# Child Maltreatment and Resilience: The Promotive and Protective Role of Future Orientation

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**Abstract**

Maltreatment is associated with risk for a wide range of socio-emotional and behavioral problems in adolescence. Despite this risk, many maltreated youth adjust well through the process of resilience. Extant research demonstrates that future orientation is linked to reduced risks for maladjustment in adolescence. Few studies, however, have tested the protective and promotive role of future orientation using positive and negative developmental outcomes among maltreated youth. The present study aimed to investigate the promotive and moderating role of future orientation among a longitudinal sample of maltreated and demographically comparable non-maltreated youth (N = 1,354, 51.5% female, 53.2% African American). Data collected from Time 1 ($M_{age}$ = 4.56, $SD_{age}$ = .70) to Time 8 ($M_{age}$ = 18.514, $SD_{age}$ = .615) were used. Compared to the non-maltreated youth, maltreated youth showed increased delinquent behaviors and reduced self-esteem. In addition, future orientation significantly predicted higher levels of social competence and attenuated the adverse effects of maltreatment on youth delinquency and substance use. The findings highlight the role of future orientation in the development of resilience among maltreated youth, bearing significant contributions to prevention and intervention programs designed to protect youth against risks linked to child maltreatment and promote their positive development.

*Keywords:* child maltreatment, future orientation, resilience, positive youth development

## Introduction

Child maltreatment encompasses various forms of offending against children, including physical and sexual abuse, neglect, and emotional maltreatment. It comprises a highly toxic and stressful rearing environment that places children at heightened risk for maladaptation across multiple domains of social (Alink et al. 2012), behavioral (Shin et al. 2013), and psychological functioning (Manly et al. 2001). Recent statistics suggest that in 2018, approximately 7.8 million children were referred to Child Protective Services (CPS) due to alleged child maltreatment, and 8.7% (678,000 children) were substantiated for maltreatment (U.S. Department of Health & Human Services 2020). Longitudinal research has demonstrated the long-term effects of child maltreatment on adolescents' development of problem behaviors, including violence and delinquency (Yun et al. 2011) and substance use (Proctor et al. 2017). In addition to promoting adolescent problem behaviors, child maltreatment undermines youth socio-emotional development, which takes a toll on youth development of social competence (Alink et al. 2012) and self-esteem (Oshri et al. 2017). Youth who experience multiple types of maltreatment are at risk for even poorer adjustment outcomes (Boxer and Terranova 2008) compared to youth experiencing one type of maltreatment. For example, Hahm et al. (2010) showed that experiencing multiple forms of maltreatment is associated with more involvement in risky sexual behaviors and delinquency. Therefore, the experience of multiple types of maltreatment reflects an overall severity that places youth at an elevated risk for problem behaviors and socio-emotional maladjustment.

### Resilience: Investigating Promotive and Protective Factors

Despite the negative effect of child maltreatment on adolescents' development, many maltreated youth can psychologically and behaviorally adjust and even thrive (Oshri et al. 2017).

Factors that may attenuate the risks linked to early adverse experiences contribute to the process of resilience, defined as positive development outcomes despite exposure to significant adversity (Masten 2014). Methodological literature suggests that resilience is a process that is informed by empirical models that identify protective and promotive factors that support positive youth development (Luthar et al. 2000; Zimmerman et al. 2013). Two models are particularly germane for this study. In the *compensatory model*, a promotive factor yields a direct effect, preferably longitudinal, in the opposite direction of a risk factor (e.g., child maltreatment). The protective factor model, on the other hand, refers to promotive processes that buffer the influence of a risk factor on specific outcomes. Protective factors are statistically tested with interaction analyses. Investigations of promotive and protective factors are particularly informative for prevention scientists because if they are modifiable, they form ideal targets for prevention programs (Zimmerman et al. 2013).

**Resilience and Positive Youth Development**

Investigations of resilience also are informed increasingly by perspectives on Positive Youth Development (Lerner 2009). Positive Youth Development is a comprehensive framework that encourages investigations and interventions that focus on the factors associated with healthy youth development. A Positive Youth Development perspective complements typical research on resilience by highlighting the need for studies that consider positive as well as negative developmental outcomes (Masten 2014). Nevertheless, studies that examine resilience in terms of both positive and negative outcomes are rare. To address this need, the present study considers youth self-esteem and social competence, in addition to youth negative outcomes such as delinquency and substance use. These healthy developmental outcomes have been linked to long-term psychosocial adjustment among adolescents, including typically developing youth

(Trzesniewski et al. 2006) and those who are exposed to high-risk environments (Salami and Uganda 2010).

**Future Orientation and Resilience**

Accumulating evidence suggests that an adolescent's future orientation, defined broadly as the extent to which an individual thinks about, anticipates, and plans for the future (Steinberg et al. 2009), may promote youth socio-emotional developmental outcomes (Schmid et al. 2011a) and reduce risks for problem behaviors in adolescence (Stoddard et al. 2011). During adolescence, there is rapid development in youth capacity to mentally visualize their possible futures and consider their lives and goals for the future in terms of relationships, education, and employment (Trempała and Malmberg 2002). Adolescents' formation of positive expectations for the future, in particular, is a core aspect of future orientation (Seginer 2008) that may function as a promotive factor supporting resilience (Griffin et al. 2004). Using compensatory models of resilience, research has shown direct connections between future orientation and reductions in substance use (Stoddard et al. 2011) and delinquency (Bolland 2003) among at-risk youth. Other studies directly link future orientation to positive developmental outcomes including self-esteem and social competence (Schmid et al. 2011b).

A second line of research on resilience investigated the potential for youth future orientation to attenuate the influence of adversity on youth outcomes, which is consistent with a protective factor model. For example, So et al. (2018) found that future orientation significantly buffered the impact of violence exposure on youth delinquent behaviors. Although empirical evidence is accumulating that future orientation acts as a promotive factor that contributes to youth reductions in risky behaviors and their development of socio-emotional competence, a number of limitations are apparent in the present research base. Notably, few of these studies

used prospective designs to test promotive factor hypotheses or considered both direct, compensatory effects as well as protective effects in the same study. Moreover, despite the importance of considering positive developmental outcomes, few prospective studies of future orientation examine risk behaviors and positive developmental outcomes concurrently. Finally, the majority of studies on future orientation have investigated either typically developing samples (Chen and Vazsonyi 2013), or those at risk due to their poverty or inner-city neighborhood status (Bolland 2003). This study extends this literature by investigating these future orientation promotive and protective processes among a sample of maltreated youth, compared to a demographically matched sample of youth without histories of child maltreatment.

## The Present Study

Informed by compensatory and protective factors models of resilience, this study simultaneously considers both negative behavioral outcomes (i.e., delinquent behaviors, substance use) as well as levels of positive developmental outcomes (i.e., self-esteem, social competence). This study is divided into three main aims. The first aim is to replicate past studies that link maltreatment to maladaptive developmental outcomes. It is hypothesized that maltreated youth would exhibit increased problem behaviors (delinquent behaviors, substance use), and reduced self-esteem and social competence, compared to non-maltreated youth. The second aim is to investigate the direct (i.e., compensatory) effects of future orientation on all four outcomes independent of the influence of maltreatment. Accordingly, increased levels of future orientation is hypothesized to predict fewer delinquent behaviors and substance use, as well as increases in self-esteem and social competence. The third aim is to examine the potential protective effects of future orientation. It is hypothesized that future orientation would constrict the downstream

detrimental effects of child maltreatment on youth delinquent behaviors, substance use, self-esteem, and social competence.

## Method

### Sample

Hypotheses were tested with data from the Longitudinal Studies on Child Abuse and Neglect (LONGSCAN) project. LONGSCAN is a prospective study of child development that was designed to facilitate investigations of the effects of maltreatment. Children were recruited at age four from five different research sites across the U.S and selected to represent exposure to documented maltreatment. Children were selected based on state public health tracking records, from pediatric clinics due to being identified as at risk, or from CPS due to suspected or confirmed maltreatment. Demographically matched control children without maltreatment histories were also included (See Runyan et al. 2014 for more details). Data collection began when children were about 4 years old (Time 1) and took place every two years until children reached 18 years old (Time 8). The attrition rate from baseline to age 14, 16, and 18 was approximately 25%, 33.9%, and 31.2%, respectively (Runyan et al. 2014). Demographic and maltreatment data used were from Time 1 to Time 6. Youth future orientation and all outcome variables used data from Time 6 ($M_{age}$ = 14.349, $SD_{age}$ = .452), Time 7 ($M_{age}$ = 16.316, $SD_{age}$ = .438), and Time 8 ($M_{age}$ = 18.514, $SD_{age}$ = .615). The total sample of 1,354 youth were used in the analyses, which consisted of maltreated (N = 672) and non-maltreated youth (N = 682). See Table 1 for sample demographics.

### Procedures

At each data collection time point, children and their primary caregivers were interviewed. In addition, Child Protective Service records were reviewed and coded every two

years according to the Modified Maltreatment Classification System (English and Investigators 1997) by trained researchers to extract information about the number of substantiated reports of maltreatment. Referrals to CPS due to alleged or suspected child maltreatment are screened, investigated, and will be substantiated by CPS upon sufficient evidence of maltreatment that is found (Hussey et al. 2005). The percentages of substantiated maltreatment allegations were 27.3% for physical abuse, 28.6% for sexual abuse, 37.6% for neglect, and 30.9% for emotional maltreatment. All adult participants gave informed consent and all minor participants gave informed assent to be included in the study.

**Measures**

**Child maltreatment (birth to age 14**). To capture the comparison between maltreated and non-maltreated youth, youth without histories of maltreatment were given a score of 0 and for maltreated youth, a binary 0/1 measure for each type of maltreatment (i.e., physical, sexual abuse, neglect, and emotional maltreatment) was used and then summed up resulting in a scale of 0-4. In addition, a simple binary 0/1 indicator for maltreatment status (non-maltreated youth were given a 0, and maltreated youth were given a 1) was used as a supplementary analysis.

**Future orientation (age 14).** Youth future orientation at age 14 was operationalized as a latent variable using 3 subscales from the 12-item Future Events Questionnaire. The subscales address future expectations in three life domains: Education & Career ($\alpha$ = .84), Employment Concerns ($\alpha$ = .65), and Family ($\alpha$ = .66). Items within each domain were summed with higher scores indicating higher future orientation. A sample item was "How likely that you will get a scholarship to go to college." Adolescents rated each item on a 5-point Likert scale (1 = "very unlikely" to 5 = "very likely").

**Delinquent behaviors (age 16 and 18).** Adolescents' involvement in delinquent and

violent behaviors at age 16 (α = .89) and 18 (α = .87) were assessed using a 26-item measure adapted from the Denver Youth Study (Huizinga et al. 1991). Youth were asked how many times they have engaged in each violent or delinquent behavior in the past year and responded on a scale from "0 = Never" to "3 = 10 or more times." A total score was then computed based on the item average. Delinquent behaviors at age 16 was controlled in predicting delinquency at age 18.

**Substance use (age 16 and 18).** Youth substance use at age 16 and 18 was indexed by three items reporting the frequencies of youth tobacco, alcohol, and marijuana use during the past year. Youth rated the items on a 3-point scale (1 = "1-3 days" to 3 = ">20 days"). The three items were used to create a latent factor of substance use. Substance use at age 16 was treated as a control variable to predict substance use at age 18.

**Self-esteem (age 18).** Youth self-esteem at age 18 was measured with the Rosenberg Self-Esteem Scale (Rosenberg 1965). Adolescents were asked if they feel that, for example, "they have a number of good qualities," and to rate themselves on a 4-point Likert scale (4 = "Strongly agree"; 1 = "Strongly disagree"). Items were averaged with higher scores indicating higher self-esteem (α = .86). Self-esteem at age 16 was not available, which might be due to some limitations during the data collection process.

**Social Competence (age 16 and 18).** Youth social competence was measured with the Activities and Social subscales of the Child Behavioral Checklist (CBCL) at age 16 and of the Youth Self-Report (YSR) at age 18 (Achenbach 1991a, 1991b). Subscales in both measures assessed the number of activities (sports, chores, hobbies) and social organizations (clubs, groups) that youth participated in; and the number of friends, amount of time that youth interacted with friends, as well as how actively youth participated in the activities or organizations and how well they got along with peers and family members compared to peers of

the same age. For each measure, a youth social competence score was created. Both YSR and CBCL have shown to have good reliability (Achenbach and Rescorla 2001). Similarly, youth social competence at age 16 was controlled to predict their social competence at age 18.

**Covariates.** Child's gender (male = 0, female = 1), ethnicity (recoded as ethnic minority = 0, European American = 1), and family socioeconomic status (SES) were controlled for in all analyses. Family SES was calculated based on three variables: Family's annual household income (e.g., 1 = < $5,000/year, 2 = $5,000 – $9,999/year, and so on), parents' years of education (e.g., 1–12 = Elementary School, 13–16+=College and so on), and receipt of government financial assistance [(i.e., AFDC, disability check, unemployment) (for each type of assistance, responses were coded as 0 = Yes, 1 = No, and were summed across all three types of assistance to calculate a total number of assistance received)]. Scores for each variable were then summed to create a Family SES total score. Higher score indicated more socioeconomic advantage.

**Analytic Strategy**

Skewed data including child maltreatment and delinquent behaviors were log-transformed. Measurement and multivariate models were tested using Mplus 7.4 (L. Muthén and Muthén 1998-2010). Missing data patterns were inspected to determine the appropriate data analytic strategy for handling missing values. The data were determined to be missing at random (MAR) per Little's MCAR test ($\chi^2$ (845) = 1157.58, $p < .001$). A full information maximum likelihood (FIML) model estimator is deemed appropriate for modeling data under MAR conditions as it produces unbiased parameter estimates (Enders and Bandalos 2001). Criteria for evaluating model fit were as follows: A maximum value of .06 for RMSEA and .08 for SRMR, and a minimum value of .90 for CFI (Hu and Bentler 1999).

Measurement models for latent variables were tested with confirmatory factor analysis (CFA). Per recent recommendations for improving assessment in diverse samples (Knight and Zerr 2010), measurement invariance for the latent future orientation construct was examined using multigroup procedures to compare European American and ethnic minority youth. Metric invariance (similar factor loadings across groups) was tested (Milfont and Fischer 2010). Criteria for invariances included non-significant change in $\chi^2$ (Byrne 2012), a change in CFI smaller than .01 (Cheung and Rensvold 2002), and a change in TLI smaller than .02 when freeing parameters between groups (Vandenberg and Lance 2000).

Structural equation models (SEM) were performed to test the study hypotheses. Per the first aim, an SEM model tested the direct effects of child maltreatment on youth outcomes at age 18, controlling for gender, race/ethnicity, and family socioeconomic status. All outcomes at age 18 were controlled at age 16 except for self-esteem due to data unavailability. Per the second aim, future orientation was added as a predictor of outcomes. The same covariates as in the first SEM were applied. A third SEM was conducted where an interaction term was added to model the protective effects of future orientation on youth outcomes. To estimate interaction effects involving latent variables such as future orientation, the Latent Moderated Structural Equations (LMS) approach with maximum-likelihood estimator was used (B. Muthén and Asparouhov 2003). The potential of multiple testing to inflate Type I error was accounted for with False Discovery Rate (FDR) (Benjamini and Hochberg 1995). It was implemented by first ordering *p* values from the smallest to the largest corresponding to the *k* parameter estimates. Then, the largest $p_k$ was tested against $\alpha = .05$. If $p_k < .05$, then the parameter was declared significant, otherwise non-significant. Then, $p_{k-1}$ was tested against adjusted significance level $\alpha^* = .05$ (k-1) / k, $p_{k-2}$ against adjusted significance level $\alpha^* = .05$ (k-2) / k, and so on. FDR is considered

an effective but less restrictive means to control for Type I error compared to the Bonferroni procedure (Cribbie 2007).

## Results

### Preliminary Analyses

Chi-square and ANOVA showed that the maltreated and control group differed significantly in their ethnicity distributions and caregiver characteristics (see Table 1). Bivariate correlations as well as means, standard deviations, and range among study variables are presented in Table 2, respectively for non-maltreated and maltreated youth. The measurement models for youth future orientation at age 14 and substance use at age 16 and 18 were tested with CFA. The model was saturated, thus yielding perfect fit. Factor loadings were all above 0.48 and significant ($p < .001$) (See Table 3 for measurement properties). Measurement invariance for future orientation across groups (European American youth versus ethnic minority youth) was tested and metric invariance was reached (see Table 4 for fit indices).

### Tests of Study Hypotheses

First, SEM was used to test the influence of child maltreatment on youth positive and negative outcomes (delinquent behaviors, substance use, self-esteem, and social competence) at age 18, controlling for baseline levels (except for self-esteem) and demographic covariates. The data fitted the model as follows: $\chi^2$ (49) = 229.95, $p < .001$, RMSEA = .05, CFI = .92, SRMR = .04. After accounting for Type I error with the FDR procedure (Benjamini and Hochberg 1995), child maltreatment was associated significantly with increased delinquent behaviors (β = .107, 95% CI [.047, .166], $p < .001$) and reduced self-esteem (β = -.105, 95% CI [-.180, -.029], $p < .01$) at age 18. Child maltreatment did not associate significantly with substance use (β = -.004, 95% CI [-.076, .068], $p = .915$) or social competence (β = -.038, 95% CI [-.107, .031], $p$

= .282) at age 18 (see Table 3 and Figure 1a).

The second SEM was used to test the direct (i.e., compensatory) effects of future orientation on both youth negative and positive outcomes at age 18. The data fit the model as follows: $\chi^2$ (80) = 272.08, $p < .001$, RMSEA = .04, CFI = .93, SRMR = .04. The results indicated that higher future orientation was significantly associated with reduced delinquent behaviors (β = -.147, 95% CI [-.241, -.053], $p < .01$), elevated self-esteem (β = .317, 95% CI [.200, .435], $p < .001$), and increased social competence (β = .199, 95% CI [.091, .307], $p < .01$). Future orientation did not significantly predict youth substance use at age 18 (β = -.032, 95% CI [-.144, .081], $p = .582$) (see Table 3 and Figure 1b).

A third SEM was used to model the protective effects of future orientation (future orientation by maltreatment interaction term) on youth negative and positive outcomes at age 18. The third model fit the data as follows: $\chi^2$ (82) = 277.32, $p < .001$, RMSEA = .04, CFI = .93, SRMR = .04. The results indicated that future orientation interacted with child maltreatment to predict youth delinquent behaviors (β = -.321, 95% CI [-.402, -.241], $p < .001$) as well as substance use (β = -.158, 95% CI [-.245, -.071], $p < .01$) at age 18. However, the interaction term did not predict youth self-esteem (β = -.007, 95% CI [-.105, .091], $p = .890$) or social competence (β = .043, 95% CI [-.051, .137], $p = .370$) at age 18 (see Table 3 and Figure 1c). The results from the supplementary analyses using a simple 0/1 indicator for maltreatment status were not significantly different from the original analyses, except that the moderating effect of future orientation on the association between maltreatment and substance use went from being significant to being marginally significant (β = -.091, 95% CI [-.185, . 002], $p = .057$). This is expected because a binary classification of maltreatment status might not account for the variance related to the experience of multiple versus a single type of maltreatment.

To probe the interaction effects, the Johnson Neyman technique (See Figure 2a & 2c, P. Johnson and Neyman 1936) and the simple slope method were used to graphically present the interaction effects (See Figure 2b & 2d, Dawson 2014). For the Johnson Neyman plots, the x-axis represents the factor scores of the latent variable future orientation. The y-axis represents the unstandardized coefficient *b* of the effects of child maltreatment on youth delinquency and substance use at age 18, respectively. The shaded areas present regions of significance for the moderating effects of future orientation. According to Figure 2a, on the right hand, the shaded area shows the region of significance in which with the increases in future orientation, the effect of child maltreatment on youth delinquency decreases. The right shaded area included youth (N = 259) with high future orientation (at least .77*SD* above the mean, 19.1% of participants). On the left hand, the shaded area shows the region of significance in which with the decreases in future orientation, the effect of child maltreatment on youth delinquency increases. The left shaded area included youth (N = 740) with low future orientation (at least lower than .09*SD* above the mean, 54.6% of participants). Similarly, according to Figure 2c, on the right hand, the shaded area shows the region of significance in which with the increases in future orientation, the effect of child maltreatment on youth substance use decreases. The right shaded area included youth (N = 263) with high future orientation (at least .75*SD* above the mean, 19.4% of participants). On the left hand, the shaded area shows the region of significance in which with the decreases in future orientation, the effect of child maltreatment on substance use increases. The left shaded area included youth (N = 213) with low future orientation (at least .91*SD* below the mean, 15.7% of participants).

Additionally, the moderating effects of future orientation were probed using the simple slope method (Dawson 2014). It is important to note that the child maltreatment variable is not

dichotomous but on a scale of 0-4, even though it was marked on the x-axis stating no child maltreatment and high level of child maltreatment. According to Figure 2b & 2d, when experiencing maltreatment, youth with low future orientation (1*SD* below the mean) exhibited increased problem behaviors including delinquency and substance use at age 18 than youth with high future orientation (1*SD* above the mean). Overall, the moderation analyses suggest that when child maltreatment is present, high future orientation attenuates the associations between child maltreatment and youth delinquent behaviors and substance use.

## Discussion

Previous research has shown the promotive effects of future orientation among at-risk adolescents (Robbins and Bryan 2004). However, less is known about the role of future orientation as both a compensatory and protective factor that forecasts both positive and negative outcomes among maltreated youth. The present study addressed this gap in a prospective national sample of maltreated and demographically matched non-maltreated youth designed to examine the effects of maltreatment. The findings partially supported the study hypotheses. First, the results showed that exposure to child maltreatment from birth to age 14 was associated with an increase in delinquent behaviors and decreased self-esteem at age 18. Contrary to the first hypothesis, child maltreatment was not directly predictive of youth substance use or social competence at age 18. The second aim was to test the hypothesis concerning the compensatory effects of future orientation. Results indicated that future orientation at age 14 was linked directly to decreased youth delinquent behaviors and increased self-esteem and social competence at age 18. Third, moderation analyses revealed that in the presence of maltreatment, high future orientation attenuated the downstream negative influence of child maltreatment on youth delinquent behaviors and substance use.

The present study suggests that, compared to non-maltreated youth, maltreated youth are more likely to engage in delinquent behaviors and have lower self-esteem. These findings are consistent with research and theory, suggesting that adverse rearing environments pose substantial developmental risks for adolescents (Proctor et al. 2017). Contrary to expectations, no significant associations were found between child maltreatment and increased levels of youth substance use, or decreased levels of social competence at age 18. Nonetheless, these findings support previous research that also reported lack of significant associations between history of maltreatment and substance use risks in late adolescence (Goldstein et al. 2013). The non-significant links between maltreatment and substance use and social competence may suggest that other unexamined protective factors may have constricted some maladaptive effects of maltreatment on substance use and social competence over time. In addition, because the non-maltreated youth were a demographically matched at-risk sample, it is plausible that both the maltreated and non-maltreated youth presented high psychosocial risks for substance use behaviors and reduced social competence.

Some research has also supported different associations between maltreatment subtypes and substance use (Lo and Cheng 2007). For example, some research suggests that sexual abuse may lead some youth to avoid risky peers and behaviors such as substance use (Oshri et al. 2012). It is, therefore, possible that by grouping multiple types of child maltreatment together to study its overall effect on substance use might have diluted or canceled out the effects of different types of maltreatment. Considering this, the overall effect of child maltreatment on substance use without distinguishing subtypes might be diminished. It would be an important research question to ask how different maltreatment types influence youth substance use. However, a minimal number of maltreated youth in the current sample actually experienced only

one type of maltreatment, except neglect (6% only physically abused, 2.7% sexually abused, 44.2% neglected, 4.3% emotionally abused), thus limiting this study's ability to respectively test the effect of each maltreatment type on substance use.

The current study modeled the compensatory (i.e., direct) and protective effects of future orientation on positive and negative adjustment outcomes. First, the compensatory effects of future orientation were examined. Results revealed that future orientation predicted directly fewer delinquent behaviors and heightened social competence at age 18. These findings are consistent with several studies that have linked future orientation to delinquency (Bolland 2003) and socio-emotional competence (Schmid et al. 2011a). In addition, the present study extends the literature on the compensatory effect of future orientation by using a prospective design. The prospective design allowed the modeling of residual variance from earlier waves for delinquency and social competence, thereby, more rigorously showing that future orientation at age 14 influenced changes in these outcomes during the two-year time period from age 16 (T7) to age 18 (T8). This provided considerably better evidence for the potential causal role of future orientation than past cross-sectional studies. However, additional experimental evidence is needed to document the causal role of future orientation in this population. Results also showed a significant positive association between future orientation at age 14 and self-esteem at age 18. However, due to the lack of self-esteem data availability at age 16, this study was constrained in its ability to conclude on the promotive role of future orientation on youth self-esteem. It is plausible, however, that youth who had higher future orientation at 14 were more likely to show increase in self-esteem through age 18.

Lastly, the protective effects of future orientation were examined across negative behavioral outcomes and positive socio-emotional outcomes. Results indicated that future

orientation significantly reduced the downstream negative impact of child maltreatment on youth delinquent behaviors and substance use at age 18. These findings support research that showed the protective effects of future orientation against problem behaviors among at-risk youth (So et al. 2018). Similarly, these results corroborate theory on the protective impact of youth expectations for positive future outcomes on development (Wigfield and Eccles 2000). It is plausible that maltreated youth who expect less from the future may focus on immediate goals, a risk factor for engaging in problem behaviors while discounting the negative long-term consequences (Oshri et al. 2018b). In contrast, maltreated youth who still manage to retain high expectations for the future would think about how engaging in risky behaviors such as delinquent and substance use behaviors would compromise their efforts to achieve future goals, therefore, less likely to engage in those behaviors. Interestingly, future orientation did not mitigate risks associated with child maltreatment on positive socio-emotional outcomes (i.e., self-esteem, social competence), but did show promotive effects on self-esteem and social competence at age 18, regardless of maltreatment status. These findings are consistent with previous studies on the promotive benefit of future orientation among community samples of adolescents (Schmid et al. 2011a). In addition, the results that future orientation promoted socio-emotional outcomes are aligned with research on the connection between future orientation and self-regulation, which is consequential for enhanced self-esteem and social competence (Schmid et al. 2011b). Nevertheless, more future research is needed to test the mechanisms that might underlie the effects of future orientation on a broader range of different developmental outcomes.

Overall, findings from the current study could inform research on the development of maltreated youth. Adolescence is a developmental stage where a series of biological, cognitive, and social transformations occur (DiClemente et al. 2009). While going through adolescence and

making a successful transition to young adulthood can be stressful, the experience of child maltreatment could further compromise adolescent development. The findings on the protective and promotive effects of future orientation further confirm the developmental benefits of future orientation in the context of adversity (i.e., child maltreatment) and contribute to the understanding of the resilience processes among maltreated youth.

Furthermore, the present study has important implications for research that aims to inform preventive interventions targeting maltreated youth. Prevention of maladjustment among maltreated youth has often been based on a deficit-oriented model (Tlapek et al. 2017). For example, previous studies on the beneficial effects of future orientation among maltreated youth have operationalized resilience or positive adaptation in the face of adversity (i.e., maltreatment) as an absence of psychopathology (Williams and Nelson-Gardell 2012). Within this deficit-oriented model, promoting resilience in maltreated youth is a matter of reducing risks and preventing problem behaviors. In an attempt to further advance research, the present study integrated aspects of a Positive Youth Development perspective when examining the contribution of future orientation to resilience among maltreated youth (Lerner 2009). Instead of solely focusing on reducing problem behaviors, the Positive Youth Development perspective endorses a strength-based model, with a focus on enhancing positive attributes that inform youth ability to achieve positive adaptations and successfully meet developmental milestones in the context of adversity (Lerner et al. 2013). The fact that future orientation was found to mitigate the downstream deleterious effect of child maltreatment on youth risky behaviors, as well as enhance youth socio-emotional competence, can benefit preventions and intervention programs aiming to promote resilience and positive development among maltreated youth.

Emerging research has demonstrated that future orientation is not a static trait but a

malleable construct in adolescents (Oshri et al. 2018a). Scholars have reported factors such as kinship social support (McCabe and Barnett 2000), teacher-student relationships, and a sense of school belongingness (Wong et al. 2019) that influence the development of future orientation. Additionally, several interventions targeting future orientation have shown to promote positive youth outcomes, such as school involvement (Oyserman et al. 2002), as well as reduced engagement in risky behaviors (Brody et al. 2006). For example, the Healthy Futures intervention strives to promote positive behaviors (e.g., career readiness) and reduce youth involvement in risky behaviors through focusing on helping youth form expectations for the future in addition to identifying environmental and behavioral barriers to realizing future plans (S. Johnson et al. 2015). Similarly, another intervention, Possible Selves, is a 9-week small-group based after school program that seeks to enhance youth school involvement through promoting their academically-centered possible selves (Oyserman et al. 2002). The Possible Selves helps youth visualize their future and facilitate their planning skills to achieve future goals. Together, this body of empirical and intervention-based research suggests that prevention programs targeting future orientation among maltreated youth may do so via promotion of family and school environment, as well as through facilitating expectations and planning for the future among maltreated youth.

The findings should be interpreted in light of several limitations. First, all youth outcomes at age 18 were self-reported by adolescents. Second, not controlling for self-esteem at age 16 limited the study's ability to make causal inferences regarding the effects of child maltreatment and future orientation on youth self-esteem at age 18. Third, some measures of the key outcomes included in the study such as substance use, delinquent behaviors, and self-esteem were not available at age 14. Though past research has shown that many youth experience the

onset of risky behaviors (e.g., substance use and delinquent behaviors) during late adolescence (ages 16-18) and that these risk behaviors continue to increase during this time period (Chassin et al. 2002), it would be more ideal to control all study outcomes from age 14, or possibly from age 12. By doing this, a time frame could be created that includes a great deal of onset in youth problem behaviors. Less is known about the timing of developmental changes in positive developmental processes, which is an important area needing more research. Fourth, the current study only analyzed the impact of early environmental risk by measuring child maltreatment from birth to age 14 without investigating the effects of more recent or current maltreatment. This is due to a limited number of participants having substantiated maltreatment reports from age 14 to 16 (2.7%) and from age 16 to 18 (0.8%). It is important for more future research to look beyond the effects of early environmental risk on youth development, as youth living environments can be very stable over time.

Despite the above-mentioned limitations, the present study has multiple methodological advantages that increased prevention science knowledge on the developmental utility of future orientation among maltreated youth. In particular, this study utilized a large at-risk sample of maltreated youth and a control group to longitudinally test the compensatory and protective effects of future orientation and its contribution to resilience and positive development among maltreated youth. As research on the association between future orientation and youth outcomes has been dominated by deficit-oriented and cross-sectional work, the current study's goal to longitudinally link future orientation with both negative and positive developmental outcomes is a unique contribution to the field.

## Conclusion

An emerging body of research is showing significant developmental benefits of future

orientation on a wide range of developmental outcomes in adolescence. Despite these efforts, less is known regarding the role of future orientation in protecting maltreated youth from adjustment risk and promoting their resilience. To address this empirical knowledge gap, the present study investigated the promotive and protective role of future orientation using a prospective design of maltreated and non-maltreated samples of youth. Results revealed that future orientation significantly promoted social competence and protected maltreated youth against involvement in delinquent and substance use behaviors. Findings from the present study contribute to the understanding of the important role future orientation has in the development of resilience among maltreated youth. By elucidating the process of resilience, this study also informs prevention and intervention programs aiming to promote positive development among maltreated youth and assist them in making a successful transition into emerging adulthood.

## References

Achenbach, T. M. (1991a). *Manual for child behavior checklist/4-18 and 1991 profile*. Burlington, VT: University of Vermont Department of Psychiatry.

Achenbach, T. M. (1991b). *Manual for the youth self-report and 1991 profile*. Burlington, VT: University of Vermont Department of Psychiatry.

Achenbach, T. M., & Rescorla, L. A. (2001). *Manual for the ASEBA school-age forms and profiles*. Burlington, VT: University of Vermont, Research Center for Children, Youth, and Families.

Alink, L. R. A., Cicchetti, D., Kim, J., & Rogosch, F. A. (2012). Longitudinal associations among child maltreatment, social functioning, and cortisol regulation. *Developmental Psychology, 48*(1), 224-236, doi:https://doi.org/10.1037/a0024892.

Benjamini, Y., & Hochberg, Y. (1995). Controlling the false discovery rate: A practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society. Series B (Methodological), 57*(1), 289-300, doi:https://doi.org/10.1111/j.2517-6161.1995.tb02031.x.

Bolland, J. M. (2003). Hopelessness and risk behaviour among adolescents living in high-poverty inner-city neighbourhoods. *Journal of Adolescence, 26*(2), 145-158, doi:https://doi.org/10.1016/S0140-1971(02)00136-7.

Boxer, P., & Terranova, A. M. (2008). Effects of multiple maltreatment experiences among psychiatrically hospitalized youth. *Child Abuse & Neglect, 32*(6), 637-647, doi:https://doi.org/10.1016/j.chiabu.2008.02.003

Brody, G. H., Murry, V. M., Gerrard, M., Gibbons, F. X., McNair, L., Brown, A. C., et al. (2006). The strong African American families program: Prevention of youths' high-risk behavior and a test of a model of change. [Periodical]. *Journal of Family Psychology,*

*20*(1), 1-11, doi:https://doi.org/10.1037/0893-3200.20.1.1.

Byrne, B. M. (2012). *Structural equation modeling with Mplus: Basic concepts, applications, and programming* (Multivariate applications series): New York: Routledge Academic.

Chassin, L., Pitts, S. C., & Prost, J. (2002). Binge drinking trajectories from adolescence to emerging adulthood in a high-risk sample: Predictors and substance abuse outcomes. *Journal of Consulting and Clinical Psychology, 70*(1), 67-78, doi:https://doi.org/10.1037/0022-006X.70.1.67.

Chen, P., & Vazsonyi, A. T. (2013). Future orientation, school contexts, and problem behaviors: A multilevel study. *Journal of Youth and Adolescence, 42*(1), 67-81, doi:https://doi.org/10.1007/s10964-012-9785-4.

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9*(2), 233-255, doi:https://doi.org/10.1207/S15328007SEM0902_5.

Cribbie, R. A. (2007). Multiplicity control in structural equation modeling. *Structural Equation Modeling: A Multidisciplinary Journal, 14*(1), 98-112, doi:https://doi.org/10.1080/10705510709336738.

Dawson, J. F. (2014). Moderation in management research: What, why, when, and how. *Journal of Business and Psychology, 29*(1), 1-19.

DiClemente, R. J., Santelli, J. S., & Crosby, R. A. (2009). *Adolescent health: Understanding and preventing risk behaviors*: John Wiley & Sons.

Enders, C. K., & Bandalos, D. L. (2001). The relative performance of full information maximum likelihood estimation for missing data in structural equation models. *Structural Equation Modeling, 8*(3), 430-457, doi:https://doi.org/10.1207/S15328007SEM0803_5.

English, D. J., & Investigators, L. (1997). Modified maltreatment classification system (MMCS). *For more information visit the LONGSCAN website at http://www/.iprc.unc.edu/longscan.*

Goldstein, A. L., Faulkner, B., & Wekerle, C. (2013). The relationship among internal resilience, smoking, alcohol use, and depression symptoms in emerging adults transitioning out of child welfare. *Child Abuse & Neglect, 37*(1), 22-32, doi:https://doi.org/10.1016/j.chiabu.2012.08.007.

Griffin, K. W., Botvin, G. J., Nichols, T. R., & Scheier, L. M. (2004). Low perceived chances for success in life and binge drinking among inner-city minority youth. *Journal of Adolescent Health, 34*(6), 501-507, doi:https://doi.org/10.1016/j.jadohealth.2003.07.026.

Hahm, H. C., Lee, Y., Ozonoff, A., & Van Wert, M. J. (2010). The impact of multiple types of child maltreatment on subsequent risk behaviors among women during the transition from adolescence to young adulthood. *Journal of Youth and Adolescence, 39*(5), 528-540, doi:https://doi.org/10.1007/s10964-009-9490-0

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1-55, doi:https://doi.org/10.1080/10705519909540118.

Huizinga, D., Esbensen, F.-A., & Weiher, A. W. (1991). Are there multiple paths to delinquency. *Journal of Criminal Law & Criminology, 82*(1), 83-118.

Hussey, J. M., Marshall, J. M., English, D. J., Knight, E. D., Lau, A. S., Dubowitz, H., et al. (2005). Defining maltreatment according to substantiation: Distinction without a difference? *Child Abuse & Neglect, 29*(5), 479-492, doi:https://doi.org/10.1016/j.chiabu.2003.12.005.

Johnson, P., & Neyman, J. (1936). Tests of certain linear hypotheses and their application to some educational problems. *Statistical Research Memoirs, 1*, 57-93.

Johnson, S., Jones, V., & Cheng, T. (2015). Promoting "Healthy Futures" to reduce risk behaviors in urban youth: A randomized controlled trial. *American Journal of Community Psychology, 56*(1-2), 36-45, doi:https://doi.org/10.1007/s10464-015-9734-y.

Knight, G. P., & Zerr, A. A. (2010). Informed theory and measurement equivalence in child development research. *Child Development Perspectives, 4*(1), 25-30, doi:https://doi.org/10.1111/j.1750-8606.2009.00112.x.

Lerner, R. M. (2009). The positive youth development perspective: Theoretical and empirical bases of a strengths-based approach to adolescent development. In S. J. Lopez, & C. R. Snyder (Eds.), *Oxford Handbook of Positive Psychology., 2nd ed.* New York, NY: Oxford University Press.

Lerner, R. M., Agans, J. P., Arbeit, M. R., Chase, P. A., Weiner, M. B., Schmid, K. L., et al. (2013). Resilience and positive youth development: A relational developmental systems model. In S. Goldstein, & R. B. Brooks (Eds.), *Handbook of Resilience in Children* (pp. 293-308). Boston, MA: Springer US.

Lo, C. C., & Cheng, T. C. (2007). The impact of childhood maltreatment on young adults' substance abuse. *The American Journal of Drug and Alcohol Abuse, 33*(1), 139-146, doi:https://doi.org/10.1080/00952990601091119.

Luthar, S. S., Cicchetti, D., & Becker, B. (2000). Research on resilience: Response to commentaries. *Child Development, 71*(3), 573-575, doi:https://doi.org/10.1111/1467-8624.00168.

Manly, J. T., Kim, J. E., Rogosch, F. A., & Cicchetti, D. (2001). Dimensions of child

maltreatment and children's adjustment: Contributions of developmental timing and subtype. *Development and Psychopathology, 13*(4), 759-782, doi: https://doi.org/10.1017/S0954579401004023.

Masten, A. S. (2014). Invited commentary: Resilience and positive youth development frameworks in developmental science. *Journal of Youth & Adolescence, 43*(6), 1018-1024, doi:https://doi.org/10.1007/s10964-014-0118-7.

McCabe, K. M., & Barnett, D. (2000). The relation between familial factors and the future orientation of urban, African American sixth graders. *Journal of Child & Family Studies, 9*(4), 491-508, doi:https://doi.org/10.1023/A:1009474926880.

Milfont, T. L., & Fischer, R. (2010). Testing measurement invariance across groups: Applications in cross-cultural research. *International Journal of Psychological Research, 3*(1), 111-121, doi:https://doi.org/10.21500/20112084.857.

Muthén, B., & Asparouhov, T. (2003). Modeling interactions between latent and observed continuous variables using maximum-likelihood estimation in Mplus. *Mplus Web Notes, 6*(1), 1-9.

Muthén, L., & Muthén, B. (1998-2010). *Mplus User's Guide: Sixth edition*. Los Angeles, CA: Muthén and Muthén.

Oshri, A., Carlson, M. W., Kwon, J. A., Zeichner, A., & Wickrama, K. K. (2017). Developmental growth trajectories of self-esteem in adolescence: Associations with child neglect and drug use and abuse in young adulthood. *Journal of Youth and Adolescence, 46*(1), 151-164, doi:https://doi.org/10.1007/s10964-016-0483-5.

Oshri, A., Duprey, E. B., Kogan, S. M., Carlson, M. W., & Liu, S. (2018a). Growth patterns of future orientation among maltreated youth: A prospective examination of the emergence

of resilience. *Developmental Psychology, 54*(8), 1456-1471, doi:https://doi.org/10.1037/dev0000528.

Oshri, A., Liu, S., Duprey, E. B., & MacKillop, J. (2018b). Child maltreatment, delayed reward discounting, and alcohol and other drug use problems: The moderating role of heart rate variability. *Alcoholism: Clinical and Experimental Research, 42*(10), 2033-2046, doi: https://doi.org/10.1111/acer.13858.

Oshri, A., Tubman, J. G., & Burnette, M. L. (2012). Childhood maltreatment histories, alcohol and other drug use symptoms, and sexual risk behavior in a treatment sample of adolescents. *American Journal of Public Health, 102 Suppl 2*(Suppl 2), S250-S257, doi:https://doi.org/10.2105/AJPH.2011.300628.

Oyserman, D., Terry, K., & Bybee, D. (2002). A possible selves intervention to enhance school involvement. *Journal of Adolescence, 25*(3), 313-326, doi:https://doi.org/10.1006/jado.2002.0474.

Proctor, L. J., Lewis, T., Roesch, S., Thompson, R., Litrownik, A. J., English, D., et al. (2017). Child maltreatment and age of alcohol and marijuana initiation in high-risk youth. *Addictive Behaviors, 75*, 64-69, doi:https://doi.org/10.1016/j.addbeh.2017.06.021.

Robbins, R. N., & Bryan, A. (2004). Relationships between future orientation, impulsive sensation seeking, and risk behavior among adjudicated adolescents. *Journal of Adolescent Research, 19*(4), 428-445, doi:https://doi.org/10.1177/0743558403258860.

Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.

Runyan, D., Dubowitz, H., English, D. J., Kotch, J., Litrownik, A. J., Thompson, R., et al. (2014). Longitudinal studies of child abuse and negelct (LONGSCAN) assessment 0-18

[Dataset]. Available from National Data Archive on Child Abuse and Neglect Web site, http://www.ndacan.cornell.edu.

Salami, S. O., & Uganda, K. (2010). Moderating effects of resilience, self-esteem and social support on adolescents' reactions to violence. *Asian Social Science, 6*(12), 101-110.

Schmid, K. L., Phelps, E., Kiely, M. K., Napolitano, C. M., Boyd, M. J., & Lerner, R. M. (2011a). The role of adolescents' hopeful futures in predicting positive and negative developmental trajectories: Findings from the 4-H Study of Positive Youth Development. *The Journal of Positive Psychology, 6*(1), 45-56, doi:https://doi.org/10.1080/17439760.2010.536777.

Schmid, K. L., Phelps, E., & Lerner, R. M. (2011b). Constructing positive futures: Modeling the relationship between adolescents' hopeful future expectations and intentional self regulation in predicting positive youth development. *Journal of Adolescence, 34*(6), 1127-1135, doi:https://doi.org/10.1016/j.adolescence.2011.07.009.

Seginer, R. (2008). Future orientation in times of threat and challenge: How resilient adolescents construct their future. *International Journal of Behavioral Development, 32*(4), 272-282, doi:https://doi.org/10.1177/0165025408090970.

Shin, S. H., Miller, D. P., & Teicher, M. H. (2013). Exposure to childhood neglect and physical abuse and developmental trajectories of heavy episodic drinking from early adolescence into young adulthood. *Drug and Alcohol Dependence, 127*(1-3), 31-38, doi:https://doi.org/10.1016/j.drugalcdep.2012.06.005.

So, S., Gaylord-Harden, N. K., Voisin, D. R., & Scott, D. (2018). Future orientation as a protective factor for African American adolescents exposed to community violence. *Youth & Society, 50*(6), 734-757, doi:https://doi.org/10.1177/0044118X15605108.

Steinberg, L., Graham, S., O'Brien, L., Woolard, J., Cauffman, E., & Banich, M. (2009). Age differences in future orientation and delay discounting. *Child Development, 80*(1), 28-44, doi:https://doi.org/10.1111/j.1467-8624.2008.01244.x.

Stoddard, S. A., Zimmerman, M. A., & Bauermeister, J. A. (2011). Thinking about the future as a way to succeed in the present: A longitudinal study of future orientation and violent behaviors among African American youth. *American Journal of Community Psychology, 48*(3), 238-246, doi:https://doi.org/10.1007/s10464-010-9383-0.

Tlapek, S. M., Auslander, W., Edmond, T., Gerke, D., Voth Schrag, R., & Threlfall, J. (2017). The moderating role of resiliency on the negative effects of childhood abuse for adolescent girls involved in child welfare. *Children and Youth Services Review, 73*, 437-444, doi:https://doi.org/10.1016/j.childyouth.2016.11.026.

Trempała, J., & Malmberg, L.-E. (2002). *Adolescents' future-orientation: Theory and research*. Frankfurt am Main; New York: P. Lang.

Trzesniewski, K. H., Donnellan, M. B., Moffitt, T. E., Robins, R. W., Poulton, R., & Caspi, A. (2006). Low self-esteem during adolescence predicts poor health, criminal behavior, and limited economic prospects during adulthood. *Developmental Psychology, 42*(2), 381-390, doi:https://doi.org/10.1037/0012-1649.42.2.381.

U.S. Department of Health & Human Services, Administratin for Children and Families, Administratin on Children, Youth and Families, Children's Bureau. (2020). *Child Maltreatment 2018. Available from https://www.acf.hhs.gov/cb/research-data-technology/statistics-research/child-maltreatment.*

Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research.

*Organizational Research Methods, 3*(1), 4-69, doi:https://doi.org/10.1177/109442810031002.

Wigfield, A., & Eccles, J. S. (2000). Expectancy–value theory of achievement motivation. *Contemporary Educational Psychology, 25*(1), 68-81, doi:https://doi.org/10.1006/ceps.1999.1015.

Williams, J., & Nelson-Gardell, D. (2012). Predicting resilience in sexually abused adolescents. *Child Abuse and Neglect, 36*(1), 53-63, doi:https://doi.org/10.1016/j.chiabu.2011.07.004.

Wong, T. K., Parent, A. M., & Konishi, C. (2019). Feeling connected: The roles of student-teacher relationships and sense of school belonging on future orientation. *International Journal of Educational Research, 94*, 150-157, doi:https://doi.org/10.1016/j.ijer.2019.01.008.

Yun, I., Ball, J. D., & Lim, H. (2011). Disentangling the relationship between child maltreatment and violent delinquency: Using a nationally representative sample. *Journal of Interpersonal Violence, 26*(1), 88-110, doi:https://doi.org/10.1177/0886260510362886.

Zimmerman, M. A., Stoddard, S. A., Eisman, A. B., Caldwell, C. H., Aiyer, S. M., & Miller, A. (2013). Adolescent resilience: Promotive factors that inform prevention. *Child Development Perspectives, 7*(4), 215-220, doi:https://doi.org/10.1111/cdep.12042.

**Table 1.**

*Demographic Characteristics for Maltreatment and Control groups*

| | Maltreatment Group (N = 672) | Control Group (N = 682) | $\chi^2$/ *F* |
|---|---|---|---|
| **Child characteristics** | N (% female) | N (% female) | |
| Gender | 357 (53.1%) | 340 (49.9%) | 1.450 |
| Ethnicity | N (%) | N (%) | 43.951*** |
| European American | 195 (29.0%) | 159 (23.3%) | |
| African American | 306 (45.5%) | 415 (60.9%) | |
| Hispanic | 55 (8.2%) | 42 (6.2%) | |
| Native American | 5 (.7%) | 3 (.4%) | |
| Asian | 3 (.4%) | 1 (.1%) | |
| Mixed race | 106 (15.8%) | 55 (8.1%) | |
| Other | 1 (.1%) | 7 (1.0%) | |
| **Caregiver characteristics** | *M* (*SD*) | *M* (*SD*) | |
| Level of Education | 11.92 (2.34) | 11.6 (2.03) | 6.259* (*F*) |
| Annual Household Income | 4.55 (2.93) | 3.98 (2.77) | 11.491** (*F*) |
| Receives Government assistance | 354 (62.54%) | 321 (55.54%) | 5.628* |

*Note.* Income is measured on an ordinal scale with 1 = < $5,000 per year, 2 = $5,000 – $9,999 per year, 3 = $10,000 – 14,999 per year, 4 = $15,000 – $19,999 per year, and so on. Level of education is measured on an ordinal scale with 0 = None, 1–12 = Elementary School, 13–16+=College, 17–20+=Graduate/Professional. Participants were asked if they received any of the three types of financial assistance from the government (AFDC, disability check, and unemployment). Participants receiving at least one type of assistance were given a 0, and participants not receiving any assistance were given a 1.

*$p$ < .05. **$p$ < .01. ***$p$ < .001.

**Table 2**.

*Descriptive Statistics and Bivariate Correlations Among Study Variables (N=1,354)*

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Gender | | – | | | | | | | | | | | | | | | | | |
| 2. Ethnicity | | -.02 | – | | | | | | | | | | | | | | | | |
| 3. SES | | .02 | .17** | – | | | | | | | | | | | | | | | |
| 4. Maltreatment total (birth to T6) | | .03 | .09** | .10** | – | | | | | | | | | | | | | | |
| 5. FO_education (T6) | | .10** | -.16** | .07 | -.06 | – | | | | | | | | | | | | | |
| 6. FO_family (T6) | | .04 | .06 | .12** | .01 | .26** | – | | | | | | | | | | | | |
| 7. FO_employment (T6) | | .06 | -.04 | .06 | -.06 | .35** | .39** | – | | | | | | | | | | | |
| 8. Delinquency & violence (T7) | | -.11** | -.01 | .04 | .06 | -.10* | -.13** | -.14** | – | | | | | | | | | | |
| 9. Delinquency & violence (T8) | | -.17** | .02 | -.01 | .12** | -.16** | -.05 | -.11** | .38** | – | | | | | | | | | |
| 10. Cigarettes (T7) | | -.01 | .17** | -.06 | .08* | -.18** | -.07 | -.10* | .37** | .25** | – | | | | | | | | |
| 11. Alcohol (T7) | | -.03 | .06 | .03 | .08* | -.10** | -.07 | -.05 | .47** | .30** | .47** | – | | | | | | | |
| 12. Marijuana (T7) | | -.06 | .06 | -.02 | .08* | -.16** | -.11** | -.08* | .42** | .26** | .51** | .55** | – | | | | | | |
| 13. Cigarettes (T8) | | -.12** | .21** | .05 | .07* | -.15** | -.02 | -.03 | .29** | .29** | .54** | .30** | .40** | – | | | | | |
| 14. Alcohol (T8) | | -.11** | .14** | .09** | .05 | -.07 | -.01 | -.03 | .23** | .38** | .27** | .36** | .32** | .33** | – | | | | |
| 15. Marijuana (T8) | | -.16** | .05 | .05 | .03 | -.13** | -.03 | -.04 | .31** | .47** | .33** | .29** | .43** | .44** | .49** | – | | | |
| 16. Self-esteem (T8) | | -.10* | -.05 | -.05 | -.11** | .19** | .08 | .16** | -.07 | -.18** | -.07 | .00 | .00 | -.12** | -.07 | -.14** | – | | |
| 17. Social competence (T7) | | -.10** | .03 | .24** | .10** | .14** | .06 | .10* | -.02 | -.03 | -.16** | .03 | -.03 | -.08* | .08 | -.03 | .13** | – | |
| 18. Social competence (T8) | | -.14** | .01 | .09* | -.02 | .16** | .07 | .08 | -.02 | -.03 | -.09* | .02 | -.03 | -.11** | .06 | -.06 | .21** | .28** | – |
| For non-maltreated youth | *M* | .50 | .23 | 17.91 | 0 | 4.09 | 3.96 | 3.68 | .09 | .08 | .39 | .38 | .32 | .82 | .69 | .57 | 3.31 | 10.22 | 10.37 |
| | *SD* | .50 | .42 | 4.16 | 0 | .77 | .78 | .85 | .18 | .17 | .90 | .73 | .78 | 1.26 | .96 | 1.02 | .53 | 3.15 | 2.75 |
| | Range | 0-1 | 0-1 | 4-32 | 0 | 1-5 | 1-5 | 1-5 | 0-1.23 | 0-1.54 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 1.2-4.0 | 1.0-19.5 | 3.0-18.5 |
| For maltreated youth | *M* | .53 | .29 | 18.88 | 1.57 | 3.99 | 3.91 | 3.53 | .11 | .12 | .56 | .53 | .49 | 1.01 | .81 | .65 | 3.18 | 10.78 | 10.44 |
| | *SD* | .50 | .45 | 5.06 | .75 | .75 | .74 | .82 | .20 | .23 | .98 | .83 | .93 | 1.27 | .99 | 1.07 | .47 | 3.59 | 2.78 |
| | Range | 0-1 | 0-1 | 4-60 | 1-4 | 1-5 | 2-5 | 1-5 | 0-1.50 | 0-1.81 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 2.0-4.0 | .5-19.5 | 2.5-18.5 |

*Note.* Child gender coded as 0 = male and 1 = female; Ethnicity recoded as European American = 1, Ethnic minority = 0;

SES = Socioeconomic status; FO = Future orientation; Time 6 = 14 years old; Time 7 = 16 years old; Time 8 = 18 years old.

*$p < .05$. **$p < .01$.

**Table 3.**

*Parameters of Measurement and Structural Equation Models*

| **Measurement models** | λ | (*SE*) | $R^2$ | *p* | 95% *CI* |
|---|---|---|---|---|---|
| **Future orientation at age 14**[a] | | | | | |
| Employment concern | .730 | .047 | .532 | <.001 | [.637, .822]*** |
| Family | .544 | .041 | .296 | <.001 | [.464, .623]*** |
| Education & career | .488 | .040 | .238 | <.001 | [.410, .566]*** |
| **Substance use at age 16**[b] | | | | | |
| Cigarette use | .665 | .028 | .443 | <.001 | [.611, .720]*** |
| Alcohol use | .710 | .027 | .504 | <.001 | [.657, .764]*** |
| Marijuana use | .768 | .027 | .590 | <.001 | [.715, .821]*** |
| **Substance use at age 18**[c] | | | | | |
| Cigarette use | .552 | .033 | .304 | <.001 | [.488, .615]*** |
| Alcohol use | .603 | .033 | .363 | <.001 | [.539, .667]*** |
| Marijuana use | .803 | .035 | .646 | <.001 | [.734, .873]*** |
| **Structural equation models** | B | (*SE*) | β | *p* | 95% *CI* |
| **Direct effects of child maltreatment (CM)**[d]**:** | | | | | |
| CM → DVB (T8) | .015 | .004 | .107 | .000 | [.047, .166]*** |
| DVB (T7) → DVB (T8) | .416 | .032 | .413 | .000 | [.355, .471]*** |
| Gender→ DVB (T8) | -.037 | .009 | -.130 | .000 | [-.189, -.070]*** |
| CM → SUB (T8) | -.003 | .029 | -.004 | .915 | [-.076, .068] |
| SUB (T7) → SUB (T8) | .844 | .059 | .711 | .000 | [.640, .781]*** |
| Gender → SUB (T8) | -.253 | .057 | -.161 | .000 | [-.231, -.090]*** |
| SES → SUB (T8) | .020 | .006 | .120 | .001 | [.049, .192]** |
| CM → SE (T8) | -.527 | .195 | -.105 | .007 | [-.180, -.029]** |
| Gender→ SE (T8) | -.976 | .405 | -.097 | .016 | [-.176, -.019]* |
| CM → SC (T8) | -.105 | .097 | -.038 | .282 | [-.107, .031] |
| SC (T7) → SC (T8) | .219 | .033 | .269 | .000 | [.192, .346]*** |
| Gender→ SC (T8) | -.568 | .200 | -.103 | .004 | [-.173, -.032]** |
| **Promotive effects of future orientation (FO)**[e]**:** | | | | | |
| FO (T6) → DVB (T8) | -.041 | .014 | -.147 | .003 | [-.241, -.053]** |
| FO (T6) → SUB (T8) | -.048 | .087 | -.032 | .582 | [-.144, .081] |
| FO (T6) → SE (T8) | 3.128 | .655 | .317 | .000 | [.200, .435]*** |
| FO (T6) → SC (T8) | 1.079 | .324 | .199 | .001 | [.091, .307]** |
| **Protective effects of future orientation (INT = CM X FO)**[f]**:** | | | | | |
| INT → DVB (T8) | -.072 | .011 | -.321 | .000 | [-.402, -.241]*** |
| INT → SUB (T8) | -.192 | .056 | -.158 | .001 | [-.245, -.071]** |
| INT → SE (T8) | -.054 | .387 | -.007 | .890 | [-.105, .091] |
| INT → SC (T8) | .184 | .205 | .043 | .370 | [-.051, .137] |

*Note.* λ = standardized factor loadings; DVB = Delinquent & violent behaviors; SUB = Substance use; SE = Self-esteem; SC = Social competence; FO = Future orientation; INT = Interaction; SES = Socioeconomic status. All structural equation models were adjusted for demographic covariates and k-1 stability covariates from age 16 except for self-esteem. Only significant covariates are presented and only for the first SEM model. Time 6 = 14 years old; Time 7 = 16 years old; Time 8 = 18 years old. [a b c] RMSEA = .00, CFI = 1.00, SRMR = .00; [d]$\chi^2$ (49) = 229.95, $p < .001$, RMSEA = .05, CFI = .92, SRMR = .04; [e]$\chi^2$ (80) = 272.08, $p < .001$, RMSEA = .04, CFI = .93, SRMR = .04; [f]$\chi^2$ (82) = 277.32, $p < .001$, RMSEA = .04, CFI = .93, SRMR = .04.

*$p < .05$. **$p < .01$. ***$p < .001$

**Table 4.**

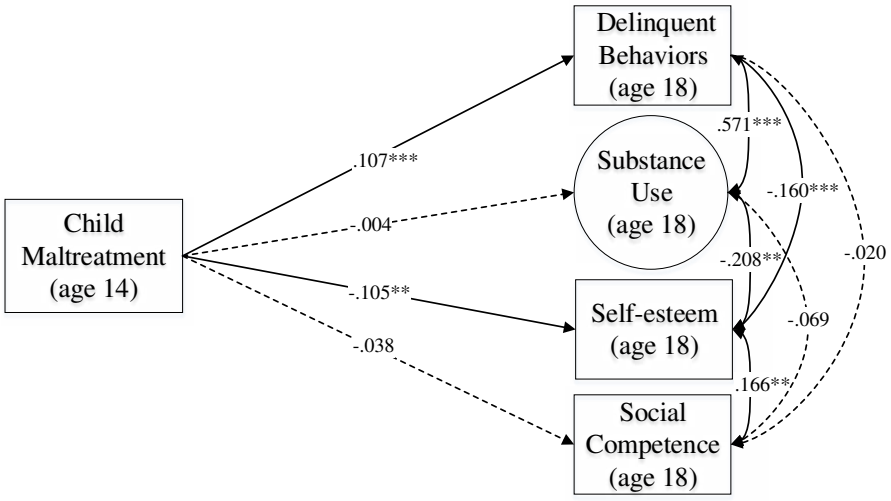
*Fit statistics for Testing Measurement Invariance of Future Orientation Across Groups of European American and Ethnic Minority Youth*

| Model | $\chi^2$ | df | CFI | TLI | $\Delta\chi^2$(df) | ΔCFI | ΔTLI |
|---|---|---|---|---|---|---|---|
| Model 1 | 263.519 | 88 | 0.938 | 0.907 | -- | -- | -- |
| Model 2 | 283.518 | 99 | 0.935 | 0.914 | 19.999 (11)* | 0.003 | 0.007 |

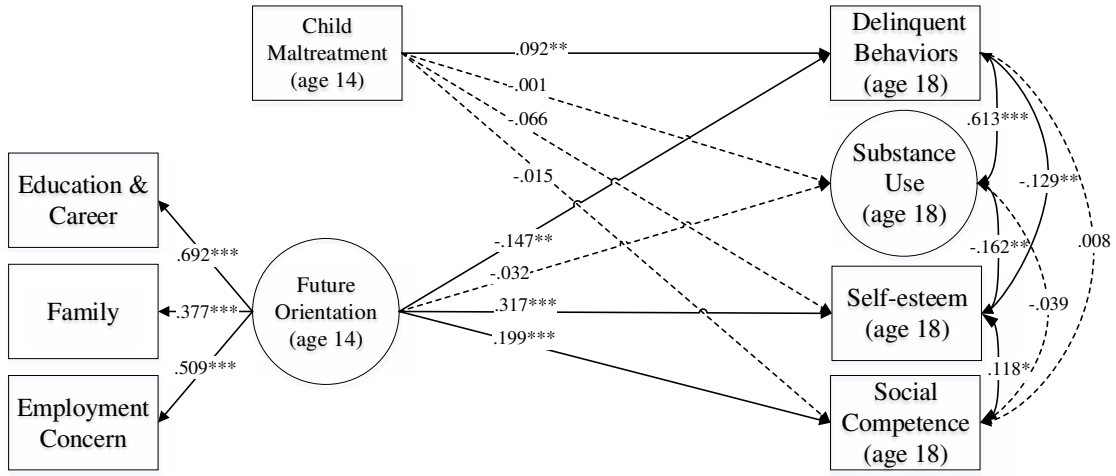
*Note.* Model 1: Configural invariance. Model 2: Metric invariance.

*$p < .05$.

(a)


Delinquent Behaviors (age 18)
Substance Use (age 18)
Self-esteem (age 18)
Social Competence (age 18)
Child Maltreatment (age 14)
.107***
-.004
-.105**
-.038
.571***
-.160***
-.208**
-.069
.166**
-.020

(b)


Child Maltreatment (age 14)
Education & Career
Family
Employment Concern
Future Orientation (age 14)
Delinquent Behaviors (age 18)
Substance Use (age 18)
Self-esteem (age 18)
Social Competence (age 18)
.692***
.377***
.509***
.092**
-.001
-.066
-.015
-.147**
-.032
.317***
.199***
.613***
-.129**
-.162**
.008
-.039
.118*

(c)

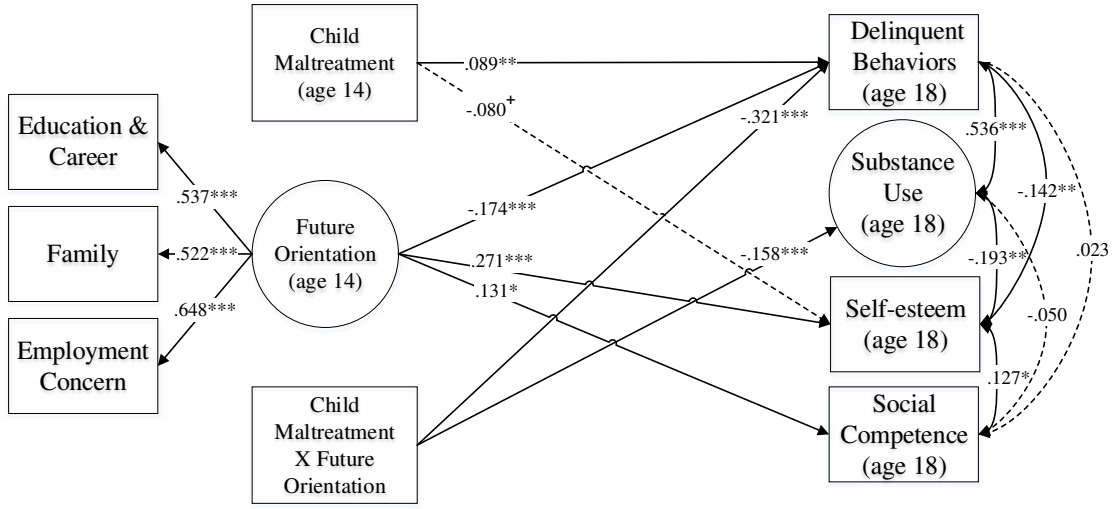
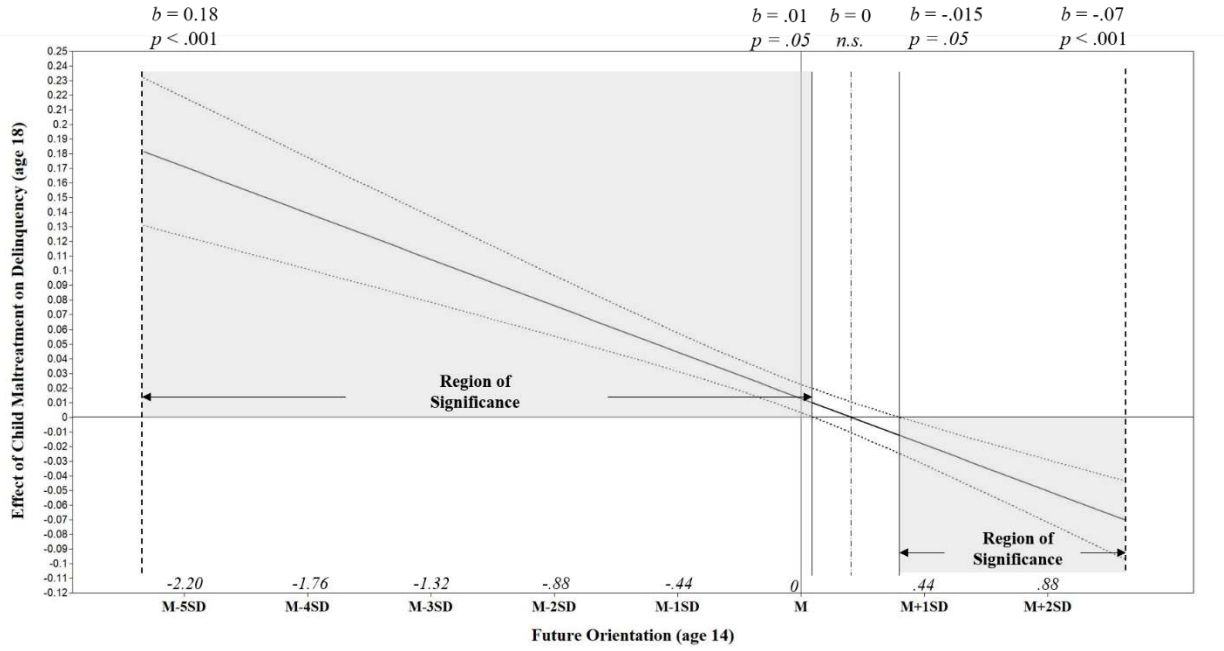

Child Maltreatment (age 14)
Education & Career
Family
Employment Concern
Future Orientation (age 14)
Child Maltreatment X Future Orientation
Delinquent Behaviors (age 18)
Substance Use (age 18)
Self-esteem (age 18)
Social Competence (age 18)
.537***
.522***
.648***
.089**
-.080+
-.174***
.271***
.131*
-.321***
-.158***
.536***
-.142**
-.193**
.023
-.050
.127*

***Fig. 1*** Effects of Child Maltreatment on Youth Outcomes and the Compensatory (i.e., Direct) & Protective Effects of Future Orientation

*Note.* Figure 1a presents the effects of child maltreatment on youth outcomes; Figure 1b presents the compensatory (i.e., direct) effects of future orientation on youth outcomes; Figure 1c presents the protective effects of future orientation on youth outcomes. Figures were created with Visio 2013. For ease of interpretation of Figure 1c, only originally significant pathways are shown in the diagram. $^{+}$paths became insignificant after multiplicity control. $*p < .05$. $**p < .01$. $***p < .001$

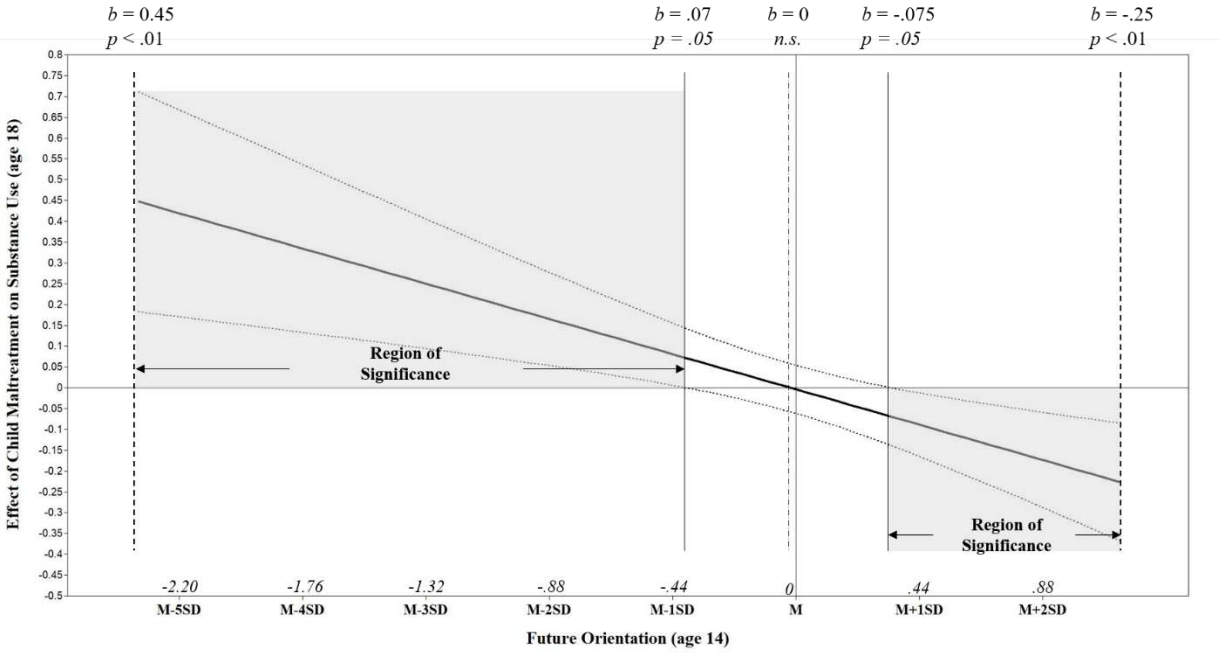
(a)


b = 0.18
p < .001
b = .01
p = .05
b = 0
n.s.
b = -.015
p = .05
b = -.07
p < .001
Effect of Child Maltreatment on Delinquency (age 18)
Region of Significance
Region of Significance
-2.20
-1.76
-1.32
-.88
-.44
0
.44
.88
M-5SD
M-4SD
M-3SD
M-2SD
M-1SD
M
M+1SD
M+2SD
Future Orientation (age 14)

(b)


0.25
0.2
0.15
0.1
0.05
0
-0.05
Delinquency (age 18)
No Child Maltreatment
High Level of Child Maltreatment
Low FO (1SD below)
High FO (1SD above)

(c)


b = 0.45
p < .01
b = .07
p = .05
b = 0
n.s.
b = -.075
p = .05
b = -.25
p < .01
Region of Significance
Region of Significance
Effect of Child Maltreatment on Substance Use (age 18)
-2.20
M-5SD
-1.76
M-4SD
-1.32
M-3SD
-.88
M-2SD
-.44
M-1SD
0
M
.44
M+1SD
.88
M+2SD
Future Orientation (age 14)

(d)


Substance Use (age 18)
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
No Child Maltreatment
High Level of Child Maltreatment
Low FO (1SD below)
High FO (1SD above)

***Fig. 2*** Johnson Neyman Plots and Dawson Plots of the Moderation Effects of Future Orientation on the Association Between Child Maltreatment and Youth Delinquent Behaviors, as well as Substance Use at Age 18

*Note.* CM = Child maltreatment; FO = Future orientation; Low FO: Youth who had future orientation 1 standard deviation (*SD*) below the mean; High FO: Youth who had future orientation 1 *SD* above the mean. Johnson Neyman plots were created with Mplus 7.4. The x-axis represents the factor scores of the latent variable future orientation. The y-axis represents the unstandardized coefficient b of the effects of child maltreatment on delinquency and substance use (age 18), respectively. The solid line represents the effects of child maltreatment on youth outcomes corresponding to the values of future orientation (from 5.34*SD* below to 2.62*SD* above the mean). The dotted lines represent 95% confidence interval around the effects of child maltreatment on youth outcomes. Shaded areas are regions of significance for moderation effects. In Figure 2a, on the right hand, the shaded area shows the region of significance in which with the increases in future orientation, the effect of child maltreatment on youth delinquency decreases. The right shaded area included youth (N = 259) with high future orientation (at least .77*SD* above the mean, 19.1% of participants). On the left hand, the shaded area shows the region of significance in which with the decreases in future orientation, the effect of child maltreatment on youth delinquency increases. The left shaded area included youth (N = 740) with low future orientation (at least lower than .09*SD* above the mean, 54.6% of participants). Similarly, in Figure 2c, on the right hand, the shaded area shows the region of significance in which with the increases in future orientation, the effect of child maltreatment on youth substance use decreases. The right shaded area included youth (N = 263) with high future orientation (at least .75*SD* above the mean, 19.4% of participants). On the left hand, the shaded

area shows the region of significance in which with the decreases in future orientation, the effect of child maltreatment on substance use increases. The left shaded area included youth (N = 213) with low future orientation (at least .91*SD* below the mean, 15.7% of participants). Figure 2b & 2d showed that when experiencing child maltreatment, youth with low future orientation (e.g., 1*SD* below the mean) exhibited increased delinquent and substance use behaviors at age 18 than youth with high future orientation (e.g., 1*SD* above the mean). It is important to note that the child maltreatment variable is not dichotomous but on a scale of 0-4 even though it was marked on the x-axis stating no child maltreatment and high level of child maltreatment.

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**Authors' Contributions**

C.Z. conceived of the study, conducted the analyses, and drafted the manuscript; A.O. assisted with statistical analyses, guided the conception of the study, and critically revise the manuscript; L.S. helped with the data analyses and interpretation of the results, and offered feedback on the writing of the manuscript; E.S. provided methodological expertise regarding measurement invariance, and provided feedback on the theoretical conceptualization of the manuscript; S.K. offered feedback on the statistical analyses and theoretical conceptualization of the study, and critically revise the manuscript. All authors read and approved the final manuscript.

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## Data Sharing and Declaration

The data that support the findings of this study were made available by the National Data Archive on Child Abuse and Neglect, Cornell University, Ithaca, NY, and have been used with permission.

## Compliance with Ethical Standards

### Conflicts of Interest

The authors declare that they have no conflict of interest.

### Ethical Approval

This study is a secondary-data analysis, thus does not contain any studies with human participants by any of the authors.

### Informed Consent

This study is a secondary-data analysis, therefore does not involve obtaining informed consent directly from all individual participants by any of the authors. However, informed consent and assent were obtained by the collectors of the original data.