

In support of our second hypothesis, I also found that female youth's substance use at baseline was significantly and positively associated with sexual risk behavior one year later, such that as the number of substances youth reported having used increased, so did their engagement in sexual risk behavior. These findings are consistent with a robust body of literature that has linked substance use with sexual risk in adolescence. In a meta-analysis of 87 studies examining the link between substance use and sexual risk behavior in over 120,000 participants, Ritchwood, Ford, DeCoster, Sutton, and Lochman (2015) documented a small to moderate effect size ($r = .22$) for the positive association between substance use and sexual risk behavior, finding that this relation was stronger among females. The authors pointed to physiological (e.g., lower rates of gastric metabolism) and social reasons (power differentials favoring male partners when negotiating condom use) to help explain why the link between substance use and sexual risk behavior was found to be particularly robust among females. The present study uniquely adds to the literature by documenting the association between substance use and sexual risk behavior among a sample of predominately juvenile-justice involved female youth, a historically understudied group.

Contrary to our second hypothesis, I did not find empirical support for a link between externalizing behaviors and later sexual risk behavior. Several reasons may explain the absence of a significant link between externalizing behaviors and sexual risk engagement. First, in the present study, I conceptualized externalizing behaviors as behavioral markers of possible deficits in regulatory processes acquired through early adversity exposure (Heleniak, Jenness, Vander Stoep, McCauley, & McLaughlin, 2016).

Although guided by theory and clinically useful, using a broad and less precise measure of such regulatory processes may preclude the ability to detect effects. Indeed, more direct measures of these regulatory processes such as emotion dysregulation and negative urgency have been shown to predict sexual risk behavior in young adult samples (Espeleta, Brett, Ridings, Leavens, & Mullins, 2018; Oshri, Sutton, Clay-Warner, & Miller, 2015). Second, given that externalizing behaviors were entered into the model at the same time as substance use, it is also possible that externalizing behaviors, when controlling for substance use, is not a significant predictor of sexual risk. Future research is needed to help clarify these findings, considering that much of the existing research that has linked externalizing behaviors with increased sexual risk has not concurrently examined nor controlled for the effects of substance use.

ACEs and Sexual Risk: Substance Use as an Indirect Pathway

In support of our third hypothesis, I found that ACEs indirectly influenced sexual risk behavior through their effects on increased substance use. These findings are consistent with single-type trauma research that has examined the mediating role of substance use on the association between child maltreatment and sexual risk behavior in adolescence (Oshri, Tubman, & Burnette, 2012; Walsh, Latzman, & Latzman, 2014). Our findings add to the literature by providing empirical support for the indirect pathway from ACEs to sexual risk behavior through substance use among at-risk female youth. ACEs may exert influence on sexual risk behavior through substance use for several reasons. First, research has linked exposure to early adversity with alterations in stress-reactivity (HPA-axis, sympathetic nervous system, and neural responses) which has been shown to operate on adolescent substance use through two pathways: (a) increased

reactivity to stress which leads to heightened negative emotions and subsequent attempts to cope with such emotions through substance use and (b) blunted reactivity to stress which leads to ongoing under-arousal and subsequent attempts to increase arousal through substance use (Chaplin, Niehaus & Gonclaves, 2018). Additionally, early adversity has also been linked with alterations in executive and reward system functioning (Cowell, Cicchetti, Rogosch, & Toth, 2015; Novick, Levandowski, Laumann, Philip, & Tyrka, 2018; Pechtel & Pizzagalli, 2011), which, in turn, has been implicated with adolescent substance use (Khurana et al., 2013; Peeters et al., 2015) via impulsive decision-making and difficulty with being able to fully weigh the consequences of such use (Dir, Coskunpinar, & Cyders, 2014). Once substance use is initiated, such use may place youth at increased risk for sexual risk-taking due to the ways in which substance use leads to sexual enhancement expectancies and psycho-pharmacological effects on decision-making and behavior (Ritchwood, DeCoster, Metzger, Bolland, & Danielson, 2016; Swartzendruber, Sales, Brown, DiClemente, & Rose, 2016).

Additionally, through the lens of peer cluster theory, female youth who engage in substance use are likely to associate with peers and select sexual partners who are also using substances (Oetting & Beauvais, 1987) and, in turn, these deviant peer associations may normalize, reinforce, or provide pressure to engage in sexual risk behavior (Clark, Buchanan, Kovensky, & Leve, 2018; Dishion et al., 2012). Pressure to engage in sexual risk behavior by male partners may be particularly salient for female youth who often face cultural and contextual challenges that may impede their ability to adopt safer sexual behaviors (e.g., negotiation of condom use) such as gender inequality (reduced power in relationships with older male partners; reliance on male partners for financial

security/survival) and gender-based violence (Wingood & DiClemente, 2000). It is unsurprising, therefore, that researchers have documented moderating effects by gender on the relation between substance use and sexual risk behavior such that these effects are significantly stronger for female youth and women while being absent or significantly weaker for male youth and men (Walsh et al., 2014; Yoon, Voith, & Kobulsky, 2018). Future research should examine specific moderators (e.g., relational power, stress reactivity, impulsivity, etc.) of the indirect effect of ACEs on sexual risk through substance use to help elucidate what might be underlying this pathway.

Contrary to our third hypothesis, I did not find empirical evidence for an indirect effect of ACEs on sexual risk behavior through externalizing behaviors. While these findings are incongruent with other research that has identified externalizing behaviors as a mediator of the link between ACEs and adolescent sexual risk behavior (Voisin, Hotton, & Neilands, 2014; Jones et al., 2013; Kovensky, Anderson, & Leve, 2019; Yoon, Voith, Kobulsky, 2018), it is important to note that many of these studies did not control for nor include substance use as a competing mediator in their statistical models. An exception is the study completed by Yoon, Voith, and Kobulsky (2018) in which substance use and externalizing behaviors were simultaneously tested as mediators of the link between physical/sexual abuse and sexual risk behavior. While the authors found evidence for a mediating effect between physical abuse and sexual risk behavior through externalizing behaviors for female youth, they did not document a significant mediating effect through substance use (e.g., alcohol, cigarette, or marijuana). The researchers acknowledged, however, that the low rates of endorsed substance use in their sample may have precluded their ability to detect a mediating effect through substance use. Given that

there is some overlap between the constructs underlying measures of externalizing behaviors and substance use, it is possible that even though externalizing behaviors may significantly mediate the relation between ACEs and sexual risk in a simple mediation model, when substance use is controlled for in a multiple mediator model, the indirect effect of externalizing behaviors may no longer be significant as the effect is likely being driven through substance use.

Additionally, it is also possible that instead of exerting influence on sexual risk behavior directly, externalizing behaviors may instead mediate the relationship between ACEs and substance use which, in turn, may lead to increased sexual risk behavior (ACEs → externalizing behaviors → substance use → sexual risk behavior). In two recent studies, for instance, researchers found that externalizing behaviors partially mediated the association between ACEs and non-medical prescription opioid use in large nationally representative adult samples (Quinn et al., 2019 ; Tang, Ports, Zhang, & Hsien-Chang Lin, 2020). Further, Fava and colleagues (2019) found that externalizing behaviors mediated the relation between ACEs (in early adolescence) and problematic alcohol use, cigarette use, and marijuana use (in late adolescence) in a sample of 465 adolescents. Interestingly, in a subsample of 92 adolescents, fMRI data indicated that increased ACE exposure was linked with lower activation in the anterior cingulate cortex (a brain region involved in executive functioning and self-regulation) in response to inhibitory errors completed during a go/no-go task (measure of error monitoring) which in turn predicted high levels of externalizing behaviors during early adolescence. Thus, future research should examine the relationship from ACEs → externalizing behaviors → substance use → sexual risk behavior in a serial mediation model in order to elucidate these findings.

This line of research may help to explain inconsistent findings present across studies that have tested externalizing behaviors as a mediator of the relation between ACEs and sexual risk behavior.

ACEs and Sexual Risk: The Moderating Role of Parent Support

In support of our final hypothesis, I found that the relationship between ACEs and sexual risk behavior depended upon the level of parent support youth reported.

Specifically, for youth reporting below average parent support, the relationship between ACEs and sexual risk behavior was significant and positive, such that as ACEs increased so did female youth's sexual risk engagement. Conversely, for youth reporting average to high levels of parent support, the relationship between ACEs and sexual risk behavior was not significant. This pattern of results suggests that ACEs, in the context of low parent support, are significantly linked with increased sexual risk-taking in female youth. These results also illustrate the protective role of parent support by demonstrating that, at average and high levels of parent support, the association between ACEs and sexual risk behavior was not significant. This finding adds to a growing body of literature that points to the important role protective factors play in helping to attenuate the deleterious consequences early adversity can have on health and wellbeing (Moore and Ramirez, 2016). Identifying such factors is critical to informing prevention and intervention efforts aimed at promoting and facilitating resilience in the face of adversity. While existing research clearly links parent support with decreased sexual risk engagement in adolescence (Sieving et al., 2017; Simons, Sutton, Simons, Gibbons, & Murry, 2016), the present study adds to the literature by demonstrating that parent support also helps to

disrupt the link between early adversity and increased sexual risk in adolescent female youth.

It is important to note that at average and above average levels of parent support, the association between ACEs and sexual risk behavior was non-significant, suggesting that youth with low levels of parent support are most at-risk and that modest changes in increasing positive support in youth-adult relationships may create meaningful change. These results also suggest that interventions aimed at reducing sexual risk behavior in female youth should specifically focus such efforts on female adolescents exposed to early adversity with poor or limited access to parent support. Kincaid, Jones, Sterrett, and McKee (2012) discussed similar findings in their review of 24 studies that tested the link between parenting and sexual risk behavior in adolescence. Specifically, they found that warm and supportive parenting was a particularly salient protective factor for female youth with regard to sexual risk. They posited that female youth's socialization to be more interpersonally oriented and attuned may help to explain findings that female adolescents tend to be more adversely impacted by deficits in the parent-youth relationship. Although the present study's findings point to parent support as a malleable protective factor that interventions aimed at reducing sexual risk behavior among female youth should seek to increase, it is important to consider that positive parent relationships may not always be viable for youth with high ACEs exposure such as in cases of child abuse or neglect. Thus, one area of needed and valuable research is to test whether or not supportive adult relationships outside of the home context (e.g., mentors, teachers, coaches) help to attenuate the link between early adversity and sexual risk behavior.

Contrary to our final hypothesis, I did not find empirical support for resistance to peer influence as a moderator of the relation between ACEs and sexual risk behavior. Sexual Script Theory (Simon & Gagnon, 1984, 1987, 2003) provides one useful framework for understanding this null finding. This theory posits that sexual scripts, socially constructed beliefs about normative sexual behaviors, not only influence what is deemed as ‘appropriate sexual conduct’, but also inform individuals’ actions in sexual situations. Studies have shown that these sexual scripts differ by gender, with sexual drive, prioritization of sex over romance, and pursuit of multiple sexual partnerships normalized and encouraged among men and male youth while women and female youth are expected to lack desire for sex in lieu of romance, prefer monogamy, and resist male advances for sex. These scripts are thought to create a sexual double standard in which female youth are judged or rejected by peers for the very same sexual behaviors (e.g., sexual activity, multiple sexual partners) that boys are likely to receive heightened social status and praise for (Ellis et al., 2012; McMillan, Felmlee, & Osgood, 2018). Research has shown support for this theory, demonstrating that while male and female youth appear to be equally susceptible to peer pressure, adolescent boys have been shown to be more susceptible to peer influences that promote risk-taking behaviors consistent with the male ideal (McCoy, Dimler, Samuels, & Natsuaki, 2017). Further, Kreager, Staff, Gauthier, Lefkowitz, and Feinberg (2016) found that female youth who reported having had sex were significantly more likely to lose same-grade friends while male youth who endorsed having sex were shown to have significant increases in same grade friends. These findings suggest that, as opposed to male youth, female youth may actually be

socially rewarded for not engaging in sexual risk behavior, helping to explain the null findings for resistance to peer influence as a possible moderator.

Alternatively, given that sexual activity typically occurs privately and separate from larger peer contexts, it is also possible that resistance to sexual or romantic partner influence may be more important as a possible moderator of the link between ACEs and sexual risk behavior in female youth. Given that male youth are socially rewarded for precocious sexual activity, adolescent females may face pressure, coercion, or be relationally rewarded for engaging in sexual activity with male partners (Morrison-Beedy, Grove, & Baker, 2017). Future research should explore whether resistance to partner influence moderates the link between early adversity and sexual risk behavior. Finally, given that I simultaneously tested resistance to peer influence and parent support as moderators of the association between ACEs and sexual risk in the same model, it is also possible that the interaction between ACEs and parent support may be the more powerful influence on the relationship between ACEs and sexual risk and that any contribution the interaction between ACEs and resistance to peer influence made is shared with the effect of the interaction between ACEs and parent support and other predictors in the model. Future research is needed to help elucidate these findings, particularly in larger adolescent samples that provide more power to detect small effects.

Limitations

While the present study provides important contributions to our understanding of the link between ACEs and increased sexual risk behavior among female youth and factors that may help to disrupt this trajectory, several limitations should be noted. First, our sample was relatively small ($n = 122$), limiting statistical power and our ability to

detect small effects. The specifics of the sample also limit the generalizability of our findings to the general population (e.g., our sample was comprised females, predominately identifying as White). It is critical, therefore, that future studies be conducted with larger and more diverse samples to expand upon the current findings. Second, the present study only examined female youth's total ACEs scores, limiting our ability to tests whether specific types (or combinations of types) of early adversity contributed to sexual risk more than others. Additionally, while capturing lifetime poly-substance use among female youth (which has been linked with increased sexual risk behavior, Green et al., 2017), the present study's measure of substance use did not measure frequency, duration, or severity of substance use. Thus, I was not able to assess how such important aspects of substance use and misuse might change the pattern of results observed in the present study. Third, while the cumulative, life-course nature of the ACEs measure permits temporal sequencing between it and the other study variables, study variables were collected about the past 6 months and substance use was a lifetime measure, precluding conclusions about temporal precedence. Although our directional hypotheses were guided by theory and prior results, nonetheless, it is conceivable that sexual risk behavior is the mediator, rather than the outcome in the present study. It is also possible that substance use could have preceded and precipitated ACEs. Fourth, data were considered to not be missing at random in the moderation model and, although FIML is deemed appropriate for this type of data when the degree of missingness is moderate (< 25%), such missing data patterns may have biased the overall results of this model. Finally, the present study did not control for baseline sexual risk behavior, preventing conclusions about changes in sexual risk engagement over time.

Implications for Prevention, Intervention, and Future Research

Despite these limitations, this study has some notable strengths. The use of adolescent report of ACEs in the current study reduced reporter bias inherent in adult retrospective recall. Further, the present study aimed to reduce reporter bias by utilizing both youth and parent report measures. Further, the present study uniquely contributed to the literature by utilizing a sample predominantly comprising juvenile-justice involved female youth, a group that has been historically understudied in ACEs research (Baglivio et al., 2014). The findings from this research have important implications for prevention, intervention, and future research efforts.

In light of the observed links between higher ACEs scores and increased substance use and externalizing behaviors in female youth, universal and early screening for ACEs within school, medical, and behavioral health settings may be useful in order to prevent further or future victimization, provide needed support and treatment to at-risk families (e.g., mental health services, addiction treatment), and identify female youth who could benefit from targeted services aimed at preventing such behaviors and their related health consequences. As Finkelhor (2018) points out, however, widespread screening is only beneficial alongside sufficient and available evidence-based treatment resources to accommodate likely referrals and systemic, upstream efforts to prevent child maltreatment and other forms of early adversity to begin with.

Further, given that ACEs were shown to be positively associated with increased substance use and externalizing symptomology in adolescent females, female youth with elevated ACE scores may benefit from interventions that have been shown to be efficacious at preventing or reducing such symptomology and behaviors. For instance,

Cognitive Behavioral Therapy (CBT) has been shown to reduce externalizing behaviors in youth by increasing their capacity to regulate strong emotions, engage in social problem-solving, and use assertive communication and behavior to effectively resolve conflict (Battagliese et al., 2015; Sukhodolsky et al., 2016). Additionally, given the present study's finding that, in the context of average to above average levels of parent support, there is no association between ACEs and later sexual risk engagement in female youth, including parents in such intervention efforts is imperative for female youth with high ACEs. Specifically, increasing positive parenting practices such as the provision of parent support and decreasing negative patterns in the parent-youth relationship may be particularly helpful in preventing sexual risk behavior in female youth with increased ACEs exposure.

Finally, the findings from this study suggest that preventing and reducing adolescent female's substance use is an important target for interventions aimed at reducing sexual risk behavior in female youth. Although providing effective treatment to female youth who are using substances is imperative, it is also critical to focus efforts on preventing substance use and misuse before it begins. Harrop and Catalano (2016) point to a variety of evidence-based prevention programs for adolescent substance use that can be administered in a variety of settings (school, family, community-level). Prevention programs shown to be efficacious include components such as school curricula that teaches social, emotional, and cognitive skills, parenting programs that promote family management strategies, improved communication, and positive parenting practices, and normative change campaigns. For female youth who are actively using substances, there are a variety of interventions that have demonstrated efficacy at reducing adolescent

substance use, including CBT, behavioral therapy, ecological family-based treatment, assertive continuing care programs, and motivational enhancement therapy (Hogue, Henderson, Becker, & Knight, 2018; Tanner-Smith, Steinka-Fry, Kettrey, & Lipsey, 2016). In particular, interventions that include parents and caregivers as a part of treatment have been shown to be efficacious in treating adolescent substance use and misuse (Allen et al., 2016; Tanner-Smith, Wilson, & Lipsey, 2013). Thus, alongside preventing and treating substance use as a means to disrupt the link between ACEs and sexual risk behavior, such parenting interventions should also focus on improving the quality of parent-youth relationships, specifically increasing positive parent support.

Further, for female youth with elevated exposure to early adversity, it may be helpful and cost-effective to adapt existing evidence-based interventions for reducing sexual risk behavior to include modules focused on substance use prevention and treatment alongside components that utilize informational, motivational, and skills-based content to reduce or delay frequencies of penetrative sex, increase acquisition and effective use of condoms, and improve safe-sex practices with sexual partners (Johnson, Scott-Sheldon, Huedo-Medina, & Carey, 2011).

Research is needed, however, to determine the efficacy of such adaptations to existing evidence-based interventions. There is also strong evidence to suggest that such interventions should also explicitly incorporate content focused on how gender and power impact sexual relationships (e.g., gender/power dynamics of condom use or substance use, particularly when a female youth's partner is using substances). In a review of the literature, Haberland (2015) found that interventions that incorporated such content were five times more likely to be effective at reducing STIs and unintended

pregnancy. Incorporating such content may be particularly important for female youth with high exposure to ACEs who may have had poor models for how to navigate and what to expect within the context of relationships and who may also be with sexual partners who are using substances (Thibodeau, Lavoie, Hebert, & Blais, 2017).

When considering the unique needs of youth involved in the juvenile justice system, interventions found to be efficacious at reducing substance use (e.g., Functional Family Therapy, Multidimensional Family Therapy, Multisystemic Therapy, and Multidimensional Treatment Foster Care) are those that include the following characteristics: (a) are family-based and seek to increase and improve caregivers' behavioral and emotional involvement with their youth, (b) mitigate risk factors (e.g., increase parent monitoring), (c) reinforce protective factors (e.g., increase caregiver engagement and school engagement), (d) use behavioral interventions to target a range of problem behaviors (e.g., learn to identify triggers for substance use and develop skills for avoiding/responding to such cues), (e) are implemented with-in the youth's own community environment (promotes generalization of skills), and (f) prioritize fidelity of intervention procedures (Leve, Van Ryzin, & Chamberlain, 2015; Leve, Chamberlain, Kim, 2015). While research on interventions that have been tailored to meet the unique needs of female youth involved in the juvenile justice system is lacking, there is some evidence to suggest that modifying existing evidence-based interventions to attend to the unique needs of female youth (e.g., incorporating trauma-focused modules in recognition of the differential rates of trauma exposure among female youth in the juvenile-justice system) leads to greater reductions in mental health symptomology and delinquent behavior (Smith, Chamberlain, & Deblinger, 2012). Taken together, community-based

interventions that support both female youth and their caregivers to decrease substance use may be particularly important in reducing sexual risk behavior among at-risk female youth.

In conclusion, the present study also highlights important areas for needed research. First, possible moderators of the indirect pathway from ACEs to sexual risk behavior through substance use should be tested, including factors such as stress reactivity, impulsivity, and emotion dysregulation. Further, in an effort to clarify inconsistent findings present across studies that have tested externalizing behaviors and substance use as mediators of the relation between ACEs and sexual risk behavior, future studies should examine the ACEs → externalizing behaviors → substance use → sexual risk pathway to help elucidate these findings and determine whether or not externalizing behaviors play a unique role in the possible sequential link between ACEs and sexual risk behavior. This work could help the field better understand the mechanisms underlying these relationships and improve intervention specificity. Finally, given the complexity of these models and that the present study may have lacked temporal sequencing and sufficient power to detect small effects, future studies should explore these questions longitudinally and in samples that are adequately powered. Finally, given that many adolescents with high ACEs lack access to a supportive and caring caregiver, research should explore whether the protective effects of parent support on the link between ACEs and sexual risk behavior hold true for supportive adult relationships outside of the immediate home context. Additionally, while resistance to peer influence was not shown to moderate the association between ACEs and sexual risk in the present study, female youth's ability to resist sexual/romantic partners' influence may be a more salient

protective factor for adolescent females. Evaluating such potential protective factors that might moderate the link between ACEs and sexual risk is critical in helping to inform interventions seeking to prevent and attenuate the deleterious effects of early adversity in female youth.

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