Longitudinal examination of contextual risk, promotive factors, and psychosocial functioning using structural equation modeling with a sample of serious adolescent offenders

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LONGITUDINAL EXAMINATION OF CONTEXTUAL RISK, PROMOTIVE FACTORS,
AND PSYCHOSOCIAL FUNCTIONING USING STRUCTURAL EQUATION MODELING
WITH A SAMPLE OF SERIOUS ADOLESCENT OFFENDERS

by

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Abstract

Mental health problems, including substance use problems, are more prevalent among adolescent criminal offenders than among the general population and are associated with an elevated risk of re-offending. It is important to understand what factors are associated with serious adolescent offenders’ future mental health and re-offending outcomes to promote their positive development. This study examined potential mechanisms behind established relationships between risk factors for mental health and criminal offending and psychosocial outcomes while integrating ecological theory and a risk and protective framework. To do this, a mediation model was examined using structural equation modeling in which contextual risk was hypothesized to have an indirect effect on psychosocial functioning through promotive factors. The sample consisted of 417 African American and 200 European American adolescents aged 14 to 17 who participated in the Pathways to Desistance Study and used 3 waves of data at the following time-points: baseline, 36-month follow-up and 72-month follow-up. Results showed that neither the measurement model nor the full structural models provided a good fit for the data. The latent factors Contextual Risk and Promotive Factors were correlated among African American adolescents but not among European American adolescents. These findings further our understanding of risk factors associated with mental health and re-offending outcomes among serious adolescent offenders and have important implications for potential ethnic differences, interventions and future research.
Longitudinal Examination of Contextual Risk, Promotive Factors, and Psychosocial Functioning Using Structural Equation Modeling with a Sample of Serious Adolescent Offenders

Mental health problems are more prevalent among youth criminal offenders than the general youth population (e.g., Cauffman, 2004; Teplin, Abram, McClelland, Dulcan, & Mericle, 2002). Over two-thirds of adolescent offenders suffer from at least one mental disorder (Shufelt & Cocozza, 2006; Teplin et al., 2002). Moreover, the majority of adolescent offenders with at least one mental disorder have more than one mental disorder (Shufelt & Cocozza, 2006). Comparatively, half of adolescents nationally have at least one diagnosed mental health problem and less than half of those adolescents have a second diagnosis (The National Comorbidity Survey-Adolescent Supplement, Merikangas et al., 2009; Merikangas et al., 2010). These statistics are important because this higher rate of mental health problems indicates a need for mental health services in adolescent offenders.

One of the most frequently co-occurring mental health problems seen in youth offenders is substance abuse. Sixty percent of youth diagnosed with a mental health problem also meet criteria for a substance use disorder (Shufelt & Cocozza, 2006). Moreover, adolescent offenders tend to have higher rates of substance use problems than adolescents representative of the general population (Johnston et al. 2000, Potter & Jenson, 2003). This is especially problematic for a youth offending population, as substance use is implicated in re-offending (Hussong, Curran, Moffitt, Caspi, & Carrig, 2004; VanderWaal, McBride, Terry-McElrath, & VanBuren, 2001) and amplifies psychological distress among young offenders (Kenny, Lennings, & Nelson, 2007). The co-occurrence of substance use problems among youth offenders was central to the present study because substance use problems exacerbate the effects of risk on reoffending, especially when they co-occur with mental health problems (Schubert, Mulvey, & Glasheen,
Substance use therefore appears to exacerbate psychosocial problems and can be thought of as a vulnerability factor.

Despite their need for mental health treatment, adolescents involved in the justice system often do not receive mental health care and are less likely to receive adequate services than other at-risk adolescents (Garland et al., 2001; Hazen, Hough, Landsverk, & Wood, 2004). Illustratively, Teplin, Abram, and McClelland (2005) found that only 15% of juveniles in need of mental health treatment received mental health treatment in a detention center and only 8% received treatment after release into the community. One potential reason for this lack of treatment is that adolescent offenders with more mental health problems are more likely to be institutionalized by juvenile courts and when they have had prior mental health treatment, courts appear to be less likely to consider mental health programs as an alternative to incarceration, possibly because prior mental health treatment is judged to have been unsuccessful (Lyons, Royce Baerger, Quigley, Erlich, & Griffin, 2001). Mental health treatment that does exist for adolescent offenders is lacking (e.g., Cocozza & Skowyra, 2000). For instance, group interventions may increase adolescent problem behavior and negative outcomes in adulthood due to aggregation of peers, especially for high-risk adolescents (Dishion, McCord, & Poulin, 1999).

Identifying factors that may lead to and mitigate comorbid substance use and other mental health problems in adolescent offenders would help mental health professionals to tailor mental health interventions to these individuals, thereby reducing negative outcomes for adolescent offenders.

The psychosocial problems of adolescents who have committed serious offenses are not limited to mental health and substance use disorders. There is also evidence that criminal history is a strong predictor of recidivism, or committing more crimes in the future (e.g., Bonta, Law, &
Hanson, 1998; United States Sentencing Commission, 2017). Reducing adolescents’ risk of offending may be one avenue through which to intervene to promote their positive development. Since the psychosocial problems of adolescents who have committed serious offenses are complex, the mechanisms that may explain the offenses are also complex. Resilience cannot be observed directly. Therefore, an estimation of unobserved variables is necessary. In the present study, contextual risk, promotive factors, and psychosocial functioning were considered to be abstract concepts that cannot be directly measured.

**The Present Study**

The present study analyzed potential mechanisms behind established relationships between risk factors and psychosocial outcomes while integrating ecological theory and a risk and protective framework. Specifically considered were factors that put adolescent offenders at risk for mental health and criminal offending, as were factors that may act as mechanisms behind the development of these outcomes. Resources that help an adolescent offender cope with adversity in ways that promote positive development are sometimes called promotive factors (Fergus & Zimmerman, 2005). Oftentimes, the protective factors that are thought to account for resilience are measured by their interaction with a risk factor (e.g., Rutter, 1987). This technique works well in measuring adolescents from the general population. However, putting individuals who are all high risk, as is the case among adolescents who have committed serious crimes (e.g., Bonta et al., 1998; United States Sentencing Commission, 2017), into categories of high and low risk may not be useful when exploring their pathways to better outcomes.

Resilience is a complex process involved in the healthy development of individuals in response to stressors or risk factors (Masten, 2001; Rutter, 1987; Ungar, 2013), including adolescent offenders (Fergus & Zimmerman, 2005; Ungar, Liebenberg, Dudding, Armstrong and
Since resilience is so complex, researchers often struggle with how to measure it. It has been widely agreed upon, however, that certain factors can put individuals at risk and certain factors can protect individuals from risk. Individuals that are protected from risk can be said to be more resilient than individuals who develop poor outcomes as a result of risk. Measuring a number of observed, singular, variables that may account for some of the variance in resilience can be useful in determining parts of what contributes to resilience. However, these variables never account for all of the variance in developmental outcomes, which can be accounted for by other variables as well as measurement error. Estimation of error variance parameters and exclusive measurement of covariance are two advantages to structural equation modeling (SEM), the analytical technique used in the present study (Byrne, 2012; Tabachnick & Fidell, 2013). Latent factors in SEM more closely estimate the complete nature of a relationship than separately measured single variables. The present study hypothesized a mediation model, in which it was predicted that protective factors would make up a latent factor that accounted for much of the relationship between a latent contextual risk factor and a latent psychosocial functioning factor (See Figure 1). Longitudinal data from the Pathways to Desistance Study (Mulvey et al., 2004) were used in the present study and were analyzed with SEM, with which the equivalence of a causal structure can be tested across two groups using multi-group SEM (Byrne, 2012). There was a moderational component to the present study’s hypothesized model in that the hypothesized causal structure was tested for both African American and European Americans. If the structure of the hypothesized model was not equivalent for both groups, this would have indicated differences in risk factors or protective mechanisms between the groups (Byrne, 2012).
The hypothesized complex relationships between variables which were thought to comprise resilience in the present study were supported by Bronfenbrenner’s (1979) Ecological Systems Theory (EST), which centers on how development is influenced by the relationship between an individual and his or her environment. Incarcerated adolescents are spending important developmental years in environments different from those of adolescents who are not incarcerated. As Malloy, Lamb, and Katz (2013) pointed out:

Certain developmental ‘tasks’ (e.g., education, vocational training, dating and intimate relationships, goal setting, cooperation in groups) help adolescents to both develop psychologically and transition successfully into young adulthood and the new roles that may await them (e.g., parent, member of the work force). (p. 668) Incarcerated adolescents accomplish such tasks differently or may not accomplish such tasks during the time that they are incarcerated. Adolescents in the juvenile justice system may therefore develop differently than other adolescents. Within ecological theory, the individual’s macrosystem influences other contexts with which the individual interacts to impact development (Bronfenbrenner, 1979). Macrosystem contexts such as cultural values may influence factors examined in the present study, such as one’s ethnic identity. For this reason and for other reasons detailed below, African American and European American adolescent participants were analyzed separately in the present study.

**Potential ethnic differences.** Empirical evidence supports that the effects of risk and promotive factors on psychosocial functioning may be different for African American and European American adolescents (Crouch et al., 2000; Hull et al., 2008; Rowan, 2016; Yasui et al., 2004; Zapolski et al., 2002). For example, Caldwell et al. (2010) also found self-reported rates of substance use among Caucasian juvenile offenders to be higher than that of African
American or Hispanic juvenile offenders. Specifically covered more below, differential effects were found for African American and European American adolescents when considering the effects of household income on exposure to violence (Crouch et al., 2000), community involvement on mental health (Hull et al., 2008), EI on psychosocial adjustment (Yasui et al., 2004) and substance use and attitudes (Zapolski et al., 2002), and peer and sibling impact on substance use (Rowan, 2016).

Another example of potential differences in mechanisms related to the present study is that African American adolescent offenders receive less mental health services than European American adolescent offenders (Baglivio, Wolff, Piquero, Greenwald, & Epps, 2017; Dalton, Evans, Cruise, Feinstein, & Kendrick, 2009), even though there may be a higher frequency of mental health problems among African American adolescent offenders as compared to European American adolescent offenders (Baglivio et al., 2017). One reason for this disparity may be due European American adolescent offenders being designated as having a serious mental illness more often than African American adolescents by juvenile justice facilities despite few differences in mental health screening (Dalton et al., 2009). Some other potential barriers to service utilization among African American juvenile offenders include mental health stigma, ineffective treatment, fear and shame from peers, and mistrust of mental health providers (Samuel, 2015). It was possible, therefore, that the outcomes in the present study would be different for African American and European American adolescents. In contrast, there may be no ethnic differences in frequency of receipt of treatment for high or low severity of substance use problems in serious adolescent offenders, although serious non-Hispanic Caucasian adolescent offenders may be more likely than other ethnic groups to receive treatment at moderate levels of substance use problems (Mansion & Chassin, 2016).
Limitations of Previous Research

Previous research links both the contextual risk outcomes and promotive factors described in the present study to the outcome variables (See Risk Factors and Promotive Factors sections, below). Some research also links some of the contextual risk and promotive factors, including parental support to exposure to violence (Bennett & Joe, 2015), neighborhood disadvantage to community involvement (Hull et al., 2008), and ethnic identity to family stress (Williams et al., 2013). Moreover, some support has been found for several of the promotive factors considered in the present study as mediators of the effects of risk factors on psychosocial functioning, including emotion regulation (Lansing, Plante, Golshan, Fennema-Notestine, and Thuret, 2017; and similarly, self-control, Evans, Simons & Simons, 2012), neighborhood factors (Zimmerman & Farrell, 2017), and peer factors (Wright, Kim, Chassin, Losoya, & Piquero, 2014). Several pieces of the hypothesized model in the present study have therefore been supported in extant literature, but those studies have not examined full mediation models including these variables. Additionally, although similar mediation models of resilience in which contextual risk indirectly influences psychosocial functioning via promotive factors have been supported (Chung and Steinberg, 2006; Ungar, 2013), those studies did not include a comprehensive list of contextual risk and promotive variables relevant to the psychosocial functioning of adolescent offenders. The present study adds to the literature by providing a full SEM model of a resilience process with youth offenders guided by an integration of two frameworks: a risk and protective framework which emphasizes an indirect effect of an asset or promotive variable on a relationship between risk and an outcome (e.g. Masten, 2001) and Bronfenbrenner’s (1979) EST.
A competing model considered for the present study was Lazarus and Folkman’s (1984) model of stress appraisal. Lazarus and Folkman’s (1984) model, which is called The Transactional Theory of Stress and Coping (TTSC), utilizes Lazarus’ (1966) integration of previous research on stress and coping in which an individual’s appraisal of a stressor determines how the individual responds to or copes with a stressor. “Psychological stress is a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being” (Lazarus & Folkman, 1984, p. 19). Although the present study took into account risk that may endanger a person’s well-being, in the TTSC model (Lazarus & Folkman, 1984), appraisal comes in two forms: An individual first evaluates whether a stressor poses a threat (primary appraisal) and then evaluates potential resources he or she could use to cope with the threat (secondary appraisal). The present study did not take into account the appraisal process of how individuals evaluate whether a stressor poses a threat or how they decide to use resources. Thus, the TTSC model (Lazarus & Folkman, 1984) was not used as a framework for the present study.

**Resilience**

Resilience has been defined as the resulting of a relatively positive psychological outcome despite the combination of serious risk experiences (Rutter, 2006). Stewart et al. (2017) pointed out that although measuring risk factors is essential to determining the necessary services and points of intervention for a particular offender, studying risk does less to contribute to the understanding of what can increase the well-being of offenders and reduce recidivism than does examining personal strengths and other protective factors among offenders. According to Masten (2001), resilience in humans was first studied in the 1970s in children at risk for psychopathology and developmental problems due to their genetic or life circumstances. Masten
(2014) wrote that resilience can be inferred by evaluating whether an individual has experienced risk in their life and whether that individual is adjusting or developing well despite that risk. For such individuals, protective factors have a greater impact on life’s outcomes than do specific risk factors and stressful life events (Werner, 2005). Werner (2005) commented that protective factors that mitigate risk do so regardless of ethnic and social class constraints.

Prior to 1970, risk factors were not discussed from a psychological perspective. However, risk factors were alluded to in epidemiology prior to 1970. For example, Wynder, Bross, and Feldman (1957) referred to suspected etiological factors which may influence the development of cancer in man. They expounded that the principles of epidemiology, already applied to the understanding and preventing of infectious diseases, could now be applied to understanding and preventing chronic illnesses (Wynder et al., 1957). In recent years, even epidemiologists have begun to utilize Bronfenbrenner’s (1979) ecological theory of development due to its wide application in prevention research with youth (e.g., Mustanski et al., 2011).

Ungar (2012) illustrated that qualities of the individual as the locus of change, rather than the environment, were the initial focus of resilience research despite the environment’s influence on developmental processes. Then, an ecological perspective of resilience was presented as reciprocal interactions between the individual and the individual’s environment (Ungar, 2012). Specifically, the way a person copes in response to adversity can be understood as interactions between the individual and elements of the mesosystem (e.g., family, community, and school systems; Ungar, 2012; Bronfenbrenner, 1979).

**Ecological Systems Theory (EST)**

Even though a large percentage of youth who are incarcerated have mental health and substance use problems, there is variability in outcomes. This variability may be explained by
EST, which suggests that individual differences in development are the result of interactions between the individual and the socioenvironmental context (e.g., family, peers, and neighborhood; Bronfenbrenner, 1979).

Bronfenbrenner (1979) described EST as an attempt to integrate science and public policy. EST describes the ecological environment as nested structures which influence the way a developing person interacts with her environment (Bronfenbrenner, 1979). For example, parents can influence their child and their child can influence the parents. In EST, the *microsystem* refers to objects or people with whom the developing individual interacts daily (Bronfenbrenner, 1979). Bronfenbrenner (1979) described the principle of interconnectedness within and between settings: The *mesosystem* refers to settings in which the developing individual actually interacts, while *exosystems* are settings which the individual may never enter, but in which events that influence the individual’s immediate environment occur. Finally, the predominant philosophy and layout of the social institutions (e.g., social classes, ethnic and religious groups) of the individual’s culture are referred to as *macrosystems* (Bronfenbrenner, 1979). In the case of the present study, an adolescent offender’s community is a mesosystem, while the political system that influences the economic conditions of the neighborhood is an example of an exosystem. The present study focused on contextual risk and promotive factors in the individual (i.e. emotion regulation, ethnic identity, self-esteem), the microsystem (i.e. factors pertaining to peers, parents and other adults), and the mesosystem (i.e. neighborhood conditions and community involvement).

According to Bronfenbrenner (1979), a scientist cannot directly observe an individual’s evolving construction of reality. Rather, observation of the individual’s verbal and nonverbal behavior can provide insight into the elements of the microsystem, which were defined by
Bronfenbrenner (1979) as the activities, roles, and relations in which the child engages. It is important to acknowledge that while the present study did not employ behavioral observation, insight into the elements of the microsystem is instead gained primarily through self-report information from study participants (Schubert et al., 2004).

According to Rutter (2006), understanding the mechanisms underlying the variation in people’s responses to the same experiences casts light on the causal processes behind those variations and has implications for prevention and treatment. EST was used in the present study to determine how contextual risk factors may influence psychosocial outcomes among adolescent offenders through promotive factors.

EST provides a useful framework for examining the risk and protective factors for adolescent offenders’ psychosocial functioning outcomes. Risk or protective factors at each of the nested levels in Bronfenbrenner’s (1979) model could affect whether an individual develops resilience. For example, family relationships are at the micro-level and could be either positive or negative, thereby putting an individual at risk or promoting the individual’s development. An adolescent’s neighborhood is a mesosystem, or an environment in which the adolescent interacts; whether or not an adolescent perceives their neighborhood as safe could affect whether an adolescent develops a mental health problem. Ungar et al. (2013) provide a social ecological definition of resilience that can be summarized as the ability of an individual to navigate and use resources, which may be individual or systemic protective processes, effectively to cope.

Other researchers found protective factors to be important in the study of resilience. Rutter (2006) wrote that “resilience is an interactive concept that can only be studied if there is a thorough measurement of risk and protective factors” (p. 3). Others, like Fergus and Zimmerman
(2005), referred to factors that promote resilience as *promotive factors*, which change the course of an adolescent’s development from exposure to risk to an outcome.

In contrast to Rutter, Fergus and Zimmerman (2005) posited three models of resilience, the protective factor model, the compensatory model, and the challenge model. First, like Rutter (2006), Fergus and Zimmerman (2005) posited a protective factor model in which an asset moderates the effect of risk on a negative outcome. Contrary to the protective factor model, in the compensatory model, the promotive factor has a direct effect on the outcome separate from the risk factor (Fergus & Zimmerman, 2005). Masten and Powell (2003) explain that “additive or compensatory models suggest that more resources, such as better parenting, intellectual skills, or social support, can offset the negative effects of risks or adversity so that children have better outcomes” (p. 10). Finally, the challenge model of resilience posits that youth develop coping responses to repeated exposures to risk over time (Fergus & Zimmerman, 2005). Similar to Fergus and Zimmerman (2005), Yates, Egeland, and Sroufe (2003) described a process of resilience similar to the challenge model in which children develop the ability to use internal and external resources despite adversity. The model in the present study was most similar to the challenge model of resilience, in which youth learn to use assets over time in response to challenging experiences. However, the challenge model does not specifically point to protective factors as the mechanism through which an adolescent is resilient and indicates only that youth develop assets over time to deal with risk (Fergus & Zimmerman, 2005).

**Mediation Model of Risk and Protective Factors**

Masten (2001) described an alternative indirect model of risk and resilience in which a risk or asset variable affects a positive outcome through a major adaptive system. Although there are many models of resilience, empirical support has been found for models in which protective
or promotive factors mediate the effect of risk on an outcome among adolescent offenders. For example, Chung and Steinberg (2006) analyzed data from a group of 488 primarily economically disadvantaged minority adolescent males and discovered that neighborhood social organization (neighborhood disorder and social cohesion) was indirectly related to delinquency through parenting behavior and peer deviance. Other researchers have found support for similar models. In one instance, Ungar et al. (2013) conducted a path analysis with 13-21-year-olds involved in community, justice and public safety, education, social development, and mental health services. The authors tested a mediation model in which contextual risk, individual risk, service use experience, and service use history would be related to functional outcomes (i.e., school engagement, pro-social behavior, participation in the community) through resilience (comprised there of protective factors such as peer support, relationships with caregivers, cultural connection, and engagement with education; Ungar et al., 2013). In the best fitting model, individual risk and service use experience were directly associated with functional outcomes and the four predictor variables were related to functional outcomes through resilience (Ungar et al., 2013). Although the youth in the study were all at risk and of the same age-range as those considered in the present study, the present study was different from Ungar et al.’s (2013) study because it only included individuals involved in justice and mental health services. The present study also improved upon Ungar et al.’s (2013) study in that it was longitudinal. The two aforementioned studies both found support for mediation of the effects of risk by promotive factors with samples comprised at least partially of adolescent offenders. However, the latter study (Ungar et al., 2013) was flawed due to the way the authors theorized resilience. Despite Ungar et al. (2013)’s reference to social ecology, the authors used a scale of protective factors which they dubbed ‘resilience,’ rather than taking multisystemic factors into account. The
present study built on previous research by using EST (Bronfenbrenner, 1979) to better explain how resilience may work. Although much support has been garnered for mediational models of resilience among adolescent offenders, one of which was the focus of the present study, it was important to consider the possibility of alternative models.

**The possibility of a moderation model.** In the literature on resilience of adolescent offenders, some support has also been found for a moderation model, indicating an effect of an interaction of risk and protective factors. For example, a research article describing analyses comparing buffering and mediational models in a sample of 3rd-12th grade children found support for protective factors (talk with parents and teacher attention) moderating, but not mediating, the effects of threats and victimization on health-compromising behavior (Fitzpatrick, 1997). Other researchers have not found support for moderation models of risk and protective factors among adolescent offenders. For instance, Hoge, Andrews and Leschied (1996) found no evidence of interactions between risk and protective factors in a sample of young offenders. A mediation model fit better than a moderation model in the case of the present study. Adolescent offenders involved in the Pathways to Desistance Study had already committed a serious criminal offense by the baseline measurement, or they would not have been included as participants. As such, it made sense to study their development longitudinally to explain the paths some adolescent offenders took to develop more positive psychosocial outcomes with regard to mental health and desistance from criminal activity. In contrast, moderation involves the interaction between two factors, which does not demonstrate temporal precedence, to predict an outcome. Masten and Powell (2003) expound that some moderators are activated by risk (e.g., emergency services in response to a crisis) and others are stable in a child’s life and alter the course of risk when it occurs (e.g., one’s level of predisposition to anxiety). The promotive factors considered in the
The present study (See Promotive Factors, below) can change over time and do not indicate activation by risk or necessitate stability. Because of the advantages of a mediational as opposed to a moderational model, the present author hypothesized a mediation model in which a substantial portion of the variance of the relationship between contextual risk and psychosocial functioning would be accounted for by promotive factors.

Psychosocial Functioning

The mental health problems considered in the present study were substance use, depression, dysthymia, mania, and post-traumatic stress. The Pathways study did not assess for Conduct Disorder (CD) because the researchers expected that a considerable percentage of the majority would meet the criteria for CD (Schubert & Mulvey, 2014). Previous research has found that to be the case, for example, 87 of 100 incarcerated juvenile offenders met criteria for conduct disorder in a study by Eppright, Kashani, Robison and Reid (1993). That finding is logical in that most of the criteria for diagnosing CD consist of delinquent behaviors (APA, 2013). Other researchers have made similar decisions as those made by researchers in the Pathways study, for example, Copeland, Miller-Johnson, Keeler, Angold and Costello (2007) excluded conduct disorder from their second analysis of which child and adolescent psychiatric disorders predicted young adult criminal offending, due to the high rates of conduct disorder found in the sample.

Risk Factors

The World Health Organization (2017) defines a risk factor as “any attribute, characteristic or exposure of an individual that increases the likelihood of developing a disease or injury.” Mental illnesses are examples of diseases (American Psychological Association [APA], 2013) Mental health problems are directly related to risk factors among adolescent offenders
(Schubert et al., 2011). It is important to assess multiple factors when examining the risk of individuals in context as guided by an ecological framework (Bronfenbrenner, 1979). Illustratively, Jennings, Maldonado-Molina, and Komro (2010) discovered that baseline delinquency, affiliation with deviant peers, residing in a natural parent household, and spending longer without adult supervision were all variables that predicted trajectories of delinquency in older adolescents. In another instance, Adriaanse, Doreleijers, van Domburgh, and Veling, (2016) found that conflicts with parents, affiliation with delinquent peers, less self-esteem, and a weak ethnic identity were among factors that were related to psychopathology in a sample of ethnic minority youth. Below are factors that are supported by empirical research to be related to negative mental health, including substance use, and delinquency outcomes among adolescent offenders and were hence supported as indicators of contextual risk in the present study.

**Neighborhood conditions.** There is evidence that neighborhood disadvantage, called *neighborhood conditions* in the present study, is a risk factor for criminal offending and negative psychological outcomes among young offenders. Neighborhood factors, such as concentrated neighborhood disadvantage (Wright et al., 2014) and high neighborhood crime rates (Brook, Brook, Rubenstone, Zhang, & Saar, 2011) are associated with youth offending. Neighborhood conditions have also been linked to mental health problems, including substance use (Boardman et al., 2001), impulsivity (Lynam, 2000) and traumatic stress (Jaggers, Prattini, & Church, 2016). Extant research therefore supported that neighborhood conditions would impact the psychosocial outcomes relevant to the present study in delinquent adolescents.

**Exposure to violence.** Several studies have shown that violence exposure is a risk factor for offending behavior, including violent behavior, among adolescents (Brown, Henggeler, Brondino, & Pickrel, 1999; Farrell & Zimmerman, 2017; Flannery, Singer & Wester, 2001;
Fitzpatrick, Piko, Wright, & LaGory, 2005; Schwab-Stone et al., 1998), even after controlling for demographic characteristics (income, changes in residence) and protective factors (verbal skills, social competence, family cohesion, peer relations; Brown et al., 1999). Furthermore, while the type of violence to which one is exposed does not necessarily influence offending behavior, the effect on offending risk appears to be stronger with repeated exposure to violence and exposure to multiple types of violence (Farrell & Zimmerman, 2017). Exposure to violence appears to predict criminal offending behavior, especially violence (Flannery et al., 2001; Schwab-Stone et al., 1998), among adolescents.

Exposure to violence and mental health problems are also related in the literature. Violent males who have been exposed to violence may display trauma symptoms, including anger, dissociation, and posttraumatic stress (Flannery et al., 2001). Adolescents exposed to violence and unsafety at school, in their neighborhood and at home may be more depressed, anxious and somaticizing than adolescents who have not been exposed to violence (Fitzpatrick et al., 2005; Schwab-Stone et al., 1998). This evidence that exposure to violence impacts mental health problems, especially depressive symptomology, among adolescents may be different for African American and European Adolescents: African American adolescents reported witnessing significantly more violence than their Caucasian peers (Crouch et al., 2000). The aforementioned research studies highlight that exposure to violence influences mental health, substance use, and delinquency outcomes among adolescents and that factors related to and levels of exposure to violence may differ by ethnic group.

**Parental hostility.** Poor family relationships, especially parental hostility, have been found to correlate with poor psychosocial outcomes among psychosocial offenders. Positive rather than harsh parenting, or a warm rather than hostile emotional style, protects adolescents
from committing violent crimes (Lösel & Farrington, 2012). Parental hostility can manifest in different ways, for example, parents’ use of verbal abuse was found to be a stronger predictor of delinquency than corporal punishment among African American children ages 10-12 (i.e. hitting with an object; Evans et al., 2012). A possible avenue to reduce the effects of verbal abuse and corporal punishment on delinquency was found through self-control (Evans et al., 2012). Family relationship problems (i.e. poor relations between parents and youth, low family cohesion, and poor family communication) are also associated with heightened rates of reoffending among adolescents (Hoge et al., 1996). Moreover, neighborhood disadvantage and family conflict place children at risk for early anti-social behaviors in early childhood and involvement with deviant peers in the neighborhood influences patterns of antisocial behavior over middle childhood (Ingoldsby et al., 2006). Delinquent behaviors were only one psychosocial outcome of interest in the present study which could be impacted by parental hostility and other family relationship problems.

Low family cohesion is also associated with higher rates of psychiatric comorbidity among adolescents (Brown et al., 1999). Relatedly, parental hostility, as reported by adolescents, significantly predicted poorer psychosocial maturity, poorer academic orientation, more internalized distress and more delinquency (Williams & Steinberg, 2011). Cold, unsupportive, and neglectful family environments disturb psychosocial functioning and lead to risk of mental health disorders, including substance abuse (Repetti, Taylor, and Seeman, 2002). The measure of such hostile family environments used in the present study was parental hostility, which is a risk factor for psychosocial outcomes.

**Delinquent peers.** Associating with delinquent peers can also put adolescents at risk for negative psychosocial outcomes, including engaging in delinquency (Ingoldsby et al., 2006;
Jennings et al., 2010), externalizing behaviors and substance use (Brook et al., 2011). In contrast, having nondelinquent peers protects youth from committing violence (Lösel & Farrington, 2012). Incarcerated youth may learn to become better offenders from their incarcerated peers (a phenomenon that has been termed ‘deviancy training’) as they are continuously around other offending peers (Dishion et al., 1999). Discovering whether associating with deviant peers is a contextual risk factor encompassing the latent construct of contextual risk in the present study could inform future interventions (i.e., by focusing on helping adolescent offenders make friends with nondeviant peers in the community and attempting to reduce deviancy training in juvenile justice institutions).

**Parental substance use.** Parental substance use disorder (SUD) is also associated with negative outcomes among children and adolescents, including increased parental neglect (Kepple, 2018) and, as mentioned above, family problems such as parental hostility, abuse, and neglect can lead to negative psychosocial outcomes. Parental substance use also predicts substance use among youth and this relationship is amplified by higher levels of neighborhood opportunities for substance use (Zimmerman & Farrell, 2017). Parental substance use can therefore influence adolescent substance use and neglectful parenting practices, which impact psychosocial functioning in children (e.g., Repetti et al., 2002). In the next section, literature is reviewed on a final parental risk factor that can influence psychosocial functioning in adolescent offenders.

**Parent arrested or jailed.** Another risk factor for negative psychosocial outcomes in adolescents is parental incarceration. Research demonstrates that youth whose parents have been incarcerated have worse outcomes. However, there have been mixed findings as to what negative results parental incarceration has on adolescents. Of a sample of 258 adolescents ages 11 to 18
receiving routine mental health services, 43% had experienced the incarceration of one or both parents (Phillips, Burns, Wagner, Kramer, & Robbins, 2002). The adolescents who had parents who had been incarcerated were more likely than other youth in treatment to present with attention-deficit/hyperactivity and conduct disorders, but less likely to present with major depression. (Phillips et al., 2002). However, the authors noted that adolescents in the study with parents who had been incarcerated were also more likely to have been exposed to greater instances of parental substance abuse, extreme poverty, and abuse or neglect (Phillips et al., 2002), so the results could have been confounded by cumulative risk. In contrast, in a meta-analysis of 40 studies, Murray, Farrington and Sekol (2012) concluded that while parental incarceration was associated with a higher risk of children’s antisocial behavior, it was not related to problems with children’s mental health, substance use, or educational performance. The authors expounded that while children with incarcerated parents did have about a 10% increased risk for antisocial behavior compared to peers, the methodological quality of many of the studies was poor in that there were few randomized designs and prospective longitudinal studies (Murray et al., 2012). One potential methodological flaw in Murray et al.’s (2012) study, however, is that the inclusion criteria may have been too stringent, as it required studies to measure outcomes after parental incarceration occurred and to have over 400 participants. Of note, the present study would have met their inclusion criteria as SEM has causal implications and the present sample includes over 900 adolescent offenders. Herrington et al. (2017) also found an increased risk of antisocial behavior among adolescents with relatively low levels of callous-unemotional traits (which often predict antisocial behavior), who were more likely to engage in higher levels of illegal acts (e.g., property damage) if either parent or caregiver had ever been incarcerated. Although further research is needed to clarify the effects of parental
incarceration on adolescent psychological functioning, extant research indicates that having a parent who was arrested or jailed negatively influences psychosocial outcomes among adolescents.

**Promotive Factors**

Empirical evidence indicates that specific factors may promote the positive development of adolescent offenders in the face of adversity (e.g., Ungar et al., 2013). The presence of such promotive factors may yield better psychosocial outcomes than the absence of such factors. Promotive factors specific to adolescent offenders include contact with a caring adult, community involvement, ethnic identity, self-esteem, emotion regulation, and friendship quality.

**Contact with a caring adult.** Merely having parents in the home does not necessarily lead to better outcomes, since parents might commit crimes, abuse substances, or demonstrate hostility towards an adolescent in the home. However, having contact with a caring adult appears to be a factor that promotes the positive development of adolescents, such as higher levels of psychological and behavioral academic engagement (Woolley & Bowen, 2007). Malloy et al. (2013) wrote that incarcerated juveniles “lack the influence of caring adult role models” (p. 668), which has the potential to negatively influence their developmental trajectories, when compared to their peers in the community. For example, both depressive symptoms and substance abuse were negatively related to parental support in a sample of African American and Latino adolescents (Bennett & Joe, 2015). These results support that caring adults have an influence on the lives of youth and positively affect their psychosocial outcomes.

**Community involvement.** Adolescents’ involvement in community activities such as extracurricular activities, religious participation, and employment can be beneficial to their mental health (Hull et al., 2008). Hull et al. (2008) discovered that race or ethnicity and
neighborhood disadvantage moderated the effect of community involvement on mental health. Black teens living in disadvantaged neighborhoods benefitted from extracurricular activities (Hull et al., 2008). Religious participation was a protective factor for white teens living in more disadvantaged neighborhoods (Hull et al., 2008). Finally, employed black teens living in more disadvantaged neighborhoods had better mental health outcomes than their unemployed peers (Hull et al., 2008). Extracurricular activities, religious participation, and working jobs are ways for adolescents to be involved in their communities and such activities appear to have promotive effects on adolescent psychosocial functioning outcomes.

**Ethnic identity.** Ethnic identity (EI) has been found to be a factor that protects minority youth from stressors. Of particular relevance to the present study, Williams, Aiyer, Durkee, and Tolan (2013) discovered that high levels of EI moderated the negative effects of both family stress and discrimination on criminal offending among 256 Black and Latino male youth (70% Black) living in low-income urban neighborhoods. EI also may protect adolescents from negative mental health outcomes. For instance, in a sample of 125 African American adolescents, EI and self-esteem moderated the negative effect of online racial discrimination on levels of anxiety (Tynes, Umana-Taylor, Rose, Lin, & Anderson, 2012).

It is possible that EI influences psychosocial outcomes in a different way for European Americans (European American). Illustratively, Zapolski, Fisher, Banks, Hensel, and Barnes-Najor (2017) analyzed the relationship between EI, drug attitudes and drug use in a sample of 34,708 school-aged youth of diverse backgrounds. While EI was indirectly associated with lower past month drug use among African American, Hispanic, and Multiracial youth via more negative attitudes toward drugs, high EI was associated with increased drug use for White youth via more positive attitudes toward drug use (Zapolski et al., 2002). While permissive parental
attitudes toward substance use, a desire to conform, heterogeneity within the ethnic group and being a numeric minority among non-White peers were offered as potential reasons why EI was related to increased drug attitudes and drug use for White youth, more research is needed to explain this apparent phenomenon (Zapolski et al., 2002). In this case, higher EI led to increased negative outcomes among European American adolescents.

In contrast, Yasui, Dorham, and Dishion (2004) found levels of EI among African American (n = 82) and European American (n = 77) adolescents to be comparable and EI predicted positive adjustment for both ethnic groups, although the effects were more consistent among African American adolescents. Specifically, the affirmation and belonging subcomponent of the EI measure was significantly related to measures of emotional adaptation (i.e. depression and internalizing symptoms) and social adjustment (i.e. competence and externalizing symptoms) for both ethnic groups, while the EI achievement subcomponent was associated with the social adaptation and emotional adjustment variables only among African American adolescents (Yasui et al., 2004). While the extant research on EI indicates that EI may operate differently for African American and European American adolescents as a promotive factor, more research is needed to determine the nature of this potentially differential relationship.

**Self-esteem.** Several researchers have found that low self-esteem is associated with psychopathology in adolescent offenders (Caldwell, Silver, & Strada, 2010; Van Damme, Colins and Vanderplasschen, 2014). Van Damme et al. (2014) studied the relation of self-esteem to psychiatric disorder and gender among 440 adolescents recruited from detention centers in Belgium. They discovered that female offenders had higher rates of psychiatric disorders and lower levels of self-esteem than male offenders (Van Damme et al., 2014). Clusters were identified and the cluster with low self-esteem had a higher prevalence of psychiatric disorders
(Van Damme et al., 2014). However, studies like Van Damme et al.’s (2014) are limited in that they do not ensure that self-esteem is the mechanism through which adolescent offenders have psychiatric disorders. It is possible that self-esteem is simply related to psychiatric disorders and are perhaps a symptom or byproduct of mental health disorders. Indeed, there appears to be a negative relationship between mental health problems such as depression and self-esteem among adolescents (Caldwell et al., 2010). The present study contributes to the literature by hypothesizing that self-esteem is an observed variable, or part of an underlying latent factor of protection that is a mechanism behind resilience in adolescents who have committed serious criminal offenses who have better psychosocial outcomes than others.

**Emotion regulation.** Effective emotion regulation is another factor that appears to contribute to positive psychosocial functioning in a few different ways. Difficulties with emotion regulation are linked to increased psychopathy (e.g., Garofalo, Neumann & Velotti, 2018). Furthermore, deficits in emotion regulation is linked with delinquent behavior. Gardner, Dishion, and Connell (2008) found that self-regulation as measured by parent, youth, and teacher report moderated the relationship between affiliation with deviant peers at age 17 and self-reported adolescent antisocial behavior at age 19. Adolescents who are better at self-regulation are likely better at emotion regulation. Malloy et al. (2013) elucidate that in general, adolescents have a deficiency in regulating their emotions, making them more impulsive and emotionally volatile. Emotion regulation has been implicated as a mechanism. Specifically, it mediated the association between verbal learning problems and psychopathology among persistently delinquent adolescents at risk for high school dropout (Lansing et al., 2017). Although the present study did not focus on learning problems, they are an example of a risk factor for delinquency among
adolescents. Therefore, emotion regulation has been found to be a promotive factor for delinquent adolescents.

**Friendship quality.** Positive peer relationships also contribute to positive psychosocial functioning outcomes among adolescents. Emotional bonding with peers is negatively related to internalizing psychological disorders (Brown et al., 1999). Poor peer relationships can have detrimental effects on mental health. In one example of a study investigating peer relationships, researchers used the Pathways to Desistance dataset to conduct multilevel regression analyses, assessing time-varying independent variables ten times over the course of 6.5 years (Backman, Laajasalo, Jokela, and Aronen, 2018). The results of these analyses supported a causal demonstration of an effect of positive peer relationships on psychopathic traits (Backman et al., 2018). It is possible that Black and White adolescents are differentially affected by peer relationships. For example, Rowan (2016) found that while both best friend and sibling substance use explained substance use for White adolescents, only sibling substance use explained substance use for Black adolescents. It was therefore predicted that friendship quality would have an impact on psychosocial functioning among adolescent offenders in the present study, although it may operate differently for European American and African Americans.

The contextual risk factors and potential promotive factors discussed in the above literature review are associated with psychosocial functioning in adolescent offenders, including criminal offending and psychological factors. Links between contextual risk factors and promotive factors included in the present study were also supported in the literature and are summarized in the *Hypothesized Model* section, below.
The Present Study

The present study was guided by a resilience framework and EST, which helps explain individual variation in outcomes by taking into account the interaction between an individual and his or her socioenvironmental context (Bronfenbrenner, 1979). Specifically, the present author predicted that indicator variables would make up latent constructs termed Contextual Risk, Promotive Factors, and Psychosocial Functioning in samples of African American and European American adolescents. Moreover, the present author proposed that Promotive Factors would mediate the relationship between Contextual Risk and Psychosocial Functioning in both samples. A full structural equation model, supported by extant research, was employed to test the validity of the latent factors in both samples as well as the aforementioned causal relations Contextual Risk, Promotive Factors, and Psychosocial Functioning. The major aim of the study was to examine whether the hypothesized latent construct Promotive Factors promoted more positive psychosocial functioning among adolescent offenders who scored highly in measures of contextual risk.

Structural equation modeling. Structural equation modeling (SEM) is a statistical methodology that enables one to test hypotheses by analyzing the structural theory of a phenomenon (Byrne, 2012). SEM, according to Byrne (2012), conveys “(a) that the causal processes under study are represented by a series of structural (i.e., regression) equations, and (b) that these structural relations can be modeled pictorially to enable a clearer conceptualization of the theory under study” (p. 3). One can then statistically test all the variables in the hypothesized model to determine how well the postulated associations among the variables fit the data (Byrne, 2012). The SEM model will not fit the data perfectly; the discrepancy between the observed data and the hypothesized model is called the residual (Byrne, 2012). Byrne (2012) describes four
major advantages of SEM over other, traditional, multivariate procedures: 1. SEM is confirmatory in nature, which allows for hypothesis testing, as opposed to other multivariate analyses such as exploratory factor analysis; 2. SEM estimates error variance parameters while other multivariate tests assume that measurement error is not present in independent variables; 3. Other multivariate procedures can only examine observed variables, while SEM can analyze both observed and unobserved (latent) factors; 4. It is the easiest and most widely used method to model relationships among multiple variables.

**Latent vs. observed variables.** An observed, or manifest, variable is directly measured (e.g., in the form of a scale given in a questionnaire, coded interview scores, or coded scores derived from observed behavior; Byrne, 2012). In contrast, a latent variable is an indirectly measured, unobserved variable. Observed variables, “within the context of SEM methodology…serve as indicators of the underlying construct that they are presumed to represent” (Byrne, 2012, p. 4).

**Exogenous versus endogenous latent variables.** In SEM, independent variables that cause change in other latent variables are called *exogenous* latent variables (Byrne, 2012). Exogenous variables are only influenced by factors external, rather than internal, to the model (Byrne, 2012). *Endogenous* latent variables are dependent variables and are directly or indirectly influenced by the exogenous variables in the model; variation in endogenous variables is explained by the specification of the influencing latent variables in the model (Byrne, 2012).

**Full SEM model.** A full SEM model allows one to specify the causal impact of one latent variable on another (Byrne, 2012). A full SEM model comprises both a measurement model, which specifies the relationships between the latent constructs and their indicators and the structural model, which illustrates the relations between the latent factors (Byrne, 2012). A
recursive model specifies cause in one direction while a nonrecursive model allows for effects in both directions (Byrne, 2012). The SEM model can be depicted pictorially or by a series of regression equations. Each regression equation describes the effect of all relevant observed and unobserved variables in the model on one variable of interest (Byrne, 2012). Equations are used in SEM to explain the covariance among variables (McQuitty & Wolf, 2013). Conventionally, an unobserved latent variable is depicted by a circle or ellipse, an observed manifest variable is depicted by a square or rectangle, a single-headed arrow represents cause in one direction, and a double-headed arrow represents covariances or correlations between pairs of variables (Byrne, 2012).

**Hypothesized model.** The structural portion of the hypothesized model for the present study is presented in Figure 1. In Figure 1, the lone single-headed arrows pointing to an observed variable and unpreceded by another variable represent associated measurement error, while the lone single-headed arrows pointing to the endogenous latent variables and unpreceded by another variable represent residual the impact of error in the prediction of Promotive Factors and Psychosocial Functioning. Unidirectional arrows connecting the latent constructs represent the expected direct relations within the model. The model is a mediation model and the direct (paths $a$ and $b$) and indirect (path $c'$) effects inherent to mediation (e.g., Baron & Kenny, 1986) are specified above each unidirectional arrow. The full SEM model is a recursive model because it specifies cause from only one direction. The expected directions of the relationships between the latent factors are depicted in Figure 2. Note that higher values on the factor Psychosocial Functioning would indicate worse psychosocial functioning. The specification of the hypothesized model was based on the preceding literature review.
Although the hypothesized model had not yet been tested in its entirety, support for aspects of the model have been supported in extant research. That is, connections between the variables of interest that are necessary to meet the conditions of mediation as outlined by Baron and Kenny (1986) were supported in the literature. Specifically, (a) both the independent variable and the mediator were found to be related to outcome variables (described in the literature review above); (b) some hypothesized indicators of the independent variable (contextual risk) were found to be related to hypothesized indicators of the postulated mediator (Promotive Factors), including parental support to exposure to violence (Bennett & Joe, 2015), neighborhood disadvantage to community involvement (Hull et al., 2008), and ethnic identity to family stress (Williams et al., 2013); and (c) support has been found for several of the promotive factors considered in the present study as mediators of the effects of risk factors on psychosocial functioning, including emotion regulation (Lansing et al., 2017; and similarly, self-control, Evans et al., 2012), neighborhood factors (Zimmerman & Farrell, 2017), and peer factors (Wright et al., 2014). More generally, Chung and Steinberg (2006) and Ungar (2013) found support for similar mediation models of resilience in which contextual risk indirectly influences psychosocial functioning via promotive factors. Several pieces of the hypothesized model in the present study have therefore been supported in extant literature.

In this model, Contextual Risk was hypothesized to have an indirect effect on Psychosocial Functioning through Promotive Factors. It was expected that the model would account for a substantial portion of the variance between the variables in the data. This project’s hypotheses were analyzed using three waves of data collected from African American and then from European American participants:
1. A measurement model containing a latent variable (labeled “Contextual Risk”) comprised of measures of neighborhood conditions, exposure to violence, parental hostility, a parent having been arrested or jailed, affiliation with delinquent peers and parental substance use; a latent variable (labeled “Promotive Factors”) comprised of measures of contact with a caring adult, community involvement, ethnic identity, self-esteem, emotion regulation and friendship quality; and a latent variable (labeled “Psychosocial Functioning”) comprised of measures of mental health, substance use and self-reported offending would be the most parsimonious and best fitting model for the calibration group (African American adolescents).

2. Contextual Risk would be causally related to Promotive Factors measured three years after Contextual Risk, which would be causally related to Psychosocial Functioning measured three years after Promotive Factors.

3. Contextual Risk would be related to Psychosocial Functioning.

4. Promotive Factors would mediate the relationship between Contextual Risk and Psychosocial Functioning (Promotive Factors would account for a substantial amount of the variance of the relationship between Contextual Risk and Psychosocial Functioning and that relationship would weaken or disappear when Promotive Factors was included in the analysis).

5. This full SEM model would be deemed equivalent when it was tested on the validation group (European American adolescents).
Method

Procedure

Data for the present study were collected as part of the *Pathways to Desistance Study* (the “Pathways study”; Mulvey et al., 2004), a collaborative research project that followed 1,354 serious juvenile offenders from Philadelphia, Pennsylvania and Maricopa County (Phoenix), Arizona from adolescence to young adulthood. Participants were interviewed every six months from baseline for the first three years and every twelve months after that for four more years (first follow up interview completed in May, 2001; last follow up interview completed in March, 2010; Schubert et al., 2004) after being found guilty of committing a serious crime based on a review of court files (Mulvey, Schubert, & Piquero, 2014). “Eligible crimes included all felony offenses with the exception of a few less serious property crimes, as well as misdemeanor weapons offenses and misdemeanor sexual assault” (Mulvey et al., 2014, p. 4). Due to concerns about compromising heterogeneity of the sample due to the significant proportion of drug offenses committed by adolescent boys, the proportion of male juveniles with drug offenses included was capped at 15% (Mulvey et al., 2014). The primary aim of the study was “to enrich our knowledge about the development of serious adolescent offenders, as they make their transition from adolescence into early adulthood” (Mulvey, et al., 2014, p. 1).

Two cities were chosen for the study to make the results more generalizable by avoiding reflecting distinctive practices of one city (Mulvey et al., 2014). Philadelphia and Phoenix were chosen for the study after an extensive review of the juvenile justice system (i.e., legislation regarding juvenile processing, interviews with key administrators, and visits to long-term and detention facilities) in six locations due to, among other reasons, having a high enough rate of serious crimes committed by a diverse ethnic or racial mix of potential participants (See
Participants section, below) in a short enough timeframe (Mulvey et al., 2014). Moreover, the researchers were able to garner cooperation from local politicians and juvenile justice practitioners in those two cities (Mulvey et al., 2014).

Collateral interviews with family members or peers were conducted and official record information regarding arrest and social service involvement was gathered (Mulvey et al., 2014). However, because many of the variables measured in the present study were not gathered from interviews with collaterals (i.e., measures of mental health, caring adult, peer delinquency, ethnic identity, parental hostility, and self-esteem), only self-report data were included. Interviews took approximately two hours and participants were paid $50 for the baseline interview and $150 for the other two interviews used in the present study, which took place at 3- and 6-year follow up time points (Mulvey et al., 2014). The study participation rate was 67% and the sample retention rate from baseline to the 6-year follow up was 87% (Mulvey et al., 2014).

Participants

Participants between the ages of 14 and 18 were recruited for the Pathways study. Adolescents in Philadelphia were primarily African American and adolescents in Phoenix were primarily White (European American) and Hispanic. Of the total sample in the Pathways study, 86% (1164.44) of participants are male. To bypass potential heterogeneity, only males were included in the present analysis. Also, to keep the analysis parsimonious, not all ethnic groups from Pathways were included in the analysis. Empirical evidence supports that the effects of risk and promotive factors on psychosocial outcomes may be different for African American and European American adolescents (Crouch et al., 2000; Hull et al., 2008; Rowan, 2016; Yasui et al., 2004; Zapolski et al., 2002). Specifically covered in the literature review above, differential effects were found for African American and European American adolescents when considering
the effects of household income on exposure to violence (Crouch et al., 2000), community involvement on mental health (Hull et al., 2008), EI on psychosocial adjustment (Yasui et al., 2004) and substance use and attitudes (Zapolski et al., 2002), and peer and sibling impact on substance use (Rowan, 2016). African American and European American participants were selected for the analyses. Out of the males in the remaining sample, 42.1% (493) were identified as African American and 19.2% (225) were identified as non-Hispanic Caucasian, for a total of 718 participants. Three non-Hispanic Caucasian participants were not born in the United States and were excluded from the analyses. Sixty African American participants and 13 European American participants were over age 17 at baseline and were excluded from the analyses to avoid potential age-related effects. The remaining 641 participants (432 African American and 209 European American) were retained for the analyses. Since extant research on exactly how the effects of risk and promotive factors on psychosocial outcomes may differ for African American and European American adolescents is limited and sometimes conflicting (e.g., while Yasui et al. [2004] found the effects of EI to be stronger for African American adolescents than for European American adolescents, Zapolski et al. [2002] found EI to affect European American adolescents in a manner inverse to how it affected African American adolescents), no specific hypotheses were made regarding how the pathway of Contextual Risk to Promotive Factors to Psychosocial Functioning may differ between African American and European American adolescents. Moreover, since the African American and European American participants in the study were, for the majority, from two distinct cities, it is possible that differences in the two groups will be due in part to differing ecological factors resulting from the distinct cities.
Measures

Risk factors.

*Neighborhood conditions (Baseline).* The Neighborhood Conditions Measure was adapted for the Pathways study to assess the environment surrounding the participant’s home (Sampson & Raudenbush, 1999). Items from the self-report measure include scales assessing the physical disorder of the neighborhood (e.g., “cigarettes on the street or in the gutters,” “graffiti or tags”), as well as social disorder (e.g., “adults fighting or arguing loudly,” "people using needles or syringes to take drugs”). The scale consists of 21 items to which participants respond on a 4-point Likert scale ranging from “Never” to “Often,” with higher scores indicating more disorder within the community. The calculated score was the mean of all 21 items in the scale.

*Exposure to violence (Baseline).* The Exposure to Violence Inventory (ETV; Selner-O'Hagan, Kindlon, Buka, Raudenbush, & Earls, 1998) was modified for the Pathways study to assess the frequency of exposure to violent events. Items from the ETV document the types of violence the adolescent has both experienced (i.e., Victim - 6 items, e.g., “Have you ever been chased where you thought you might be seriously hurt?”) and observed (i.e., Witnessed - 7 items, e.g., “Have you ever seen someone else being raped, an attempt made to rape someone or any other type of sexual attack?”). The calculated score was the sum of the victim and witness scales endorsed, with higher scores indicating a greater exposure to violence.

*Parental hostility (Baseline).* The Quality of Parental Relationships Inventory (Conger, Ge, Elder, Lorenz, & Simons, 1994) was adapted for this study. Twelve items measured maternal hostility (e.g., “How often does your mother get angry at you?”; alpha = .85) and 12 items measured paternal hostility (e.g., “How often does your father throw things at you?”; alpha = .88). Participants responded on a 4-point Likert scale ranging from “Always” to “Never,” with
higher scores indicating a more hostile relationship. The calculated scores for maternal and paternal hostility were the means of all 12 items on each scale.

**Parent arrested or jailed (Baseline).** The Pathways study dataset includes a marker to indicate when the biological mother has been arrested and/or jailed, when the biological father has been arrested and/or jailed, and when both biological parents have been arrested and/or jailed. In the Pathways study dataset, a value of 0 indicates that neither parent has been arrested or jailed, a value of 1 indicates that both parents were arrested or jailed and a value of 2 indicates that only one parent was arrested or jailed. Since all the other variables indicate higher levels of some variable at higher numbers, the values 1 and 2 were reversed for the purposes of the present analyses. So, in the present study, a value of 0 indicated that neither parent has been arrested or jailed, a value of 1 indicated that only one parent was arrested or jailed and a value of 2 indicated that both parents were arrested or jailed.

**Delinquent peers (Baseline).** The Peer Delinquent Behavior items are a subset of those used by the Rochester Youth Study (Thornberry et al., 1994) to assess the degree of antisocial activity among the adolescent's peers. There are two dimensions to this scale: Antisocial Behavior (e.g., “During the last six months how many of your friends have sold drugs?”) and Antisocial Influence (e.g., “During the last six months how many of your friends have suggested that you should sell drugs?”). The scale contains 19 total items to which participants respond on a 5-point Likert scale ranging from “None of them” to “All of them.” The calculated score for Antisocial Behavior was the mean rating of the prevalence of friends who engage in the 12 given behaviors. The calculated score for Antisocial Influence was the mean rating of the prevalence of friends who encourage the youth to engage in the 7 given items.
Parental substance use (Baseline). The Pathways study dataset includes a marker for combining past and current drug and alcohol problems for the participant’s biological mother and a marker indicating if the participant’s biological father had a past or current drug problem. The substance abuse marker is different for the biological father because there is missing data regarding the biological father in the Pathways study. Regarding past and current drug and alcohol problems for the participant’s biological mother, a value of 0 indicates no past and no current drug or alcohol problems, a value of 1 indicates past drug or alcohol problems and a value of 2 indicates current drug or alcohol problems. Regarding past or current drug problems for the participant’s biological father, a value of 0 indicates no past or present drug problem, a value of 1 indicates a past drug problem and a value of 2 indicates a current drug problem.

Promotive factors.

Contact with a caring adult (36-month follow up). The Contact with Caring Adults inventory was derived from several sources for the Pathways study (Nakkula, et al., 1990; Phillips and Springer, 1992; Institute of Behavioral Science, 1990) and assesses the type and range of supportive adults in the adolescent's life across eight domains: adults you admire and want to be like, adults you could talk to if you needed information or advice about something, adults you could talk to about trouble at home, adults you would tell about an award or if you did something well, adults with whom you can talk about important decisions, adults you can depend on for help, adults you feel comfortable talking about problems with, and special adults who care about your feelings. The Domains of Social Support Score, which provides the number of different domains for which at least one caring adult is present, was used for the present study due to its validation by Pathways researchers by a one-factor confirmatory factor analysis. The calculated score was the count of the number of domains with at least 1 person mentioned.
**Community involvement (36-month follow up).** The Community Involvement scale (Elliot, 1990) was modified for the Pathways study to assess participants’ partaking in structured activities in four different community organizations: sports teams, scouts, church related groups, and volunteer work. Involvement in community activities was calculated as a count of the endorsed activities on a scale from 0 through 4, with higher scores indicating more community involvement.

**Ethnic identity (36-month follow up).** Sections of the Multigroup Measure of Ethnic Identity (MMEI) were used to determine an individual's overall sense of ethnic identity (Phinney, 1992). Items from the measure assess feelings of affirmation & belonging (e.g., “I am happy that I am a member of the group I belong to”) and identity achievement (e.g., “I have spent time trying to find out more about my ethnic group, such as its history, traditions, and customs”). For this scale, participants responded to 12 items using a 4-point Likert scale ranging from “Strongly Disagree” to “Strongly Agree,” with higher scores indicating greater ethnic identity. The calculated score was the mean of the 12 items in the full scale.

**Self-esteem (36-month follow up).** The Identity subscale of the Psychosocial Maturity Inventory (PSMI Form D; Greenberger, Josselson, Knerr, & Knerr, 1974) is 10 items and measures self-esteem, clarity of the self, and consideration of life goals (e.g., “I change the way I feel and act so often that I sometimes wonder who the 'real' me is”). Participants responded to items on a 4-point Likert scale ranging from “Strongly Agree” to “Strongly Disagree”. All items in the PSMI except one are reverse coded, with higher scores indicating more responsible behavior. The calculated score for the Identity subscale was the mean of the 10 items.

**Emotion regulation (36-month follow up).** The Children's Emotion Regulation scale was adapted for the Pathways study to serve as a self-report measure of the adolescent's ability to
regulate emotions (Walden, Harris, Weiss, & Catron, 1995). Nine items out of 12 were found to fit a single factor model using baseline data and were kept for the follow-up interviews (e.g., “I know things to do to make myself more happy,” and “I can change my feelings by thinking of something else”). Participants responded on a 4-point Likert scale ranging from “Not at all like me” to “Really like me” and higher scores indicate a better ability to regulate emotion. The calculated score was the mean of the final 9 items included in the scale.

**Friendship quality (36-month follow up).** The Friendship Quality scale was adapted from the Quality of Relationships Inventory (Pierce, et al. 1994). The scale, which originally measured support from a romantic partner, consists of a global rating regarding the youth's five closest friends (participants were asked to average the rating across these closest friends). The scale contains 10 items which measure varying contexts of offered support (e.g. "How much can you count on the people for help with a problem", "How close do you think you will be to these people in ten years" and "How much do you depend on these friends"), to which participants responded on a 4-point Likert scale ranging from "not at all" to "very much". The calculated score was the mean of 10 items in the scale.

**Outcome measures.**

**Mental health problems (72-month follow up).** The Composite International Diagnostic Interview (CIDI; World Health Organization [WHO], 1990) is a structured interview used to assess mental disorders. Using computerized algorithms, the CIDI yields lifetime ("Ever") and current ("Past year" & "Past 30 days") diagnosis as defined by the DSM-IV and ICD-10. The entire CIDI was not administered in the Pathways study. The following eight modules were selected for the purpose of the study: Major Depressive Disorder, Dysthymia, Manic Episode, Posttraumatic Stress Disorder, Alcohol Abuse, Alcohol Dependence, Drug Abuse, & Drug
Dependence. The present study utilized the second administration of the CIDI to participants, which occurred between the 72- and 84-month interviews at a different time than the rest of the follow-up interview to ensure that participants would remain engaged in the interview. Since self-reported criminal offending (below) was measured by offenses committed within the last year, past year diagnoses were used for the present study. Because the frequencies of past year diagnoses were low for each of the individual mental health variables and to make the observed variables more generalizable, the four substance use variables were combined into one variable and the four other mental health problem variables were combined into another variable. Preacher (2006) described generalizability as a balance between goodness-of-fit and parsimony that indicates how well a model can describe not only the present data, but also “other data generated by the same underlying process” (p. 232). The present data were made more generalizable by considering the presence or absence of a mental disorder or substance use diagnosis, rather than each individual diagnosis. For each of the two resulting variables (mental health and substance use problems), a value of 0 indicated that the participant did not meet criteria for a problem over the past year and a value of 1 indicated that the participant did meet criteria for a problem over the past year.

**Criminal offending (72-month follow up).** The Self-Reported Offending scale (SRO; Huizinga, Esbensen, & Weihar, 1991) was adapted for the Pathways study to measure participant account of involvement in antisocial and illegal activities. Criminal behavior in the Pathways study was assessed by whether any of 22 different offenses had been committed within the last year (e.g., destroying property, motor vehicle theft, aggravated assault, murder) as measured by self-reported offending. Self-reported offending was more useful for the purposes of this study than official records of arrest because individuals may not have been arrested for committing
offenses even though they did commit them. Self-reported offending is often used to measure offending (e.g. Wright et al., 2014). The original calculated score was the sum of the frequencies reported across the 22 acts. Due to extreme outliers in the resulting data and to more parsimoniously answer the question of whether individuals re-offended six years after the initial interview, scores were converted to binary values. The final calculated values for the criminal offending variable were thus 0 or 1, indicating either self-reported abstinence from re-offending or self-reported re-offending, respectively, over the past year at the time of the 72-month follow-up interview.

**Data Analytic Plan**

*Power analysis.* A power analysis was conducted to determine the minimum sample required for the structural equation model using Preacher and Coffman’s (2006) root mean square error of approximation (RMSEA) online calculator. The degrees of freedom (df) were calculated for the SEM analyses using common guidelines described by Byrne (2012) and Tabachnick and Fidell (2013) in which the number of parameters included in the estimated model is subtracted from the number of data points in the model. “The number of data points is calculated as,

\[
\text{number of data points} = \frac{p(p + 1)}{2}
\]

where \( p \) equals the number of measured variables” (Tabachnick & Fidell, 2013, p. 700).

In the present model with 18 measured variables, there were \( \frac{18(19)}{2} = 171 \) data points. Moreover, according to Byrne (2012), “In addition, however, because Mplus estimates the observed variable intercepts by default, the observed means also contribute to information upon which the analysis is based” (p. 33). Therefore, 18 means were added to this total, yielding
189 data points. The estimated model included 39 parameters (18 regression coefficients and 21 variances) and thus had (189 – 39 = ) 150 dfs.

Given an alpha level of .05, .80 power, a null RMSEA of .05, an alternative RMSEA of .08, and 150 dfs, the minimum sample size required for the present study according to the RMSEA online calculator was 101 (Preacher and Coffman, 2006). The sample sizes of 432 African American and 209 European American adolescents available for the present analyses were therefore sufficient. A sample size of 200 is generally recommended for an SEM analysis (Kenny, 2015).

**Proposed statistical analyses.** The full SEM was employed using Mplus Version 8.3 (Muthén & Muthén, 1998-2017) to analyze the relationship between contextual risk factors, promotive factors, and psychosocial outcomes across groups. Before the SEM models were analyzed, indicator variables comprising latent factors Contextual Risk, Promotive Factors, and Psychosocial Functioning was tested to determine that the measurement of each latent variable was psychometrically sound (Byrne, 2012). Specifically, the measured variables were assessed to confirm multivariate normality, absence of outliers, linearity among measured variables, absence of multicollinearity and singularity, and small residuals centered around zero with symmetrical frequency distribution of residual covariances (Tabachnick & Fidell, 2013)

**The measurement model.** The measurement (baseline) model was first tested and modified “such that the resulting structure best fits the sample data in terms of both parsimony and goodness-of-fit” (Byrne, 2012, p. 262) for the calibration group (African American participants were selected as the calibration group). For this measurement model, the indicators (observed variables) that were expected to comprise each latent construct were carefully chosen based on a literature review (described above). The measurement model was examined to
determine how well the observed measures reflected the hypothesized latent constructs. Specifically, it was predicted that neighborhood disadvantage (called neighborhood conditions in the Pathways study), exposure to violence, parental hostility, having a parent who was arrested or jailed, affiliation with delinquent peers, and parental substance use would be related to the latent construct Contextual Risk. Furthermore, it was predicted that contact with a caring adult, community involvement, ethnic identity, self-esteem, emotion regulation, and friendship quality would be related to the latent construct Promotive Factors. Finally, the present author predicted that self-reported offending and mental health problems as measured by the CIDI would be related to the latent construct Psychosocial Functioning. These relationships in the measurement model were defined as item loadings on each factor.

A confirmatory factor analysis (CFA) was conducted to test the measurement model (Byrne, 2012). If relationships between the indicators and their latent factors were statistically significant and the measurement model was a good fit for the data, this would suggest that the items were representative of their corresponding latent constructs. If, however, upon testing, the resulting structure of the hypothesized model did not best fit the sample data of the calibration group in terms of both parsimony and goodness-of-fit, the model would be modified.

Potential problems with the measurement model. Although the specifics of the ways in which the hypothesized model may not have been the most parsimonious or best fitting model of the sample data were unknown prior to the present analyses, some potential problems were anticipated. For example, it was possible that Mplus would indicate that the data would fit the present model better without one or more of the observed variables or paths included in the model. Although the hypothesized model was based on previous research, it was possible that not all the observed variables or paths included would be relevant to the present sample.
Illustratively, “nonsignificant parameters, with the exception of error variances, can be considered unimportant to the model; in the interest of scientific parsimony, albeit given an adequate sample size, they should be deleted from the model” (Byrne, 2012, p. 78). In such a case, the variables or paths in question would be removed from the model.

Byrne (2012) provided another potential problem in the form of a warning message in an Mplus output file related to tests of hypothesized full SEM measurement models: In the case of a correlation of 1.00 between two latent factors, there exists a definite overlapping of variance. One approach to resolve such a difficulty is to combine the two factors into one. Relevant extant research indicates that several of the present risk and promotive factors are related, including parental support and exposure to violence (Bennett & Joe, 2015), neighborhood disadvantage and community involvement (Hull et al., 2008), and ethnic identity and family stress (Williams et al., 2013).

Another problem that could have arisen with the measurement model involves the discovery of variances that are either negative or constrained to zero-error, which indicate that something is wrong with the model, data, or estimator (Chen, Bollen, Paxton, Curran, & Kirby, 2001). Biased parameter estimates also often have large mean standard errors and larger empirical standard deviations (Chen et al., 2001). Chen et al. (2001) examined improper solutions in the specification of SEM path analyses involving mediation using two samples and did not find a simple positive relation between measurement model misspecification (omitted paths) and the number of improper solutions. Instead, we must consider the impact of misspecification on the model parameter, the standard deviation, and the distribution of the error variance estimator. It is the combination of these factors that determines the probability of improper solutions under misspecification. (p. 501)
Several types of z-tests can be used to determine whether a negative error variance is due to a misspecified model (Kolenikov & Bollen, 2012). Moreover, if a negative error variance is found, one should either locate the sources of underidentification if the model is underidentified, or “estimate the model without constraining the error variances to be positive” (p. 503), if the model is not underidentified (Chen et al., 2001).

Although there are numerous problems which a measurement model could have, the research was outlined above in the anticipation of potential problems with the present measurement model, the structure of which should have best fit the sample data of the calibration group (African American adolescents) in terms of parsimony and goodness-of-fit. If the hypothesized measurement model was not supported, rationale guided by extant research would be used to correct the model so that it best fit the calibration group. The resulting causal structure would then be cross-validated with the sample of European American adolescents.

*Equivalence of the causal structure.* To test whether the full SEM specified in the sample of African Americans replicated to the sample of European Americans from the same population of adolescent offenders, an invariance-testing strategy was employed (Byrne, 2012). First, invariance was tested by running confirmatory factor analyses separately for each group of interest. If the factor loadings were reasonably similar, the latent factor loadings would then be constrained so that they must be equal across groups for the analysis (Byrne, 2012; Knight & Hill, 1998). “If the fit indices indicate that the within-group covariance matrices fit the model, this provides evidence that the item-total relations are similar across ethnic/race groups” (Knight & Hill, 1998, p. 194). If the latent factor loadings for the indicator variables proved to be equal across the groups, the models would be equivalent (Byrne, 2012; Knight & Hill, 1998). If the models were not equivalent, the hypothesized model would be adjusted for the validation group.
According to Knight and Hill (1998), CFA can be used to identify items that lack equivalency across groups.

In sum, to test invariance across the calibration (African American) and validation (European American) groups, the present author (a) tested and (if necessary) modified the measurement (baseline) model for the calibration group per the above guidelines, (b) validated the causal structure involving the effect of Contextual Risk on Psychosocial Functioning through Promotive Factors for African American adolescent offenders, (c) cross-validated the model across European American Adolescent offenders and (d) tested for the invariance of causal structural paths across the two groups, as recommended by Byrne (2012). Step (d) represents a multigroup SEM, employed in the case in which the hypothesized model is already (b) validated for the calibration group and (c) cross-validated for the validation group. If step (b) was unsuccessful, the present author would adjust the model based on the nonsignificant parameter estimates (Mplus provides warning messages that specify which parameter estimates are statistically nonsignificant if the model estimation terminates, or fails; Byrne, 2012). If the nonsignificant paths resulted in no specified relations between specific latent factors or any of the remaining factors, the factors in question would be deleted from the model. If step (c) was unsuccessful, the present author would adjust the model for best fit for European Americans in the same manner used for step (a) and then test the resulting causal structure separately.

Goodness-of-fit. A nonsignificant chi-square value and practical fit indices, such as Comparative Fit Index (CFI), characterize good model fit in SEM (Knight & Hill, 1998). Tabachnick and Fidell (2013) pointed out that multiple fit indices are often reported in research articles using SEM. For the present analyses, the following fit indices were reported: the CFI (Bentler, 1990), the Tucker-Lewis Index (TLI; Tucker & Lewis, 1993), the root mean square error
of approximation (Browne & Cudeck, 1993), and the Standardized Root Mean Square Residual (SRMR). A CFI close to .95 is considered to be a cutoff value indicative of a well-fitting model (Hu & Bentler, 1999).

\[
CFI = 1 - \frac{[\chi^2_H - df_H]}{[\chi^2_B - df_B]} \tag{2}
\]

where \( H \) = the hypothesized model, and \( B \) = the baseline model (Byrne, 2012).

Although the TLI is a nonnormed index, so the values can extend outside the range of 0.0 to 1.0, values close to 1.0 are considered representative of well-fitting models (Byrne, 2012).

\[
TLI = \frac{[\chi^2_B / df_B] - ([\chi^2_H / df_H] - [\chi^2_B / df_B] - 1)} {1} \tag{3}
\]

The RMSEA, which may be one of the most frequently reported fit indices, was used to estimate any lack of fit in the present model as “compared to a perfect (saturated) model. The equation for the estimated RMSEA is given by” (Tabachnick & Fidell, 2013, p. 722)

\[
\text{estimated RMSEA} = \sqrt{\left(\frac{\chi^2_{\text{model}} - df_{\text{model}}}{N} \right)} / df_{\text{model}} \tag{4}
\]

Finally, the SRMR represents the average residual value across all standardized residual values “derived from the fitting of the variance–covariance matrix for the hypothesized model \( \Sigma(\theta) \) to the variance–covariance matrix of the sample data (S)” (Byrne, 2012, p. 76).

**Mediation analysis.** The hypothesized causal structural paths in the full SEMs predicted mediation. It is advantageous to use SEM to test a mediation model because the effects in mediation \( (c', a, \text{and } b; \text{See Figure 1}) \) can be tested simultaneously (Hayes & Preacher, 2014; Kenny, 2018). Mediation analyses with SEM were performed using the Mplus software.

According to Muthén (2011), for a mediation analysis with “factors measured by multiple indicators… [involving] causally-defined effects…the usual formulas for continuous variables apply” (p. 43). The formula for mediation, as provided by Kenny (2018) is: the total effect = direct effect + indirect effect, or
\[ c = c' + ab \]  

Results

Descriptive information for the observed variables for the overall sample, as well as separated by adolescent ethnicity, is presented in Table 1. Correlations between the observed variables in the study among African American adolescents are presented in Table 2. Correlations between the observed variables in the study among European American adolescents are presented in Table 3.

Assumptions

The assumptions of SEM were evaluated through IBM SPSS version 26. After univariate outliers were deleted, data from 417 African American and 200 European American participants remained. No multivariate outliers were found using a \( \chi^2 \) critical value of 42.31 with degrees of freedom equal to 18 variables per Tabachnick and Fidell’s (2013) guidelines. There was evidence that univariate normality was violated, as eleven of the continuous variables (maternal hostility, paternal hostility, parent arrested or jailed, peer antisocial behavior, peer antisocial influence, maternal substance use, paternal substance use, contact with a caring adult, community involvement, ethnic identity, and friendship quality) were significantly univariately skewed, \( p < .001 \). Therefore, the models were estimated with weighted least square mean and variance adjusted (WLSMV), developed by Muthén (1993).

The WLSMV Estimator

The WLSMV estimator is a weighted least square estimator which is robust against non-normality and with which categorical data can be used in SEM (Finney & DiStefano, 2006). The default maximum likelihood estimator cannot be used with SEM analyses with binary or categorical data, as is the case with the present data (Byrne, 2012; Muthén & Muthén, 1998-
2017). The WLSMV estimator represents “weighted least square parameter estimates using a diagonal weight matrix with standard errors and mean- and variance-adjusted chi-square test statistic that use a full weight matrix” (Muthén & Muthén, 1998-2017, p. 668). For the WLSMV estimator, the chi-square value cannot be used in the regular way “because the chi-square difference is not distributed as chi-square” (Muthén & Muthén, 1998-2017, p. 507). Instead, the diagonal elements of an asymptotic covariance matrix are used (Finney & DiStefano, 2006). See Muthén, du Toit, and Spisic (1997) for a more detailed description of the robust weighted least-squares approach. Chi-square difference testing for the WLSMV estimator, in accordance with Muthén and Muthén’s (1998-2017) guidelines, was conducted for the present analyses. It is important to note that the fit indices, such as CFI, differ in WLSMV as a result of the different chi-square values and different degrees of freedom used in the calculations (Finney & DiStefano, 2006). The values of degrees of freedom are lower in WLSMV.

**Model Estimation**

**Measurement model.** Hypothesis 1, a measurement model containing a latent variable (labeled “Contextual Risk”) comprised of measures of neighborhood conditions, exposure to violence, parental hostility, a parent having been arrested or jailed, affiliation with delinquent peers and parental substance use; a latent variable (labeled “Promotive Factors”) comprised of measures of contact with a caring adult, community involvement, ethnic identity, self-esteem, emotion regulation and friendship quality; and a latent variable (labeled “Psychosocial Functioning”) comprised of measures of mental health, substance use and self-reported offending would be the most parsimonious and best fitting model for the calibration group (African American adolescents), was not supported. The hypothesized measurement model did not fit the
data well. Of note, only standardized, rather than unstandardized, coefficients are reported for the present analyses because there are categorical observed variables in the dataset:

In the analysis of CFA models in which the observed variables are categorical (likewise for the measurement portion of full SEM path analytic models), the $y^*$ variances of these variables are standardized to 1.0…This caveat signifies that we should focus on the standardized, rather than on the unstandardized, estimates in our interpretation of the findings. (Byrne, 2012, p. 142)

Among African American adolescents, support was not found for the hypothesized measurement model, $\chi^2_{\text{difference}}(3, N = 417) = 16.87, p < .05, \text{CFI} = .82, \text{TLI} = .79, \text{RMSEA} = .04, \text{SRMR} = .08$. The indicator variables loaded onto the factors of both groups, except for contact with a caring adult ($\beta = .10, p = .117$) and community involvement ($\beta = .04, p = .602$). Table 4 presents the factor loadings for the hypothesized measurement model.

**Post hoc adjustments to the measurement model.** Post hoc measurement model adjustments and analyses were performed in an attempt to develop a better fitting model. A post hoc model that fit the data well could give insight into the resilience of adolescent offenders and inform future research and psychological interventions. Since the paths to two indicator variables, contact with a caring adult and community involvement, were not statistically significant, the factor analysis was performed again without those indicator variables. Despite the adjustment, the fit of the measurement model was not improved, $\chi^2_{\text{difference}}(3, N = 417) = 16.78, p < .05, \text{CFI} = .82, \text{TLI} = .80, \text{RMSEA} = .05, \text{SRMR} = .08$. Table 5 presents the factor loadings for this post hoc adjustment to the measurement model.

Although the indicator variables parent arrested or jailed ($\beta = .20, p < .05$) and neighborhood conditions ($\beta = .28, p < .05$) loaded onto Contextual Risk, the factor loadings of
the variables were less than .30. According to Heene, Freudenthaler, and Bühner (2012), “Lower factor loadings lead to smaller CFI values, as covariances among observed variables will generally be smaller with low factor loading” (p. 43). When deleting items with low factor loadings, Afthanorhan (2013) recommends deleting the items one at a time and deleting the item with the lowest loading first. When the indicator parent arrested or jailed was removed from the model, the fit indices did improve somewhat from the previous model, $\chi^2_{\text{difference}}(3, N = 417) = 15.65, p < .05$, CFI = .85, TLI = .83, RMSEA = .05, SRMR = .08. However, the model fit suffered slightly when neighborhood conditions was removed, $\chi^2_{\text{difference}}(3, N = 417) = 15.40, p < .05$, CFI = .85, TLI = .82, RMSEA = .05, SRMR = .08. Neither new model fit the data well. Tables 6 and 7 present the factor loadings for these post hoc adjustments to the measurement model.

**Measurement model for European American adolescents.** Since the model did not fit the data well among African Americans, a full SEM model from that calibration group could not be validated on European Americans as the next step in the analyses. The hypothesized measurement model was therefore tested using data from European American adolescents.

Although the model estimations terminated normally, Mplus provided a warning message stating that the latent covariance matrix (PSI) was not positive definite, which could indicate that a latent variable’s variance or residual variance is negative, that two latent variables are correlated at one, or that there is linear dependency among more than two latent variables. The warning message indicated that the problem involved the self-reported offending variable. Indeed, a review of the parameter estimates revealed a negative variance associated with the residual R-square value of the self-reported offending variable. Byrne (2012) suggested and demonstrated that an approach to solve such a problem is to fix the parameter to a value of zero.
Kleysen and Street (2001) also set estimates of parameters causing a not positive definite covariance matrix in their SEM analysis to zero, which proved to be a successful solution. Upon fixing the parameter to zero in the present analysis, *Mplus* provided a warning message stating that the model may not be identified, indicating that the program could not compute the standard errors of the model parameter estimates. *Mplus* further specified that the problem involved the parameter of the Psychosocial Functioning factor.

Bentler (1976) provided an alternative approach to resolve an improper solution in which the parameter is instead fixed at a small positive number. Gerbing and Anderson (1987) provided ‘.005’ as an example of such a number. When the self-reported offending parameter was fixed at .005, the analysis ran successfully without a warning message.

Support was not found for the hypothesized measurement model among European American adolescents, $\chi^2_{\text{difference}}(3, N = 200) = 5.07, p = .167$, CFI = .89, TLI = .88, RMSEA = .03, SRMR = .10 (See Table 4 for factor loadings). As with African Americans, neither contact with a caring adult ($\beta = .09, p = .335$) nor community involvement ($\beta = .21, p = .223$) loaded onto Contextual Risk. Differently, mental health did not load onto Psychosocial Functioning ($\beta = .32, p = .101$).

Notably, mental health loaded onto Psychosocial Functioning ($\beta = .44, p < .05$) when the WLSMV chi-square difference test was not used. It is apparent that the chi-square difference test required for the WLSMV estimator has some effect on the factor loadings and the covariance matrix. Specifically, the estimate of the parameter in question dropped from $\beta = .44 (p < .05)$ to $\beta = .32 (p = .101)$ following the chi-square test for difference testing. It appears that the parameter became not significant following the difference test due to its resulting in a low loading. Interestingly, the use of the chi-square difference test for WLSMV also resulted in a reduction of
the estimate of the mental health parameter and resulted in an increase of the estimate of the
substance use parameter among African Americans by .27 and .34, respectively. Yet, the reduced
loading of mental health remained significant at $\beta = .47$ ($p < .05$) for African Americans. Among
European Americans, the estimate of the self-reported offending parameter increased by .13
following the WLSMV chi-square difference test. Differently, the parameter estimates for items
on the latent factors Contextual Risk and Promotive Factors remained relatively stable among
both groups following the WLSMV chi-square difference test. Since there is limited extant
research on the functioning of the WLSMV estimator, it is unclear why the items comprising
Psychosocial Functioning fluctuated following the WLSMV chi-square difference test (Byrne,
2012; Finney & DiStefano, 2006). It is likely, however, that the Psychosocial Functioning items
were most affected by the WLSMV chi-square difference test because they were all categorical
variables.

When the measurement model was tested without mental health among European
Americans, Mplus provided a warning message stating that the program could not compute the
chi-square difference test due to a singular matrix and that that the model may not be identified,
indicating that the program could not compute the standard errors of the model parameter
estimates. Without the inclusion of mental health, Psychosocial Functioning only contained two
indicators. As Muthén (2009) wrote, “A model with 2 indicators for a factor is not identified”
(para. 2). The remaining analyses for European Americans were conducted with mental health
included in the model so that the model would remain identified.

Post hoc adjustments to the measurement model. To test invariance across groups, the
modified measurement model (without contact with a caring adult or community involvement)
was run. Following the modification, the fit statistics did not meet the standard cutoffs for an
excellent fit. However, the values are in the range of what could be considered an adequate fit, $\chi^2_{\text{difference}}(3, N = 200) = 4.94, p = .176$, CFI = .91, TLI = .89, RMSEA = .04, SRMR = .09 (See Table 5 for factor loadings).

As done with African Americans (above), items with loadings below .3 were deleted from the measurement model for European Americans. The indicator variable parent arrested or jailed ($\beta = .23, p < .05$) was the only item with a loading below .3 and was removed from the measurement model. The resulting model fit the data better, but fit indices still were not in the range of an excellent fit, $\chi^2_{\text{difference}}(3, N = 200) = 4.87, p = .182$, CFI = .93, TLI = .92, RMSEA = .03, SRMR = .09 (See Table 6 for factor loadings). Although the post hoc adjustments to the measurement model yielded an adequate fit among European American adolescents, the measurement model was not supported, as mental health still did not load onto Psychosocial Functioning following the WLSMV chi-square difference test ($\beta = .32, p = .100$).

**Structural model.** Even though the measurement model did not fit the data well, the full structural model was tested to determine whether any information could be garnered to support future research. As removal of indicator variables with factor loadings below .3 only slightly improved the model’s fit, the full SEM model was run with those indicators included. Contact with a caring adult and community involvement were not included for either African American or European American adolescents, as those indicators did not load onto Promotive Factors for either group.

Please note that chi-square values were not obtained for the full structural models: *Mplus* supplied the warning message that the chi-square difference test needed to compute the chi-square value in WLSMV estimation could not be computed because the null hypothesis model was not nested in the hypothesized model. According to Bentler and Chou (1987), nested models
are two models in which one is a subset of another, so parameters which are estimated freely in one model are fixed at zero in the second model. Although the chi-square difference test was successfully computed by Mplus for the CFA needed to test the measurement model, the chi-square difference test only works with nested structural models: “The chi-square difference test compares the H0 analysis model to a less restrictive H1 alternative model in which the H0 model is nested” (Muthén & Muthén, 1998-2017, p. 694). Figures 5 and 6 show standardized coefficients for the modified structural model for African Americans and European American adolescents, respectively. (To illustrate the results of the hypothesized structural model, Figures 3 and 4 show standardized coefficients for the hypothesized structural model for African Americans and European American adolescents, respectively).

Hypothesis 2, Contextual Risk would be causally related to Promotive Factors measured three years after Contextual Risk, which would be causally related to Psychosocial Functioning measured three years after Promotive Factors, was not supported. Promotive Factors was not related to either Contextual Risk ($\beta = .03, p = .756$) or Psychosocial Functioning ($\beta = -.18, p = 0.198$) among African Americans. Promotive Factors was not related to either Contextual Risk ($\beta = -.01, p = 0.914$) or Psychosocial Functioning ($\beta = -.10, p = 0.455$) among European Americans.

Hypothesis 3, Contextual Risk would be related to Psychosocial Functioning, was supported in the full SEM analysis for African Americans ($\beta = .42, p < .05$), with the caveat that the initial measurement model did not fit the data well. Hypothesis 3 was not supported for European Americans; Contextual Risk was not significantly related to Psychosocial Functioning ($\beta = .24, p = .055$).

Hypothesis 4, Promotive Factors would mediate the relationship between Contextual Risk and Psychosocial Functioning (Promotive Factors would account for a substantial amount
of the variance of the relationship between Contextual Risk and Psychosocial Functioning and
that relationship would weaken or disappear when Promotive Factors was included in the
analysis), was not supported. To mediate the relationship between Contextual Risk and
Psychosocial Functioning, Promotive Factors would have had to have been related to both
Contextual Risk and Psychosocial Functioning; Promotive Factors was not related to Contextual
Risk or to Psychosocial Functioning.

Hypothesis 5, this full SEM model would be deemed valid when it was tested on the
validation group (European American adolescents), was not supported. The full SEM model was
not valid among African American (CFI = .87, TLI = .84, RMSEA = .04, SRMR = .07) or
European American adolescents (CFI = .90, TLI = .88, RMSEA = .04, SRMR = .08). Tables 8
and 9 present the fit statistics for both full structural equation models.

Discussion

The purpose of this study was to provide a better understanding of why some adolescent
serious criminal offenders develop better psychosocial functioning than others. Several important
results emerged from this study. In contrast to expectations, the hypothesized measurement
model did not fit the data well. Additionally, post hoc modifications to the measurement model
did not result in a well-fitting model. Moreover, although the hypothesized structural model did
not fit the data well, Contextual Risk was significantly associated with Psychosocial Functioning
among African American adolescents, but not among European American adolescents.

Measurement Model

The hypothesis that neighborhood conditions, exposure to violence, parental hostility, a
parent having been arrested or jailed, affiliation with delinquent peers and parental substance use
would comprise the latent construct “Contextual Risk;” that contact with a caring adult,
community involvement, ethnic identity, self-esteem, emotion regulation and friendship quality would comprise the latent construct “Promotive Factors;” and that mental health, substance use and self-reported offending would comprise the latent construct “Psychosocial Functioning” was not supported. This suggests that the indicator variables were not representative of their corresponding latent constructs. This finding is inconsistent with extant research supporting the present observed variables as contextual risk factors, promotive factors, and psychosocial functioning outcomes.

Moreover, post hoc revisions to the measurement model did not result in a substantially better fitting model. The first post hoc adjustment to the measurement model was to remove the indicator variables community involvement and contact with a caring adult, which did not load onto Promotive Factors in the analysis of the hypothesized measurement model. There are two possible reasons why these indicator variables did not load onto Promotive Factors. It is possible that the way the items were measured in the Pathways study was not the most effective way to measure the items. For instance, community involvement was measured by whether an adolescent participated in sports teams, scouts, church related groups, and volunteer work during the past sixth months. Perhaps adolescents participated in their community in ways other than those four ways. It is also possible that these factors would be protective to adolescent offenders in a different context, for example, by considering how adolescents became involved in their community. Having positive relationships with peers or adults can help adolescent offenders engage in developmentally healthy activities (Chung, Little, & Steinberg, 2005). Similarly, in Multisystemic Therapy (MST), adolescent offending is often treated by focusing on family development of social support networks, including through engagement in community activities (Henggeler, Cunningham, Pickrel, Schoenwald, & Brondino, 1996). MST provides an example
of a more structured avenue through which a promotive factor like community involvement could be more effective to adolescent offenders.

Contact with a caring adult may also not have been measured in the most effective way. Some research indicates that quality of social support, such as satisfaction with relationships, is a better indicator of health and well-being than quantity of social support (Spohr, Suzuki, Marshall, Taxman, & Walters, 2016; Wu, Stewart, Huang, Prince, & Liu, 2011). For adolescent offenders, extant research indicates that prosocial social support is related to less engagement in criminality, substance use, and other risky behaviors, while quantity of social support is associated with increased risky behavior (Spohr et al., 2016). The present study defined contact with a caring adult as the count of the number of eight domains in which adolescent offenders reported having caring adults in their lives. It is possible that measures of the depth of or satisfaction with their relationships with caring adults in their lives would better predict the latent construct Promotive Factors among adolescent offenders.

Additionally, with the removal of the item for parent arrested or jailed for African American and European American adolescents and neighborhood conditions for African American adolescents, the measurement model still did not significantly improve. Although the measurement model fit the sample data adequately among European American adolescents, the model was not supported because mental health did not load onto the Psychosocial Functioning factor following the WLSMV chi-square difference test. It is possible that different items may better represent the latent factors considered in the present study; other possible indicators of the latent constructs estimated in the present study that are supported by extant research are not available in the Pathways study dataset. For example, avoidant coping and externalizing behaviors, such as expression of anger, are risk factors for substance use, use-related
consequences and criminal offending among adolescents (Aebi, Giger, Plattner, Metzke, & Steinhausen, 2014; Eftekhari, Turner, & Larimer, 2004). It is also possible that the hypothesized measurement model may be a good fit for data other than those garnered from participants in the Pathways study; for instance, geographic location may have confounded the potential influences of ethnicity in the present study, as African American adolescents were primarily from Philadelphia, Pennsylvania and European American adolescents were primarily from Phoenix, Arizona.

**Full Structural Model**

The hypothesized full SEM model was not supported by the results. The measurement model did not fit the data well. Additionally, most of the hypothesized paths in the full structural model were not significant. Contextual Risk was significantly associated with Psychosocial Functioning among African American adolescents, but not among European American adolescents.

Given the fact that the measurement model was not a good fit for the data, it follows that the full structural paths from Contextual Risk to Promotive Factors and from Promotive Factors to Psychosocial Functioning were not significant. For a full SEM model to fit the data, a measurement model must first be validated (Byrne, 2012). Therefore, it is possible that it was not the hypothesized structural paths that were incorrectly hypothesized. Future researchers may wish to re-test the hypothesized structural paths with different data or with a different measurement model. It is also possible that other factors not measured in this study are promotive of the positive psychosocial functioning of adolescent criminal offenders. Factors such as problem-solving skills, cooperation, social skills, cultural or religious factors, employment, engagement with education, and family cohesion have been supported as
promotive of positive functioning among adolescents with complex needs, including those involved in the justice system (Brown et al., 1999; Chung et al., 2005; Ungar et al., 2013).

For European Americans, the path from Contextual Risk to Psychosocial Functioning was not significant. This finding is contrary to previous research (e.g., Ungar et al., 2013), in which contextual risk variables were found to be related to psychosocial functioning variables. However, extant research on risk and promotive factors among adolescent offenders focused mostly on the individual variables that comprised the latent factors in the present study. The present study is different from most studies mentioned in the above literature review in that it included latent factors. There are several other possible reasons why the path from Contextual Risk to Psychosocial Functioning was not significant for European Americans. As noted earlier, some extant research supports that the effects of risk and promotive factors on psychosocial outcomes may be different for African American and European American adolescents (Crouch et al., 2000; Hull et al., 2008; Rowan, 2016; Yasui et al., 2004; Zapolski et al., 2002). It is possible that other, unmeasured variables influence the relationship between contextual risk and psychosocial functioning for European Americans.

Moreover, as Byrne (2012) specifies, the preceding measurement model must be validated before attempting to validate a full structural model. As mental health did not load onto Psychosocial Functioning following the WLSMV chi-square difference test, this part of the measurement model was not valid. Two possible reasons for the item not loading are that the sample size was too small or that other aspects of psychosocial functioning were more important for European Americans. Nonsignificant parameters (in this case mental health) are often deleted from SEM models, but could also indicate that the sample size is too small (Byrne, 2012). The final sample size for European American adolescent offenders was 200. Although a sample size
of 200 is of sufficient size for the present analyses per the power analysis conducted prior to the analyses, 200 just meets the sample size generally recommended for an SEM analysis (Kenny, 2015). So, it is possible that mental health did not load onto Psychosocial Functioning for European Americans because the sample size was too small.

It is also possible that mental health does not represent Psychosocial Functioning well for European Americans. Of note, self-reported offending was the highest loading variable on the factor for European Americans, while substance use diagnosis loaded highest for African Americans. This suggests that different aspects of psychosocial functioning are important among different ethnic groups. Indeed, African American adolescent offenders receive less mental health services than European American adolescent offenders (Baglivio et al., 2017; Dalton et al., 2009), even though there may be a higher frequency of mental health problems among African American adolescent offenders as compared to European American adolescent offenders (Baglivio et al., 2017). It is possible that mental health interventions are especially important for African American adolescent offenders. Presently, mental health treatment is lacking in the justice system, which leads to negative long-term consequences for adolescent offenders, including problems adjusting to positive roles as adults (Steinberg, Chung, & Little, 2004).

Limitations and Future Directions

This study’s strengths include its longitudinal design, the capability of SEM to analyze the causal relationship between unobserved latent constructs and the use of the Pathways study dataset, which contains extensive data on a population that is difficult to study. However, this study also has some limitations.

The data used in the present study were based on interviews with the adolescent offenders themselves. Self-reporting may be subject to social desirability or memory effects in which
participants forget or misremember an experience. The present study did not use all data available in the Pathways study. Future researchers working with the Pathways study dataset may wish to consider other available variables in a model of risk and promotive factors, including collateral information available in the dataset.

Future researchers may also wish to consider a similar model of resilience to the one tested in the present study, but with different data. The present study relied on secondary data from the Pathways study, including the measures used in that study. A research team with more resources than the present researcher could collect their own data over time from adolescent offenders. There are several advantages to collecting one’s own data: More data could be collected, variables not available in the Pathways study dataset could be considered and potential confounds such as geographic location-specific ethnic group sampling could be corrected in future research.

This study examined contextual risk, promotive factors and psychosocial functioning in early to late adolescence. To expand upon the findings of the present study, future research should examine time points in earlier childhood to get a more comprehensive view of the longitudinal nature of risk and through adulthood to see what promotive factors and psychosocial functioning outcomes may result for serious adolescent criminal offenders later in life.

Future researchers should continue to consider how to improve interventions for mental health problems and reoffending among adolescent offenders. Ungar, Liebenberg, and Ikeda (2012) suggested that services for youth with complex needs can be improved with care that is multi-level, coordinated, continuous, matched to culture and context, on a continuum based on level of need and evidence-based. For example, wraparound social work services, a team-based approach involving family in treatment, can be effective for mental health and delinquency
problems among adolescent offenders (McCarter, 2016). The present study revealed that among African Americans, contextual risk is related to psychosocial functioning. Future research could examine whether interventions targeting risk factors most representative of contextual risk in the present study (i.e., exposure to violence, maternal hostility and peer antisocial behavior and influence) improve mental health and psychosocial outcomes among adolescent offenders.


Center for Research on Health Care (CRHC) Data Center. *Children's Emotional Intensity Child Report (Walden) - Subject Follow-up.*

https://www.pathwaysstudy.pitt.edu/codebook/walden-sf.html


https://doi.org/10.1080/10509670902766570


Pierce, G.P. (1994) the quality of relationships inventory: Assessing the interpersonal context of social support. In B.R. Burleson, T.L Albrecht & I.G. Sarason (Eds.), *Communication of*
social support: Message, interactions, relationship and community (pp 247-266).


Table 1

Demographic Information

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### Table 2

**Bivariate Correlations of Observed Variables Among African American Adolescents**

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<td>.60**</td>
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**Note.** **. Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed).**
### Table 3

**Bivariate Correlations of Observed Variables Among European American Adolescents**

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<td>0.01</td>
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<td>0.04</td>
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<td>-.11</td>
<td>-.05</td>
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<td>.09</td>
<td>.24*</td>
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<td>.04</td>
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<td>.01</td>
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<td>12. Ethnic Identity</td>
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<td>.00</td>
<td>-.07</td>
<td>-.08</td>
<td>-.15*</td>
<td>-.16*</td>
<td>.02</td>
<td>-.13</td>
<td>.04</td>
<td>.00</td>
<td>.09</td>
<td>1.00</td>
<td>.28**</td>
<td>.25**</td>
<td>-.08</td>
<td>-.16*</td>
<td>-.01</td>
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<tr>
<td>13. Identity (Self-esteem)</td>
<td>.04</td>
<td>.12</td>
<td>-.01</td>
<td>.08</td>
<td>.02</td>
<td>.00</td>
<td>.05</td>
<td>.01</td>
<td>-.09</td>
<td>.03</td>
<td>.15</td>
<td>.24*</td>
<td>.28**</td>
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<td>.26**</td>
<td>-.03</td>
<td>.01</td>
<td>-.09</td>
</tr>
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<td>14. Emotion Regulation</td>
<td>-.09</td>
<td>.09</td>
<td>.11</td>
<td>.04</td>
<td>-.08</td>
<td>-.04</td>
<td>.02</td>
<td>.01</td>
<td>-.02</td>
<td>.15</td>
<td>.05</td>
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<td>.25**</td>
<td>.26**</td>
<td>1.00</td>
<td>-.04</td>
<td>.11</td>
<td>.09</td>
</tr>
<tr>
<td>15. Friendship Quality</td>
<td>-.05</td>
<td>.15*</td>
<td>.08</td>
<td>.11</td>
<td>.12</td>
<td>.01</td>
<td>.08</td>
<td>.09</td>
<td>.05</td>
<td>.01</td>
<td>-.04</td>
<td>.04</td>
<td>.04</td>
<td>-.08</td>
<td>-.03</td>
<td>-.04</td>
<td>.04</td>
<td>1.00</td>
</tr>
<tr>
<td>16. Self-Reported Offending</td>
<td>-.05</td>
<td>.20**</td>
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<td>-.07</td>
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<td>.03</td>
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<td>.06</td>
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<td>-.05</td>
<td>-.08</td>
<td>-.16*</td>
<td>.01</td>
<td>.11</td>
<td>.15</td>
<td>1.00</td>
<td>.07</td>
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<tr>
<td>17. Mental Disorder Diagnosis</td>
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<td>0.06</td>
<td>.12</td>
<td>.08</td>
<td>.00</td>
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<td>.09</td>
<td>.11</td>
<td>-.08</td>
<td>-.01</td>
<td>.01</td>
<td>.08</td>
<td>.01</td>
<td>-.01</td>
<td>-.09</td>
<td>.09</td>
<td>.29**</td>
<td>0.07</td>
</tr>
</tbody>
</table>

*Note.**. Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed).
Table 4

*Standardized Factor Loadings for Hypothesized Measurement Model*

<table>
<thead>
<tr>
<th></th>
<th>African Americans</th>
<th>European Americans</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contextual Risk</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neighborhood Conditions</td>
<td>0.28</td>
<td>0.43</td>
</tr>
<tr>
<td>Exposure to Violence</td>
<td>0.63</td>
<td>0.68</td>
</tr>
<tr>
<td>Maternal Hostility</td>
<td>0.54</td>
<td>0.38</td>
</tr>
<tr>
<td>Paternal Hostility</td>
<td>0.41</td>
<td>0.54</td>
</tr>
<tr>
<td>Parent Arrested/Jailed</td>
<td>0.20</td>
<td>0.23*</td>
</tr>
<tr>
<td>Peer Antisocial Behavior</td>
<td>0.80</td>
<td>0.79</td>
</tr>
<tr>
<td>Peer Antisocial Influence</td>
<td>0.67</td>
<td>0.67</td>
</tr>
<tr>
<td>Maternal Substance Use</td>
<td>0.36</td>
<td>0.39</td>
</tr>
<tr>
<td>Paternal Substance Use</td>
<td>0.38</td>
<td>0.48</td>
</tr>
<tr>
<td><strong>Promotive Factors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact with a Caring Adult</td>
<td>0.10, <em>p = 0.117</em></td>
<td>0.09, <em>p = 0.335</em></td>
</tr>
<tr>
<td>Community Involvement</td>
<td>0.04, <em>p = 0.602</em></td>
<td>0.21, <em>p = 0.223</em></td>
</tr>
<tr>
<td>Ethnic Identity</td>
<td>0.31</td>
<td>0.30*</td>
</tr>
<tr>
<td>Identity (Self-esteem)</td>
<td>0.61</td>
<td>0.45</td>
</tr>
<tr>
<td>Emotion Regulation</td>
<td>0.48</td>
<td>0.63</td>
</tr>
<tr>
<td>Friendship Quality</td>
<td>0.33</td>
<td>0.46</td>
</tr>
<tr>
<td><strong>Psychosocial Functioning</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Reported Offending</td>
<td>0.44*</td>
<td>0.997*</td>
</tr>
<tr>
<td>Mental Disorder Diagnosis</td>
<td>0.47*</td>
<td>0.32, <em>p = 0.101</em></td>
</tr>
<tr>
<td>Substance Use Diagnosis</td>
<td>0.88*</td>
<td>0.58*</td>
</tr>
</tbody>
</table>

*Note.* *p < .05. All coefficients are significant at *p < .001 unless otherwise noted.
Table 5

*Standardized Factor Loadings for Post Hoc Measurement Model After Removal of Non-significant Loadings*

<table>
<thead>
<tr>
<th>Contextual Risk</th>
<th>African Americans</th>
<th>European Americans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neighborhood Conditions</td>
<td>0.28</td>
<td>0.43</td>
</tr>
<tr>
<td>Exposure to Violence</td>
<td>0.63</td>
<td>0.68</td>
</tr>
<tr>
<td>Maternal Hostility</td>
<td>0.54</td>
<td>0.38</td>
</tr>
<tr>
<td>Paternal Hostility</td>
<td>0.41</td>
<td>0.54</td>
</tr>
<tr>
<td>Parent Arrested/Jailed</td>
<td>0.20</td>
<td>0.23*</td>
</tr>
<tr>
<td>Peer Antisocial Behavior</td>
<td>0.80</td>
<td>0.79</td>
</tr>
<tr>
<td>Peer Antisocial Influence</td>
<td>0.67</td>
<td>0.67</td>
</tr>
<tr>
<td>Maternal Substance Use</td>
<td>0.36</td>
<td>0.39</td>
</tr>
<tr>
<td>Paternal Substance Use</td>
<td>0.38</td>
<td>0.48</td>
</tr>
</tbody>
</table>

**Promotive Factors**

| Contact with a Caring Adult                          |                    |                    |
| Community Involvement                                 |                    |                    |
| Ethnic Identity                                       | 0.31               | 0.33*              |
| Identity (Self-esteem)                               | 0.61               | 0.47               |
| Emotion Regulation                                   | 0.49               | 0.61               |
| Friendship Quality                                    | 0.32               | 0.45               |

**Psychosocial Functioning**

| Self-Reported Offending                               | 0.44*              | 0.996*             |
| Mental Disorder Diagnosis                             | 0.47*              | 0.32, p = 0.100    |
| Substance Use Diagnosis                               | 0.88*              | 0.58*              |

Note. * p < .05. All coefficients are significant at p < .001 unless otherwise noted.
Table 6

*Standardized Factor Loadings for Post Hoc Measurement Model After First Removal of Low Loadings*

<table>
<thead>
<tr>
<th>Contextual Risk</th>
<th>African Americans</th>
<th>European Americans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neighborhood Conditions</td>
<td>0.28</td>
<td>0.41</td>
</tr>
<tr>
<td>Exposure to Violence</td>
<td>0.63</td>
<td>0.69</td>
</tr>
<tr>
<td>Maternal Hostility</td>
<td>0.53</td>
<td>0.38</td>
</tr>
<tr>
<td>Paternal Hostility</td>
<td>0.40</td>
<td>0.53</td>
</tr>
<tr>
<td>Parent Arrested/Jailed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer Antisocial Behavior</td>
<td>0.82</td>
<td>0.83</td>
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<tr>
<td>Peer Antisocial Influence</td>
<td>0.71</td>
<td>0.69</td>
</tr>
<tr>
<td>Maternal Substance Use</td>
<td>0.34</td>
<td>0.37</td>
</tr>
<tr>
<td>Paternal Substance Use</td>
<td>0.36</td>
<td>0.45</td>
</tr>
</tbody>
</table>

| Promotive Factors                     |                   |                     |
| Contact with a Caring Adult           |                   |                     |
| Community Involvement                 |                   |                     |
| Ethnic Identity                       | 0.31              | 0.33*               |
| Identity (Self-esteem)                | 0.61              | 0.47                |
| Emotion Regulation                    | 0.49              | 0.61                |
| Friendship Quality                    | 0.32              | 0.45                |

| Psychosocial Functioning              |                   |                     |
| Self-Reported Offending               | 0.44*             | 0.996*              |
| Mental Disorder Diagnosis             | 0.47*             | 0.32, $p = 0.100$   |
| Substance Use Diagnosis               | 0.88*             | 0.58*               |

Note. * $p < .05$. All coefficients are significant at $p < .001$ unless otherwise noted.
Table 7

*Standardized Factor Loadings for Post Hoc Measurement Model After Second Removal of Low Loadings*

<table>
<thead>
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<td>Maternal Hostility</td>
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<td>Paternal Hostility</td>
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<tr>
<td>Parent Arrested/Jailed</td>
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<td>Maternal Substance Use</td>
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<td>Paternal Substance Use</td>
<td>0.35</td>
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<td>Promotive Factors</td>
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<tr>
<td>Identity (Self-esteem)</td>
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<tr>
<td>Emotion Regulation</td>
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<tr>
<td>Friendship Quality</td>
<td>0.32</td>
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<tr>
<td>Psychosocial Functioning</td>
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</tr>
<tr>
<td>Self-Reported Offending</td>
<td>0.44*</td>
<td></td>
</tr>
<tr>
<td>Mental Disorder Diagnosis</td>
<td>0.47*</td>
<td></td>
</tr>
<tr>
<td>Substance Use Diagnosis</td>
<td>0.88*</td>
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*Note.* *p* < .05. All coefficients are significant at *p* < .001 unless otherwise noted.
Table 8

**Structural Equation Modeling Results for African American Adolescents**

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2_{\text{difference}}$</th>
<th>df</th>
<th>$p$</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
<th>SRMR</th>
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<tbody>
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<td>0.79</td>
<td>0.04</td>
<td>0.08</td>
</tr>
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<td>0.82</td>
<td>0.80</td>
<td>0.05</td>
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<tr>
<td>3</td>
<td>15.65</td>
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<td>&lt; .05</td>
<td>0.85</td>
<td>0.83</td>
<td>0.05</td>
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<tr>
<td>4</td>
<td>15.40</td>
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<td>0.82</td>
<td>0.05</td>
<td>0.08</td>
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<tr>
<td>5</td>
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<td>0.87</td>
<td>0.84</td>
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</table>

*Note.* Model 1 is the hypothesized measurement model. Models 2, 3, and 4 are the post hoc measurement models after the removal of non-significant loadings and first and second removals of low loadings, respectively. Model 5 is the full structural model.
Table 9

**Structural Equation Modeling Results for European American Adolescents**

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2_{\text{difference}}$</th>
<th>df</th>
<th>$p$</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
<th>SRMR</th>
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<td>0.09</td>
</tr>
<tr>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>0.90</td>
<td>0.88</td>
<td>0.04</td>
<td>0.08</td>
</tr>
</tbody>
</table>

*Note.* Model 1 is the hypothesized measurement model. Models 2 and 3 are the post hoc measurement models after the removal of non-significant loadings and the removal of the lowest loading, respectively. Model 4 is the full structural model.
Figure 1. Full hypothesized structural equation model.
Figure 2. Expected directions between latent factors.
Figure 3. Standardized coefficients for the hypothesized model among African Americans. Factor loadings are different than the loadings resulting from the chi-square difference test for WLSMV reported in the text. Broken lines indicate pathways with $p$-values $> .05$. 
Figure 4. Standardized coefficients for the hypothesized model for European Americans. Factor loadings are different than the loadings resulting from the chi-square difference test for WLSMV reported in the text. Broken lines indicate pathways with $p$-values $> .05$. 
Figure 5. Standardized coefficients for the modified structural model with African Americans. Factor loadings are different than the loadings resulting from the chi-square difference test for WLSMV reported in the text. Broken lines indicate pathways with $p$-values $> .05$. 
Figure 6. Standardized coefficients for the modified structural model with European Americans. Factor loadings are different than the loadings resulting from the chi-square difference test for WLSMV reported in the text. Broken lines indicate pathways with $p$-values $>$ .05.