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Regular Article

Timing of childhood adversities and self-injurious thoughts and behaviors in adolescence

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Abstract

Greater childhood adversity predicts a higher likelihood of later self-injurious thoughts and behaviors (SITB). There is little research focused on whether the timing of childhood adversity predicts SITB. The current research examined whether the timing of childhood adversity predicted parent- and youth-reported SITB at age 12 and 16 years in the Longitudinal Studies of Child Abuse and Neglect (LONGSCAN) cohort ($n = 970$). We found that greater adversity at age 11–12 years consistently predicted SITB at age 12 years, while greater adversity at age 13–14 years consistently predicted SITB at age 16 years. These findings suggest there may be sensitive periods during which adversity may be more likely to lead to adolescent SITB, which can inform prevention and treatment.

Keywords: adolescent, childhood adversity, LONGSCAN, suicide

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Self-injurious thoughts and behaviors (SITB), both suicidal and nonsuicidal, affect millions of people around the world annually. Each year, more than 800,000 people are estimated to die by suicide worldwide (WHO, 2019). For every person that dies by suicide, many more attempt suicide (WHO, 2019). In the United States, suicide is the second leading cause of death for youth and young adults aged 10–29 years (Curtin & Heron, 2019). In 2017, over 7% of youth in Grades 9–12 reported attempting to die by suicide in the past year (CDC, 2020). Nonsuicidal self-injury (NSSI), which falls under the umbrella of self-harm, is quite common, with nearly 5.5% of adults and 17% of adolescents reporting engaging in these behaviors (Swannell, Martin, Page, Hasking, & St John, 2014).

One predictor of SITB is a higher number of adverse childhood experiences (ACEs) (Cleare et al., 2018), which are defined as experiences during one's childhood that are characterized as potentially traumatic (CDC, 2019). In a survey of US adults, 61% had experienced at least one instance of childhood adversity, and one in six reported experiencing four or more adversities (NCIPC, 2020). ACEs are commonly measured via 10 experiences that include physical, emotional and sexual abuse; physical and emotional neglect; household dysfunction such as mental illness; incarcerated relative; mother treated violently; substance abuse; and divorce. However, childhood adversity is not limited to these 10 ACEs and can include experiences such as homelessness, parental death, or foster care.

SITB are more common among people who have experienced greater childhood adversities (Bruwer et al., 2014; Choi, Dinitto,

Marti, & Segal, 2017; Tunnard et al., 2013). For example, suicide attempts are more common after experiencing childhood adversity, with one study finding them two to five times more likely varying across adversity type (Choi et al., 2017). Childhood adversity is also associated with increased NSSI risk (Kaess et al., 2013). Several studies demonstrate a graded association between childhood adversity and SITB, with more adversities associated with a higher risk of SITB-related outcomes (Dube et al., 2001). For example, an individual with three or more childhood adversities has a three times greater risk for suicidal ideation than an individual with no childhood adversities (Thompson, Kingree, & Lamis, 2019). Similarly, this graded association has been demonstrated between the number of abusive experiences during childhood and NSSI (Wan, Chen, Sun, & Tao, 2015).

The developmental psychopathology framework provides insight into the pathways between childhood adversity and SITB. It is hypothesized that trauma disrupts normative development through a domino effect, where developmental delays at one stage affect development later on (Howe, 2016). Others have described this phenomenon as a negative developmental cascade, which can unfold across the life span (Cicchetti, 2016). For example, if a negative event such as childhood adversity occurs, it can affect resilience processes and shift someone from a positive trajectory to a more negative one that could lead to psychopathology and SITB (Fergusson, Beautais, & Horwood, 2003).

Consistent with the developmental psychopathology framework's focus on multiple levels of analysis, there are several mechanisms by which childhood adversity could increase risk for SITB. Long-term alterations in physiology following childhood adversity have been consistently demonstrated, which could increase SITB risk. For example, there is evidence that the hypothalamic–pituitary–adrenal system may be altered as a result of experiencing childhood abuse

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(Shonkoff, 2016), and these alterations are associated with increased suicide risk (McGowan *et al.*, 2009). Childhood adversity may also interact with genetic predispositions to increase risk for emotional dysregulation, suicidal ideation, and multiple forms of psychopathology, which have all been associated with SITB outcomes (Sachs-Ericsson, Rushing, Stanley, & Sheffler, 2016).

Cognitive and emotional mechanisms may also contribute to the association between childhood adversity and SITB. Childhood adversities have been associated with the development of cognitive biases, emotion regulation deficits, poorer executive functioning, and less effective coping strategies. Again, each of these are associated with increased risk for psychopathology and SITB (Burton, Vella, Weller, & Twamley, 2011; Sachs-Ericsson *et al.*, 2016). Childhood adversities have also been associated with deficits in interpersonal functioning, which may leave individuals without strong social support systems, which in turn could increase SITB risk (Sachs-Ericsson *et al.*, 2016). Fewer education and employment opportunities for those who experience greater childhood adversities may also be associated with later SITB risk (Font & Maguire-Jack, 2016; Ports *et al.*, 2017).

Beyond studies documenting the association between overall childhood adversities and SITB, there has been more specific research examining the association between specific types of childhood adversity and SITB. Research suggests that certain adversities, including maltreatment and parental incarceration, are associated with increased risk for NSSI (Thompson *et al.*, 2019), while sexual abuse in particular is associated with even greater risk (Serafini *et al.*, 2017). Another study found that certain combinations of adversities were more predictive of suicidal ideation than others. This association was further moderated by developmental timing (i.e., adolescence vs. childhood; Thompson *et al.*, 2012a). There is less research focused on whether childhood adversity that occurs during certain chronological ages or developmental stages better predicts SITB. One study considered recency of childhood adversity and suicidal ideation of 16-year-olds using data from the Longitudinal Studies of Child Abuse and Neglect (LONGSCAN). The results indicated that recent adversity (defined as the period of time between 12 and 16 years of age) was associated with suicidal ideation at age 16 years (Thompson *et al.*, 2012a). While the article by Thompson and colleagues provides some insight into timing as a factor in SITB outcomes, more research is needed to develop a more nuanced understanding of the developmental timing of childhood adversity and the subsequent associations with SITB (Thompson *et al.*, 2012a).

The current research examined whether childhood adversities that occurred during specific developmental periods (measured prospectively) were more strongly associated with later SITB in adolescence. Similar to the approach of Thompson *et al.* (2012a), the current study also used the LONGSCAN data set. Extending prior research, the present study examined cumulative adverse experiences that occur during more discrete developmental stages, as determined by chronological age groupings of 0–6 years, 7–8 years, 9–10 years, 11–12 years, 13–14 years, and 15–16 years. In addition, the present study assessed both adolescent- and parent-reported suicidal ideation and intentional self-harm as outcomes of interest during two different points in adolescence: 12 and 16 years of age. In light of prior evidence showing an association between more recent adversity and negative mental health outcomes including suicidal ideation (Thompson *et al.*, 2012a, 2012b), we hypothesized that more recent childhood adversity (15–16 years for 16-year outcomes, and 11–12 years for 12-year outcomes) will have more consistent associations with SITB.

Method

The LONGSCAN study was conducted with 1,354 families in five regions throughout the United States. Participants were selected in caregiver–child dyads based on different criteria for each region. The East sample was made up of children from pediatric clinics serving low-income children that met criteria for risk through failure to thrive or prenatal drug use by the mother. The Midwest sample was derived from Child Protective Services (CPS) reports of infants aged 3–18 months. The Northwest sample came from children 0–4 years old at moderate risk based on CPS reports. The South sample was children aged 4–5 years, identified as high risk at the time of birth as determined by public health tracking. In the Southwest sample, the children were 4 years old and were placed with a relative or foster family due to confirmed maltreatment (Runyan *et al.*, 2014). Based on these criteria, children were either 4 or 6 years of age at the time of recruitment.

The sample for this study was closely split between males (49%) and females (51%). The primary race of participants was Black or African American (53%), followed by non-Hispanic White (26.3%) (descriptive statistics are provided in Table 1). Data on maltreatment were collected from face-to-face interviews and CPS records every two years. Child assessments took place at ages 4, 6, 8, 12, 14, 16, and 18 years. In addition, there were yearly phone calls with caregivers to track important life events and suicide risk between the two-year assessments (i.e., at ages 5, 7, 9, 10, 11, 13, and 15 years). CPS records were reviewed on an ongoing basis. The study began with 1,354 identified children. From baseline to 14 years old attrition was 25%, and baseline to 16 years old was 33.9% (Runyan *et al.*, 2014).

Childhood adversity

To create a childhood stressors index, all study variables were reviewed to identify childhood threat, abuse/neglect, adversity, and extreme stress (e.g., homelessness, foster care, parental

Table 1. Descriptive statistics

	<i>M</i>	<i>SD</i>	%
Female	—	—	51.0
Age at 12-year assessment	12.34	0.41	
Age at 16-year assessment	16.29	0.41	
Black or African American	—	—	53.0
Non-Hispanic White	—	—	26.3
Hispanic/Latinx	—	—	7.1
Multiracial	—	—	12.1
Native American	—	—	0.6
Asian	—	—	0.3
Other race	—	—	0.6
Adversity 0–6 years	1.94	1.67	—
Adversity 7–8 years	0.95	1.09	—
Adversity 9–10 years	0.91	1.03	—
Adversity 11–12 years	0.91	1.06	—
Adversity 13–14 years	0.82	0.97	—
Adversity 15–16 years	1.05	0.95	—

death). The childhood adversity variables in this study included: physical abuse, sexual abuse, neglect, emotional maltreatment, substance use, divorce/separation, incarceration, death, foster care, homelessness, and witnessed violence. We extracted childhood adversities from several sources within the data set, including parent-report and CPS records using the Modified Maltreatment Classification System (English & LONGSCAN Investigators, 1997). Table S1 of the Supplementary Material details the different categories of childhood adversity, which measures were used to assess it, and which specific questions were used for the current study. For each type of adversity, if an adversity occurred during a specific time period (ages 0–6 years, 7–8 years, 9–10 years, 11–12 years, 13–14 years, 15–16 years), a code of 1 was assigned. If it did not occur, a code of 0 was assigned. As children entered the study at various times before the age of 6 years, adversities from ages 0 to 6 years were grouped together rather than in two-year increments like the other groupings.

Physical abuse/sexual abuse/emotional maltreatment/neglect/substance use

For each of the five LONGSCAN sites, CPS records were assessed annually for maltreatment allegations regarding the child participants. Substantiated allegations were included for this study. CPS records were reviewed using the Modified Maltreatment Classification System. Physical abuse, sexual abuse, emotional maltreatment, and neglect were separately coded as 1 for substantiated maltreatment or 0 for no substantiated maltreatment. Caregiver substance use problems were coded as 1 for substantiated problems and 0 for no substantiated problems.

Divorce and separation

Divorce and separation were assessed through two questions from the Child Life Events Scale (CLES) examining the past year: “Did anybody divorce?” and “Did anybody separate?” (LONGSCAN Investigators, 1992). For all ages, except for one assessment period, responses were coded as 0 = *No* or 1 = *Yes*. For ages 0–6 years, responses were coded as 0 = *No*, 1 = *Yes*, and 2 = *Don't know*. For this age, *Don't know* was counted as *No*, as the divorce or separation likely did not affect the child if the parent did not know about it. As a result, any time period with a divorce or separation was coded as a 1 and coded as a 0 if there was no divorce or separation.

Incarceration

Incarceration in the past year was assessed through one question from the CLES: “Was anyone in child’s family or household jailed or imprisoned?” (LONGSCAN Investigators, 1992). There was a variation to this question for the 11–12 and 13–14 year time points, with the question: “Was anyone in the child’s family or household jailed, imprisoned, or kept in a juvenile residential facility for breaking the law?” For all ages except one assessment period, responses were coded 0 = *No*, 1 = *Yes*. For ages 0–6 years old, responses were coded as 0 = *No*, 1 = *Yes*, and 2 = *Don't know*. For this age, *Don't know* was reported as *No*. Incarceration in a particular time period was thus coded as 1, while no incarceration was coded as 0.

Death

Death was assessed through one question from the CLES examining the past year: “Did anyone who was close to child die during the

past year?” (LONGSCAN Investigators, 1992). There was a slight variation to this question for ages 11–12 and 13–14 years: “Was anyone who was close to [child] die during the past year?” For all ages except one assessment period, responses were coded 0 = *No*, 1 = *Yes*. For ages 0–6 years, 0 = *No*, 1 = *Yes*, and 2 = *Don't know*. For this age, *Don't know* was recoded as *No*. Death during a time period was coded as 1, while no death was coded as 0.

Foster care

Foster care was assessed through a two-part question from the CLES examining the past year. Participants were first asked if they moved. If they answered yes, they were then asked either if they moved to foster care or for a number of “moves to foster care” (LONGSCAN Investigators, 1992). If they responded *No* to moving, they were not asked about foster care. Responses were coded as 0 = *No* if they had no moves to foster care and 1 = *Yes* if they had one or more moves to foster care.

Homelessness

To assess homelessness, one question was used from the CLES. For age 0–6 years, the question was: “Was the child ever homeless?” (LONGSCAN Investigators, 1992). The responses were 0 = *No*, 1 = *Yes*, 2 = *Don't know*. Again, *Don't know* was reported as *No*. For the remaining assessment time points, the Service Utilization Scale was used and examined the past year. For ages 8–11 years, the following questions were used: “Have you or [child] used or received a service like this: A homeless shelter?” and “Did you ever need a homeless shelter in the last year?” (LONGSCAN Investigators, 1991). For ages 12–16 years, the following questions were used: “In the last year, did you ever need a homeless shelter as a place to stay?” and “Did you stay at a homeless shelter, in the last year?” (LONGSCAN Investigators, 1998). If homelessness was indicated, participants were assigned a 1 for that time period and assigned a 0 for no homelessness.

Witnessed violence

From the CLES, witnessed violence was assessed using multiple questions examining the past year. For ages 0–6 years, the following five questions were asked: (a) “Has child seen anyone physically threatened with a weapon?” (b) “Did s/he see anyone get shot or stabbed (other than on TV or movies)?” (c) “Has s/he seen someone killed or murdered?” (d) “Did s/he witness anyone being sexually abused, assaulted, or raped?” (e) “Has s/he seen anyone getting hit, kicked, or physically harmed in some other way?” (LONGSCAN Investigators, 1992). These responses were assessed as 0 = *No*, 1 = *Yes*, 2 = *Don't know*. *Don't know* was recoded as *No*. During the assessment of 8- to 15-year-olds, the same five questions were asked. Responses were coded as 0 = *No*, 1 = *Yes*. For the 16-year assessment, the Adolescent Witnessed Violence-Short Form was utilized (LONGSCAN Investigators, 2000). The following questions were assessed: (a) “In the last year, how often have you seen someone being slapped, kicked, hit with something, or beaten up?” (b) “In the last year, how often have you seen someone pull a gun, a knife, or another life-threatening weapon on another person?” (c) “In the last year, how many times have you seen someone get stabbed or cut with some type of weapon?” (d) “In the last year, how many times have you seen someone get shot?” (e) “In the last year, how many times have you seen someone get killed by another person?” (f) “In the

last year, how many times have you seen someone getting sexually assaulted, molested, or raped?" (LONGSCAN Investigators, 2000). The response options to these questions were 0 = *Never*, 1 = *one time*, 2 = *two or three times*, 3 = *four or more times*. Responses were recoded as 0 = *No* and 1 = *Yes* (for one or more times). Any witnessed violence during a particular time point was assigned a 1 and no witnessed violence was assigned a 0.

Childhood adversities composite

Composite scores for childhood adversities could range between 0 and 11. To create a composite score, anyone that responded in the affirmative to experiencing an adversity in the respective category was given a score of 1. Those who responded they had not had an experience in the category were given a 0. The mean of the categories of childhood adversities experienced at a particular time period was calculated for those who had valid data on seven or more individual adversities at each age to get a composite score for each time period. The mean was multiplied by 11, the total number of possible adversities, so every child with enough data would have a score from 0 to 11 for that time period. The time periods were divided as follows: 0–6 years old, 7–8 years old, 9–10 years old, 11–12 years old, 13–14 years old, and 15–16 years old. To create a composite of the mean number of childhood adversities experienced from 0 to 16 years, a mean was calculated of the six individual childhood adversities scores (one from each time period) for those with valid data on three or more time points. To create a composite of the mean number of childhood adversities experienced from 0 to 12 years, a mean was calculated of the four individual childhood adversity scores (one from each time period) for those with valid data on two or more time points.

Self-harm and suicide

We extracted information on child SITB engagement from both parent-report and self-report. Parent-reports of SITB outcomes came from the Child Behavior Checklist (CBCL) (Achenbach, 1991a). Self-report outcomes came from the Youth Self-Report Measure (Achenbach, 1991b) and the Adolescent Health Status and Service Utilization Questionnaire (Knight, Smith, Martin, & Lewis, 1998).

From the CBCL, the following items were assessed at ages 12 and 16 years: (a) "deliberately harms self or attempts suicide" (self-harm) and (b) "talks about killing self" (suicidal ideation) (Achenbach, 1991a). The responses for these questions were 0 = *Not true*, 1 = *Somewhat or sometimes true*, 2 = *Very true or often true*. For these questions, both a 1 or 2 were considered *Yes* as a response to the question. From the Youth Self-Report, the following questions were assessed at age 12: (a) "I deliberately try to hurt or kill myself" and (b) "I think about killing myself" (Achenbach, 1991b). The responses for these questions were 0 = *Not true*, 1 = *Somewhat or sometimes true*, 2 = *Very true or often true*. For these questions also, both 1 or 2 were considered *Yes*. From the Adolescent Health Status and Service Utilization Questionnaire, the following questions were answered by youth at age 16 years old in reference to the past year: (a) "During the last 12 months, did you ever seriously consider attempting suicide?" (b) "During the last 12 months, did you make a plan about how you would attempt suicide?" (c) "During the last 12 months, how many times did you actually attempt suicide?" For all the SITB questions, "no" or "not true" were coded as 0, and "yes" or "somewhat or very true" were coded as 1 to indicate

any self-harm or suicidal ideation. Any participants younger than 11 years or older than 13.5 years at the 12-year assessment were excluded from the analyses with SITB outcomes at 12 years. Any participants younger than 15 years or older than 17.5 years at the 16-year assessment were excluded from analyses with SITB outcomes at 16 years.

Demographics

Gender was coded as *male* = 1, *female* = 2.¹ For race/ethnicity, Black or African American served as the reference group, and non-Black or African American was coded as 1. Age at the 12- or 16-year assessment was included as a covariate depending on the timing of SITB assessment for the analysis.

Data analytic plan

Only participants who had nonmissing data on the demographic, adversity, and outcome variables were included in the analyses. The primary outcomes were self-reported (a) suicidal ideation, (b) suicide plan, and (c) suicide attempt at age 16 years. Three logistic regressions were conducted to predict whether childhood adversity at different time points (0–6 years, 7–8 years, 9–10 years, 11–12 years, 13–14 years, or 15–16 years) predicted each of the three dichotomous dependent variables. Gender, age, and race/ethnicity were included as covariates.

The secondary outcomes were used to examine variations in reporter and timing of suicide outcomes. The first set of secondary outcomes included parent-report of suicide outcomes measured dichotomously at age 16 years: (a) whether youth deliberately harms self or attempts suicide and (b) whether youth talks about killing self. Two logistic regressions were conducted with childhood adversity at different time points (0–6 years, 7–8 years, 9–10 years, 11–12 years, 13–14 years, or 15–16 years) as independent variables. Covariates included gender, age, and race/ethnicity. These analyses tested whether parent-reported suicidal ideation at 16 years produced similar results to the primary outcomes self-reported at 16 years.

The second set of secondary outcomes were self- and parent-reported suicide outcomes at 12 years, which were all measured dichotomously. The self-reported outcomes are (a) whether youth deliberately tries to hurt or kill self and (b) whether youth thinks about killing self. The parent-reported outcomes are (a) whether youth deliberately harms self or attempts suicide and (b) whether youth talks about killing self. Four logistic regressions were conducted with each of the self- and parent-reported suicide outcomes as dependent variables in separate analyses, with childhood adversity at different time points (0–6 years, 7–8 years, 9–10 years, and 11–12 years) as independent variables. Covariates included gender, age, and race/ethnicity. These analyses tested whether childhood adversity at specific time points predicted self- and parent-reported suicidal outcomes at age 12 years.

Results

Descriptive statistics

A total of 970 participants were included in either the 12-year or 16-year analyses (902 in the 12-year assessment, 744 in the

¹Although this measure is labeled as gender in the codebook and dataset, we believe it may actually be a measure of biological sex at birth.

16-year assessment, and 676 in both the 12- and 16-year assessments). The higher number of childhood adversities from age 0 to 6 years is consistent with both the wider age range and recruitment strategy of selecting participants with maltreatment experiences or who were at risk for maltreatment in early childhood. At age 16 years, 8.6% of youth reported seriously considering attempting suicide, 5.2% had made a plan about how to attempt suicide, and 5.5% had attempted suicide in the past year. At 16 years of age, 4.4% of parents reported their child had deliberately harmed themselves or attempted suicide, while 5.4% reported their child had talked about suicide. At age 12 years, 3.7% reported deliberately harming themselves or attempting suicide, and 4.7% had thought about attempting suicide. At the same age, 3.4% of parents reported their child had deliberately harmed themselves or attempted suicide, while 4.5% reported their child

had talked about suicide. A correlation table of associations between childhood adversities at different time points is included in the Supplementary Material, as well as means of childhood adversity by timing with each of the SITB outcomes.

Primary outcomes: Self-reported SITB at 16 years

Greater childhood adversities from age 0 to 16 years predicted self-reported suicidal ideation at age 16 years, $B = 0.46$, $SE = 0.21$, $\chi^2(1) = 5.01$, $p = .025$, $OR = 1.59$, but not making a suicide plan, $p = .50$, or reporting a suicide attempt in the past year, $p = .72$. Greater childhood adversities at age 13–14 years predicted self-reported suicidal ideation at 16 years, $B = 0.45$, $SE = 0.16$, $\chi^2(1) = 8.26$, $p = .004$, $OR = 1.57$ (Table 2). None of the childhood adversity timing variables predicted making a suicide plan at

Table 2. Results of regression analyses with self-reported 16-year outcomes

	<i>B</i>	<i>SE</i>	χ^2	<i>p</i>	<i>OR</i>	<i>OR</i> 95% CI
Dependent variable: Self-reported suicidal ideation at 16 years						
Female	1.09	0.33	10.99	.001	2.97**	[1.56, 5.65]
Age	0.78	0.36	4.75	.029	2.18*	[1.08, 4.39]
Not Black or African American	0.40	0.30	1.73	.19	1.49	[0.82, 2.68]
Adversity 0–6 years	0.11	0.09	1.39	.24	1.11	[0.93, 1.32]
Adversity 7–8 years	–0.11	0.15	0.48	.49	.90	[0.67, 1.21]
Adversity 9–10 years	–0.15	0.16	0.92	.34	.86	[0.63, 1.17]
Adversity 11–12 years	0.12	0.14	0.72	.40	1.12	[0.86, 1.46]
Adversity 13–14 years	0.45	0.16	8.26	.004	1.57**	[1.16, 2.14]
Adversity 15–16 years	0.02	0.16	0.01	.92	1.02	[0.74, 1.39]
Dependent variable: Self-reported suicide plan at 16 years						
Female	1.82	0.50	13.29	<.001	6.15***	[2.32, 16.34]
Age	0.52	0.45	1.30	.25	1.67	[0.69, 4.05]
Not Black or African American	0.70	0.38	3.39	.066	2.00 [†]	[0.96, 4.20]
Adversity 0–6 years	0.06	0.11	0.28	.60	1.06	[0.85, 1.33]
Adversity 7–8 years	–0.11	0.19	0.35	.55	0.89	[0.61, 1.30]
Adversity 9–10 years	–0.18	0.21	0.75	.39	0.84	[0.56, 1.26]
Adversity 11–12 years	0.04	0.17	0.06	.81	1.04	[0.75, 1.45]
Adversity 13–14 years	0.27	0.21	1.68	.20	1.31	[0.87, 1.98]
Adversity 15–16 years	0.11	0.19	0.30	.59	1.11	[0.76, 1.62]
Dependent variable: Self-reported suicide attempt at 16 years						
Female	1.07	0.41	6.77	.009	2.92**	[1.30, 6.53]
Age	0.72	0.44	2.71	.100	2.06	[0.87, 4.85]
Not Black or African American	0.59	0.38	2.51	.11	1.81	[0.87, 3.78]
Adversity 0–6 years	–0.09	0.12	0.62	.43	0.91	[0.72, 1.15]
Adversity 7–8 years	–0.43	0.22	3.78	.052	0.65 [†]	[0.42, 1.00]
Adversity 9–10 years	–0.14	0.21	0.44	.51	0.87	[0.58, 1.31]
Adversity 11–12 years	0.09	0.17	0.29	.59	1.09	[0.79, 1.51]
Adversity 13–14 years	0.57	0.20	8.25	.004	1.76**	[1.20, 2.59]
Adversity 15–16 years	0.16	0.19	0.66	.42	1.17	[0.80, 1.72]

Note: [†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$. The reference group for race is Black or African American.

16 years, all $p > .19$. Similar to suicidal ideation, greater childhood adversities at age 13–14 years predicted the likelihood of reporting a suicide attempt in the past year, $B = 0.57$, $SE = 0.20$, $\chi^2(1) = 8.25$, $p = .004$, $OR = 1.76$.

When each time point of childhood adversity was included in models separately, childhood adversity from age 13 to 14 years predicted seriously considering attempting suicide, $B = 0.47$, $SE = 0.14$, $\chi^2(1) = 11.36$, $p = .001$, $OR = 1.59$ (Table S12 of the Supplementary Material), and actually attempting suicide, $B = 0.44$, $SE = 0.17$, $\chi^2(1) = 6.86$, $p = .009$, $OR = 1.55$ (Table S13 of the Supplementary Material). No other childhood adversity timing variables were significant predictors of self-reported SITB outcomes at age 16 years.

Secondary outcomes

Parent-reported SITB at 16 years

Greater childhood adversity from age 0 to 16 years predicted greater parent-reported youth deliberately harming self or attempting suicide at 16 years, $B = 0.56$, $SE = 0.26$, $\chi^2(1) = 4.73$, $p = .030$, $OR = 1.75$, but not youth talking about suicide, $p = .11$. Childhood adversity timing did not predict parent-reported youth deliberately harming self or attempting suicide at 16 years, all $p > .11$ (Table 3). Greater childhood adversity at 9–10 years, $B = 0.39$, $SE = 0.17$, $\chi^2(1) = 5.55$, $p = .018$, $OR = 1.48$, and 13–14 years, $B = 0.41$, $SE = 0.19$, $\chi^2(1) = 4.93$, $p = .026$, $OR = 1.51$, predicted parent-reported youth talking about suicide at age 16 years.

When each time point of childhood adversity was included in models separately, greater childhood adversity at age 0–6 years, B

$= 0.21$, $SE = 0.10$, $\chi^2(1) = 4.38$, $p = .036$, $OR = 1.24$ (Table S14 of the Supplementary Material), and 9–10 years, $B = 0.32$, $SE = 0.16$, $\chi^2(1) = 4.15$, $p = .042$, $OR = 1.38$ (Table S15 of the Supplementary Material), predicted parent-reported youth harming self or attempting suicide at age 16 years. Greater childhood adversity at 9–10 years, $B = 0.35$, $SE = 0.14$, $\chi^2(1) = 5.91$, $p = .015$, $OR = 1.42$ (Table S16 of the Supplementary Material), and 13–14 years, $B = 0.38$, $SE = 0.16$, $\chi^2(1) = 5.75$, $p = .016$, $OR = 1.46$ (Table S17 of the Supplementary Material), predicted parent-reported youth talking about killing self at age 16 years.

Self- and parent-reported SITB at 12 years

The composite of childhood adversity from age 0 to 12 years did not predict self-reported deliberately harming self or attempting suicide, $p = .10$, self-reported thinking about killing self, $p = .25$, parent-reported youth self-harm or suicide attempt at age 12 years, $p = .10$, or parent-reported youth talking about suicide at 12 years, $p = .052$.

When all adversity timing variables were included in the model, no time point of childhood adversity predicted self-reported deliberately harming self or attempting suicide, all $p > .16$, or self-reported talking about suicide at age 12 years, all $p > .14$ (Table 4). Greater childhood adversity at age 9–10 years, $B = 0.45$, $SE = 0.16$, $\chi^2(1) = 7.49$, $p = .006$, $OR = 1.56$, and at 11–12 years, $B = 0.37$, $SE = 0.15$, $\chi^2(1) = 5.80$, $p = .016$, $OR = 1.44$, predicted greater likelihood of parent-reported youth self-harm and suicide attempt at age 12 years (Table 5). Greater childhood adversity at age 11–12 years, $B = 0.35$, $SE = 0.14$,

Table 3. Results of regression analyses with parent-reported 16-year outcomes

	<i>B</i>	<i>SE</i>	χ^2	<i>p</i>	<i>OR</i>	<i>OR</i> 95% CI
Dependent variable: Parent-reported harming self or suicide attempt at 16 years						
Female	0.77	0.41	3.53	.060	2.15 [†]	[0.97, 4.79]
Age	1.07	0.43	6.15	.013	2.93*	[1.25, 6.84]
Not Black or African American	1.45	0.47	9.36	.002	4.25**	[1.68, 10.72]
Adversity 0–6 years	0.17	0.11	2.45	.12	1.19	[0.96, 1.47]
Adversity 7–8 years	–0.31	0.21	2.25	.13	0.73	[0.49, 1.10]
Adversity 9–10 years	0.26	0.18	2.07	.15	1.30	[0.91, 1.86]
Adversity 11–12 years	0.02	0.17	0.01	.91	1.02	[0.73, 1.43]
Adversity 13–14 years	0.30	0.21	2.04	.15	1.35	[0.89, 2.05]
Adversity 15–16 years	0.02	0.20	0.02	.90	1.02	[0.70, 1.51]
Dependent variable: Parent-reported youth talking about suicide at 16 years						
Female	0.49	0.36	1.85	.17	1.63	[0.81, 3.30]
Age	1.22	0.38	10.32	.001	3.37**	[1.61, 7.07]
Not Black or African American	1.00	0.38	6.89	.009	2.71**	[1.29, 5.71]
Adversity 0–6 years	–0.08	0.11	0.52	.47	0.93	[0.75, 1.14]
Adversity 7–8 years	–0.25	0.19	1.78	.18	0.78	[0.54, 1.13]
Adversity 9–10 years	0.39	0.17	5.55	.02	1.48*	[1.07, 2.04]
Adversity 11–12 years	–0.02	0.16	0.01	.91	0.98	[0.71, 1.35]
Adversity 13–14 years	0.41	0.19	4.93	.026	1.51*	[1.05, 2.18]
Adversity 15–16 years	–0.07	0.19	0.13	.72	0.94	[0.65, 1.35]

Note: [†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$. The reference group for race is Black or African American.

Table 4. Results of regression analyses with self-reported 12-year outcomes

	<i>B</i>	<i>SE</i>	χ^2	<i>p</i>	<i>OR</i>	<i>OR</i> 95% CI
Dependent variable: Self-reported harming self or suicide attempt at 12 years						
Female	0.10	0.38	0.07	.80	1.10	[0.52, 2.32]
Age	-0.17	0.47	0.13	.72	0.84	[0.33, 2.13]
Not Black or African American	1.46	0.44	10.76	.001	4.29**	[1.80, 10.24]
Adversity 0–6 years	-0.04	0.12	0.10	.75	0.96	[0.76, 1.22]
Adversity 7–8 years	-0.30	0.22	1.89	.17	0.74	[0.48, 1.14]
Adversity 9–10 years	-0.06	0.21	0.09	.77	0.94	[0.62, 1.43]
Adversity 11–12 years	-0.12	0.21	0.34	.56	0.89	[0.59, 1.33]
Dependent variable: Self-reported youth talking about suicide at 12 years						
Female	0.14	0.34	0.18	.67	1.16	[0.59, 2.27]
Age	0.49	0.41	1.45	.23	1.64	[0.73, 3.67]
Not Black or African American	0.79	0.36	4.82	.03	2.21*	[1.09, 4.47]
Adversity 0–6 years	0.05	0.11	0.23	.63	1.05	[0.85, 1.30]
Adversity 7–8 years	-0.17	0.17	1.01	.32	0.84	[0.60, 1.18]
Adversity 9–10 years	0.11	0.16	0.47	.49	1.12	[0.81, 1.54]
Adversity 11–12 years	0.21	0.15	2.11	.15	1.24	[0.93, 1.66]

Note: [†]*p* < .10, **p* < .05, ***p* < .01, ****p* < .001. The reference group for race is Black or African American.

Table 5. Results of regression analyses with parent-reported 12-year outcomes

	<i>B</i>	<i>SE</i>	χ^2	<i>p</i>	<i>OR</i>	<i>OR</i> 95% CI
Dependent variable: Parent-reported harming self or suicide attempt at 12 years						
Female	-0.25	0.39	0.41	.52	0.78	[0.37, 1.67]
Age	0.11	0.49	0.05	.83	1.11	[0.43, 2.88]
Not Black or African American	1.25	0.43	8.51	.004	3.49**	[1.51, 8.08]
Adversity 0–6 years	-0.13	0.13	1.06	.30	0.88	[0.69, 1.12]
Adversity 7–8 years	-0.32	0.20	2.55	.11	0.73	[0.49, 1.08]
Adversity 9–10 years	0.45	0.16	7.49	.006	1.56**	[1.14, 2.15]
Adversity 11–12 years	0.37	0.15	5.80	.016	1.44*	[1.07, 1.94]
Dependent variable: Parent-reported youth talking about suicide at 12 years						
Female	-0.33	0.34	0.98	.32	0.72	[0.37, 1.38]
Age	0.63	0.40	2.51	.11	1.88	[0.86, 4.12]
Not Black or African American	0.94	0.35	7.06	.008	2.56**	[1.28, 5.12]
Adversity 0–6 years	-0.05	0.11	0.19	.67	0.96	[0.77, 1.18]
Adversity 7–8 years	-0.05	0.15	0.11	.74	0.95	[0.71, 1.28]
Adversity 9–10 years	0.18	0.15	1.39	.24	1.19	[0.89, 1.60]
Adversity 11–12 years	0.35	0.14	6.81	.009	1.42**	[1.09, 1.85]

Note: [†]*p* < .10, **p* < .05, ***p* < .01, ****p* < .001. The reference group for race is Black or African American.

χ^2 (1) = 6.81, *p* = .009, *OR* = 1.42, predicted parent-reported youth talking about suicide at age 12 years.

When each time point of childhood adversity was included in models separately, both childhood adversities at age 9–10 years, *B* = 0.44, *SE* = 0.15, χ^2 (1) = 8.99, *p* = .003, *OR* = 1.55 (Table S18 of the Supplementary Material), and 11–12 years, *B* = 0.39, *SE* = 0.14,

χ^2 (1) = 7.96, *p* = .005, *OR* = 1.48 (Table S19 of the Supplementary Material), predicted parent-reported youth harming themselves or attempting suicide. Greater childhood adversities at age 11–12 years predicted parent-reported youth talking about killing themselves at 12 years, *B* = 0.37, *SE* = 0.13, χ^2 (1) = 8.90, *p* = .003, *OR* = 1.45 (Table S20 of the Supplementary Material).

Discussion

Consistent with previous research (Bruwer *et al.*, 2014; Tunnard *et al.*, 2013), greater childhood adversity was associated with increased risk for SITB in this sample. Our results suggest that the timing of childhood adversities may help clarify the association between childhood adversity and SITB and thus inform prevention and intervention efforts. We found that self-reported suicidal ideation and suicide attempts at age 16 years were predicted by childhood adversity at age 13–14 years. In addition, parent-reported talking about suicide at 16 years old was predicted by childhood adversity at both 9–10 and 13–14 years old. We also found that parent-reported self-harm and suicide attempts at age 12 years were predicted by childhood adversity at 9–10 and 11–12 years old, and parent-reported talking about suicide at 12 years old was predicted by childhood adversity at 11–12 years old.

More specifically, we found that the mean level of adversity from 0 to 16 years and adversity specifically from 13 to 14 years predicted self-reported suicidal ideation at age 16 years, and only adversity from age 13 to 14 years predicted self-reported suicide attempts. These findings suggest some specificity for adversity from age 13 to 14 years for predicting suicide attempts versus ideation at age 16 years. However, when *parents* reported adolescents harming themselves or attempting suicide at age 16 years, the mean level of childhood adversity from age 0 to 16 years was a better predictor than adversity at any individual time point. One caveat is that the parent-reported measure did not disentangle NSSI and suicide attempts, so these self- and parent-reported outcomes cannot be directly compared. When all time points of adversity were examined in separate analyses – rather than compared directly in the same model – greater adversity from ages 0 to 6 years and from 9 to 10 years predicted parent-reported youth self-harm and suicide attempts at age 16 years. Together, these results suggest that some time periods could have greater impact on parent-reported youth SITB risk, though we will need larger samples with more specific SITB measurements to replicate and unpack this finding. Overall, the findings suggest that more recent adversities may set in motion developmental cascades of cognitive, emotional, social, and biological changes leading to greater SITB risk at age 16 years.

Interestingly, greater adversity at ages 9–10 and 13–14 years predicted parent-reported youth talking about killing themselves at age 16 years, though the mean level of adversity from age 0 to 16 years was not a predictor. This finding again supports the specificity of the timing of adversity predicting SITB outcomes rather than cumulative adversity. Finally, greater adversity at ages 9–10 and 11–12 years predicted parent-reported youth self-harm or suicide attempts at age 12 years, and greater adversity at 11–12 years predicted parent-reported youth talking about killing themselves at age 12 years. The mean level of adversity from age 0 to 12 years did not predict either of these outcomes, suggesting that more recent adversity better predicts parent-reported SITB outcomes at age 12 years than cumulative adversity. Similar to the 16-year SITB outcome analyses, developmental cascades of disrupted functioning in cognitive, emotional, social, and biological domains may result in greater SITB risk at age 12 years.

These findings are consistent with prior research examining 16-year-olds from the LONGSCAN study, where recent adversity from 12 to 16 years of age was most predictive of suicidal ideation at age 16 years (Thompson *et al.*, 2012a). Instead of using larger age groupings (e.g., 12–16 years old) as in the study by Thompson and colleagues, we examined childhood adversity in

two-year intervals (e.g., 9–10 years old) to allow for a more nuanced assessment of the timing of adversity and SITB. Building on prior research, the present study included more comprehensive assessments of SITB across both adolescent self-report and parent-report at ages 12 and 16 years. The findings contradict the idea of early childhood being the most impactful period for later mental health (Zeanah, Gunnar, McCall, Kreppner, & Fox, 2011). Although early childhood adversity predicts a range of psychopathology, it might not be as predictive for SITB at ages 12 and 16 years compared to more recent adversity. This research sheds light both on the potential power of recent adversity for predicting SITB and the potential for adversity occurring during or around the sensitive period of early adolescence and puberty for predicting SITB.

The current study can inform suicide prevention efforts. For example, if someone has experienced a great deal of adversity at age 11–12 years, it may be especially important to check in with them about SITB around age 12 to ensure they are supported and can access the services they need. Similarly, knowing someone has experienced a great deal of adversity at age 13–14 years, it may be particularly important to assess SITB around age 16 to ensure that these adolescents are getting the treatment they need.

The developmental psychopathology framework uses an approach with multiple levels of analysis to understand why childhood adversities may be associated with greater risk for SITB. This framework postulates that childhood adversity may negatively affect multiple domains of functioning soon after experiencing adversity, which can spread across even more domains of functioning as development proceeds – a process termed “developmental cascades” (Masten & Cicchetti, 2010). One downstream outcome of these negative developmental cascades following adversity may be greater risk for SITB. Potential mechanisms between childhood adversities and SITB in these developmental cascades include alterations in the hypothalamic–pituitary–adrenal axis and brain development, cognitive biases, poorer executive functioning, emotion dysregulation, deficits in interpersonal functioning, fewer education and employment opportunities, and onset of psychopathology (Burton *et al.*, 2011; Font & Maguire-Jack, 2016; Ports *et al.*, 2017; Sachs-Ericsson *et al.*, 2016; Shonkoff, 2016). Our results suggest that more recent adversities are associated with greater SITB risk at age 12 and 16 years, which points to mechanisms occurring closer in time to SITB outcomes as potentially being particularly important to target in interventions and future research.

Strengths

The present study surveyed youth and parents about childhood adversity prospectively rather than retrospectively in order to reduce problems with memory or reporting biases later in development. In addition, the sample was racially diverse, with more than half of the participants identifying as Black or African American. The sample primarily included children who had experienced maltreatment or who were at higher risk for maltreatment, which makes these findings particularly applicable to populations experiencing higher levels of adversity. Finally, there were multiple reporters of SITB in order to compare findings for both parent- and self-report.

Limitations

Although the study has numerous strengths, there are also notable limitations. The first limitation of the study was missing data. The

present study intentionally included a large sample of youth at high risk for childhood maltreatment, with a primary focus on topics not related to SITB. As a result, it is not surprising that some adversity and SITB measures were missing or measured inconsistently across ages. For example, the time period of assessment (e.g., the past 2 weeks) for the CBCL was not defined in the measure, while some measures clearly defined the time period of assessment. An additional expected limitation was the limited sample size of those endorsing SITB. This limitation follows the push and pull of prediction, where researchers have to choose between large, general populations and populations at particularly high risk for suicide and self-harm. Future research seeking to better understand the prospective relationship between childhood adversity and SITB should consider using a larger sample, and perhaps a sample with familial risk for SITB. Such choices could increase statistical power to detect meaningful associations. In addition, several questions used assessed SITB outcomes not distinguished by suicidal intent, as is currently recommended. Future longitudinal studies should use updated measures of SITB outcomes that are in line with current recommendations in the field.

Like many longitudinal prediction studies (Franklin et al., 2016), another limitation of this work is that we observed only small associations between childhood maltreatment and future suicidal thoughts and behaviors. Results continue to suggest that self-harm and suicidal thoughts and behaviors are complex outcomes that likely will not be strongly predicted by any given factor, including childhood abuse, which is often discussed as a critical predictor regardless of the age at which it is experienced. Lastly, many children were recruited because they experienced early maltreatment, so our sample tended to have greater adversity scores in early childhood rather than later in childhood or in adolescence. The oversampling for early adverse experiences may limit the variability of childhood adversities and affect the generalizability of findings.

Future directions

To better determine the strength and reliability of these findings and to replicate and extend the results, several future directions are needed. The present study intentionally included a large sample of youth who had experienced maltreatment or who were at high risk for childhood maltreatment. Although this study is unique in that it assessed risk for SITB over time, it was limited by inconsistent SITB measurement. Several different SITB measures were used across assessments, and several of these items conflated suicidal threats and behaviors. Future research should consider carefully assessing NSSI (i.e., intentional self-harm enacted without suicidal intent) separately from suicidal thoughts and behaviors in light of evidence showing critical distinctions in the etiology and course of these outcomes (e.g., Nock, 2009). Future longitudinal studies should consider using consistent and precise language to assess engagement in suicidal and self-harming thoughts and behaviors to reduce error. Prior research demonstrates that the way questions about suicide are asked can greatly alter rates of endorsement (e.g., Nock & Kessler, 2006). Future research should also consider asking participants at younger ages about their own suicidal and self-harming thoughts and behaviors. Contrary to the common misconception, asking about suicide and self-harm does *not* increase the likelihood that people will have or act on those thoughts (e.g., DeCou & Schumann, 2017); moreover, there is evidence that children as young as

4 years old endorse suicidal thinking and often understand key aspects of death (Hennefield, Whalen, Wood, Chavarría, & Luby, 2019). Finally, frequent assessment of suicidal and self-harming thoughts and behaviors may be useful as there is evidence that longer-term retrospective reports may miss prior experiences with these outcomes (Goldney, Smith, Winefield, Tiggerman, & Winefield, 1991).

In addition to improving measures of suicidal and self-harming thoughts and behaviors, future studies should consider using more intensive assessments of childhood adversity. For example, multiple annual assessments of adversity may help to reduce memory biases that can occur after traumatic experiences (Baldwin, Reuben, Newbury, & Danese, 2019). However, it is important to note that retrospective reports of experiences of childhood adversity have unique associations with health that do not always parallel concurrent reports (Danese & Widom, 2020). In addition, although we were not sufficiently powered to examine both timing *and* type of childhood adversities in relation to SITB outcomes, we encourage researchers with access to larger samples of longitudinal, well-characterized participants to address these important questions.

Another consideration for the study is how demographic information is collected. Given that LGBTQ+ populations are at disproportionately high risk for SITB outcomes (CDC, 2016), future research should expand the binary coding of male/female for gender and incorporate a wide range of gender identities and sexual orientations.

Conclusion

The results of this study suggest that childhood adversity predicts suicide and self-harming outcomes in adolescence and the timing of these exposures impacts the strength of the association. Future research probing these associations using a more systematic assessment of childhood adversity and SITB will be critical to better understand potential mechanisms and implications for interventions.

Supplementary Material. The supplementary material for this article can be found at <https://doi.org/10.1017/S0954579421000808>

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Conflicts of Interest. None.

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