

## ORIGINAL ARTICLE

# Gender identity-based disparities in self-injurious thoughts and behaviors among pre-teens in the United States

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**Funding information**

National Institutes of Health, Grant/Award Number: U24DA041147, U24DA041123, U01DA041089, U01DA041093, U01DA041148, U01DA051038, U01DA041120, U01DA041025, U01DA041156, U01DA051039, U01DA050988, U01DA041134, U01DA041028, U01DA041117, U01DA041106, U01DA041174, U01DA050987, U01DA051037, U01DA051018, U01DA041022, U01DA051016, U01DA050989 and U01DA041048

**Abstract**

**Introduction:** Transgender individuals are at heightened risk for self-injurious thoughts and behaviors (SITBs). Evidence suggests that middle childhood-aged transgender individuals experience elevated rates of non-suicidal self-injury (NSSI) and passive suicidal ideation (SI), compared to cisgender children. Little is known about gender identity-based disparities in SI more broadly and suicidal behavior (SB) in children aged 9 and 10. The aim of this study was to examine gender identity-based disparities in SITBs among children in middle childhood (pre-teens) in a US-based sample.

**Methods:** Using data from the 3.0 baseline release of the Adolescent Brain Cognitive Development (ABCD) study, logistic regression models, unadjusted and adjusted for covariates, were performed to examine gender identity-based disparities in SITBs.

**Results:** In a model adjusted for birth sex, race/ethnicity, and household income, transgender children were at significantly higher odds for current (adjusted odds ratio [AOR] = 6.34) but not lifetime NSSI compared with cisgender children. Transgender children were at significantly higher odds for current and lifetime SI (AOR = 13.03; AOR = 5.39, respectively) and SB (AOR = 14.21; AOR = 12.64, respectively) compared with cisgender children.

**Conclusions:** Gender identity-based disparities in SITBs may be present as early as age 9 and 10, demonstrating the need for SITB prevention and intervention efforts specific to transgender children.

**KEYWORDS**

disparities, middle childhood, prevalence, self-injury, suicide, transgender

## INTRODUCTION

Transgender individuals are at heightened risk for self-injurious thoughts and behaviors (SITBs; e.g., non-suicidal self-injury [NSSI], suicidal ideation [SI], and

suicidal behavior [SB]), compared to their cisgender peers (Connolly et al., 2016; Reisner et al., 2015; Su et al., 2016). For example, a recent meta-analysis found that the prevalence rate of lifetime NSSI among transgender adults and adolescents was 46.7% (Liu et al., 2019), while prevalence

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estimates of lifetime NSSI in the general population include 17.2% of adolescents, 13.4% of young adults, and 5.5% of adults (Swannell et al., 2014). Beyond increased rates of NSSI, transgender individuals also experience higher rates of SI than their cisgender peers. In a systematic review of suicide in transgender populations, prevalence rates of lifetime SI ranged from 37% to 83% across 17 articles (McNeil et al., 2017). This is substantially higher than in the general population (9.2% lifetime prevalence; Nock et al., 2008). Transgender populations also report higher rates of suicide attempts. One survey of over 27,000 transgender adults in the United States found that 40% of respondents had attempted suicide in their lifetime (James et al., 2016), which is nearly 15 times the rate in the general population (2.7% lifetime prevalence; Nock et al., 2008). This disparity is present in adolescence as well, with 30–51% of transgender adolescents reporting a history of at least one lifetime suicide attempt (Eisenberg et al., 2017; Toomey et al., 2018). Taken together, these statistics highlight the substantial gender identity-based disparities in SITBs in the overall US population.

Despite evidence that transgender populations experience elevated rates of SITBs, the majority of prior research on SITBs among transgender individuals has been conducted with adult and adolescent samples. Therefore, little is known about SITBs among transgender children. Some scholars have suggested that this may be due to the assumption that children lack detectable and/or meaningful gender diversity (Potter et al., 2021). Yet, research suggests that gender identity is often established in young toddlerhood (i.e., ages 3–5; Kohlberg, 1966). While most literature on childhood gender identity development has focused on cisgender children, the limited existing literature suggests that socially transitioned transgender preschoolers do not differ from cisgender preschoolers in the timing of onset of gender identity development and gender expression (Fast & Olson, 2017). Just as research suggests that gender identity is relatively stable among cisgender children after the onset of gender development (Fast & Olson, 2017), emerging evidence suggests that among socially transitioned binary transgender children, the majority of children do not change their gender identification later (i.e., retransition). Specifically, a recent study conducted by Olson et al. (2022) found that among 317 socially transitioned binary children ( $M_{\text{age}} = 8.1$  years), 94% of participants were living as binary transgender youth for an average of 5.37 years ( $SD = 1.74$  years) after their initial social transition. The remaining participants were either living as cisgender youth (2.5%) or nonbinary youth (3.5%). This indicates that both transgender and cisgender children are likely to be aware of their gender identity at an early age. It is important to note that gender

identity is separate from sexual orientation, which develops later for most people (i.e., early adolescence; D'Augelli & Hershberger, 1993; Savin-Williams & Diamond, 2000). These findings suggest that children indeed have detectable and meaningful gender diversity, underscoring the possibility to also examine mental health disparities among young children as a function of gender identity.

Self-injurious thoughts and behaviors are present among children as early as the preschool period of development (e.g., Hennefield et al., 2022; Luby et al., 2019; Whalen et al., 2015). Although one may assume that children this age do not understand what it means to die, prior work has demonstrated that depressed young children presenting with SI/SB have a better understanding of death than their non-suicidal peers (Hennefield et al., 2019). Further, children with active SI in a story completion task included significantly more violence or homicide themes relative to their non-suicidal peers, indicating that children with SI/SB indeed have a different conceptualization of death (Hennefield et al., 2022). Further, longitudinal work has demonstrated that early childhood SI is a robust predictor of later school-age SI, even after controlling for relevant demographic variables, psychiatric disorders in early childhood, and school-age psychiatric disorders (Whalen et al., 2015). This suggests that children who report SI/SB likely understand what it means to die and are experiencing SI/SB rather than expressing nonspecific distress.

To date, there is a paucity of knowledge on whether gender identity-based disparities in SITBs exist in middle-childhood (i.e., ages 9 and 10). Given that earlier age of SITB onset is associated with greater SITB engagement at the time of reporting and across development (Nock et al., 2008; O'Connor et al., 2018), it is important to examine these disparities among children. A recent study found that middle childhood-aged transgender individuals experience significantly elevated rates of lifetime NSSI and lifetime passive SI compared to cisgender children in a US-based sample (Potter et al., 2021). However, they did not examine disparities in lifetime SB, lifetime SI more broadly, or current (i.e., past two-week) SITBs. Accordingly, little remains known about gender identity-based disparities in lifetime SB, as well as current SITBs, among children in middle childhood in large US samples. Therefore, the purpose of this study was to examine whether transgender children in middle childhood in the United States are at an increased risk for SITBs compared to cisgender children in a US-based sample. Given extant literature, we hypothesized that transgender children in middle childhood in the United States will experience significantly elevated rates of SITBs compared to cisgender children.

## MATERIALS & METHODS

### Participants

This study used the baseline data from the 3.0 release of the Adolescent Brain Cognitive Development (ABCD) study (Volkow et al., 2018). The ABCD study is an ongoing, 10-year longitudinal study of brain development and child health in the United States and includes 11,878 youth recruited at ages 9 and 10 across 21 sites. Detailed information about the sampling procedures, study protocol, and informed consent process can be found at <http://abcdstudy.org>. Baseline participants who responded that they did not understand the question on transgender identity (39.5%) were removed from the sample. Data from 7,171 participants were included in the analysis. Missingness of data in final models was minimal (0.2%) and not further accounted for. IRB approval was not required for this secondary analysis of deidentified data.

### Measures

#### Self-Injurious thoughts and behaviors

Self-injurious thoughts and behaviors were measured using items assessing lifetime and past two-week NSSI, any SI (passive SI, nonspecific active SI, active SI with intent, active SI with plan), and any suicidal behavior (suicide attempt, aborted attempt, interrupted attempt, and preparatory behavior) from the suicide module of the youth computerized version of the Kiddie Schedule for Affective Disorders and Schizophrenia (K-SADS-5; Barch et al., 2018), a diagnostic interview based on the *Diagnostic and Statistical Manual of Mental Disorders-5*. The K-SADS suicidality items are face-valid and have been widely used and reported in other studies using the ABCD dataset (e.g., Deville et al., 2020; Janiri et al., 2020; Potter et al., 2021). Further, these items have demonstrated robust associations with child psychopathology and family conflict (Deville et al., 2020; Janiri et al., 2020), both of which are known risk factors for suicidality (e.g. Mars et al., 2019; Nock et al., 2013; Randell et al., 2006; Sampasa-Kanyinga et al., 2017; Spirito et al., 1989). SI and SB were dichotomously coded as any present (1) or absent (0) during the past two-weeks and in their lifetime.

#### Gender identity

Gender identity was assessed using responses to the face-valid K-SADS-5 background question asking participants “Are you transgender?” without any further definition

provided. Response options included “Yes,” “Maybe,” and “I don’t understand the question.” Following precedent (Potter et al., 2021), responses of “Yes” (0.1%;  $n_{\text{unweighted}} = 12$ ) and “Maybe” (0.4%;  $n_{\text{unweighted}} = 46$ ) were coded as transgender, and responses of “No” (59.9%) were coded as cisgender. Besides precedent, we combined the “Yes” and “Maybe” groups because research suggests that, after onset of gender development, gender identity may be less stable among transgender children than cisgender children (Fast & Olson, 2017; Olson et al., 2015); subsequently, cisgender children are more likely to be certain about their gender earlier on, while this may occur later for transgender children (who may identify as “Maybe” at the time of reporting). The “Maybe” group may be more likely to experience some level of gender incongruence at the moment, regardless of their gender identity at later ages, and therefore, are more similar in their experience of gender identity to the “Yes” group. Furthermore, gender-questioning youth, in addition to transgender youth, are at elevated risk for suicidality compared with cisgender children (Gonzales & Deal, 2022; Jackman et al., 2021). Lastly, given the relatively small number of participants who responded “Yes” to this question, separating the “Yes” and “Maybe” groups would have resulted in small and unstable cells.

#### Covariates

Sex assigned at birth, race/ethnicity, and household income were included as covariates in adjusted analyses. These factors may confound the association between gender identity and SITBs given that they have been identified as stand-alone risk factors for SITBs (Beautrais, 2002; Bridge et al., 2006; Cash & Bridge, 2009; Miller et al., 2012; Näher et al., 2020; Rhodes et al., 2014; Stephenson et al., 2006) and may affect differential ways in which children respond to the transgender question (Table 1). Sex assigned at birth was coded as male (0) or female (1). Race and ethnicity were assessed through parent report to the KSADS-5 background questions “What race do you consider the child to be?” and “Do you consider the child Hispanic/Latino/Latina?” In adjusted analyses, race/ethnicity was coded as non-Hispanic White (0) versus any other race/ethnicity response (1). Annual gross household income per parent report was categorized into low (0 = less than \$50,000), middle (1 = \$50,000 to \$100,000), and high (2 = more than \$100,000).

#### Statistical analyses

In order to analyze whether groups of transgender and cisgender children differed in demographic composition,

TABLE 1 Demographics by gender identity group.

	Transgender children	Cisgender children	p Value
	N = 58	N = 7113	
Sex assigned at birth, % Female (N)	69.9 (34)	48.4 (2880)	0.020
Age, M (SD)	9.8 (0.63)	10.1 (0.61)	0.032
Gay/Bisexual			<0.001
Yes, % (N)	33.2 (15)	1.6 (84)	
No, % (N)	66.8 (25)	98.4 (5335)	
Race/Ethnicity			0.857
Non-Hispanic White, % (N)	56.3 (24)	54.2 (3275)	
Hispanic White, % (N)	20.2 (9)	11.7 (559)	
Non-Hispanic Black, % (N)	8.2 (5)	13.2 (896)	
Hispanic Black, % (N)	0.0 (0)	1.1 (46)	
American Indian or Alaskan Native, % (N)	0.0 (0)	0.9 (28)	
Native Hawaiian or Other Pacific Islander, % (N)	0.0 (0)	0.2 (6)	
Asian, % (N)	2.4 (1)	3.5 (138)	
Bi- or Multiracial, % (N)	5.1 (7)	5.8 (615)	
Other race/ethnicity, % (N)	3.5 (2)	7.1 (366)	
Do not know/Refuse to answer, % (N)	4.3 (2)	2.2 (108)	
Gross household income			0.601
Low (Lower than 50K USD annually), % (N)	45.1 (13)	39.7 (1450)	
Middle (50–200 K USD annually), % (N)	49.1 (28)	52.3 (3359)	
High (Greater Than 200 K USD annually), % (N)	5.8 (6)	8.0 (771)	

Note: Weighted percentages with unweighted counts.

independent samples *t*-tests were used for continuous variables and chi-square tests were used for categorical variables. Two sets of logistic regressions were performed to examine gender identity-based disparities in SITBs: (1) unadjusted and (2) adjusted. All analyses were conducted using complex samples in SPSS (v28; IBM, New York) and maintained a significance level of  $\alpha = 0.05$ . All analyses were weighted to adjust for clustered sampling and recruitment techniques and to make the data reflective of the US population of children aged 9 and 10 on key sociodemographic variables (i.e., age, birth-assigned sex, race/ethnicity, and household socioeconomic status). US population-based weighting was used to match key demographic and socioeconomic distributions for US children aged 9 and 10, estimated from the American Community Survey (U.S. Census Bureau, 2020) so that the present sample would reflect US children aged 9 and 10 on key sociodemographic variables.

## RESULTS

The weighted sample consisted of 4,941,862 participants ( $n_{\text{unweighted}} = 7,171$ ) with 39,801 ( $n_{\text{unweighted}} = 58$ ) children

identifying as transgender (0.81% of population). The mean ages of transgender and cisgender children were 9.8 (95% CI: 9.6, 10.0) and 10.1 (95% CI: 10.0, 10.1) years, respectively, with transgender children significantly more likely to be younger ( $p = 0.032$ ) than cisgender children. The majority of transgender (56.3%) and cisgender (54.2%) children identified as non-Hispanic White and heterosexual (66.8% and 98.4%, respectively). The majority of transgender children (69.9%) were assigned female at birth; in contrast, the majority of cisgender children were assigned male at birth (51.6%). Transgender children were more likely to identify as gay/bisexual ( $p < 0.001$ ), to be assigned female at birth ( $p = 0.020$ ), but not to significantly differ by race/ethnicity ( $p = 0.857$ ) or in gross annual household income ( $p = 0.601$ ) compared with cisgender children. Full demographics of the sample by gender identity group can be found in Table 1.

Transgender participants were at significantly higher odds to endorse current NSSI, with 10.2% of transgender children reporting past two-week NSSI versus 2.3% of cisgender children (Odds ratio [OR] = 4.90, 95% CI: 1.30, 18.53,  $p = 0.022$ ). In a model adjusted for covariates, transgender children continued to be at significantly higher odds for past two-week NSSI (Adjusted odds ratio



[AOR] = 6.34, 95% CI: 1.76, 22.90,  $p = 0.007$ ), compared with cisgender children (See Table 2). Transgender participants were not at significantly higher odds to endorse lifetime NSSI (OR = 3.04, 95% CI: 0.80, 11.58,  $p = 0.099$ ; AOR = 3.92, 95% CI: 0.98, 15.71,  $p = 0.054$ ), compared with cisgender children.

Further, the odds for current SI were significantly higher among transgender children than cisgender children, with past two-week suicidal ideation prevalence of 14.9% and 1.8%, respectively (OR = 9.70, 95% CI: 3.07, 30.66,  $p < 0.001$ ). In a model adjusted for covariates, transgender children continued to be at significantly higher odds for past two-week SI (AOR = 13.03, 95% CI: 4.14, 40.96,  $p < 0.001$ ), compared with cisgender children. The odds for lifetime SI were also significantly higher among transgender children than cisgender children, with lifetime SI prevalence of 31.1% and 8.4%, respectively (OR = 4.93, 95% CI: 2.16, 11.25,  $p < 0.001$ ). In a model adjusted for covariates, transgender children continued to be at significantly higher odds for lifetime SI (AOR = 5.39, 95% CI: 2.46, 11.79,  $p < 0.001$ ), compared with cisgender children.

Lastly, the odds for current SB were significantly higher among transgender children than cisgender children, with 5.6% and 0.4% reporting past two-week SB, respectively (OR = 13.75, 95% CI: 1.43, 132.54,  $p < 0.001$ ). Transgender children remained at significantly higher odds for past two-week SB (AOR = 14.21, 95% CI: 1.55, 129.91,  $p = 0.021$ ) compared with cisgender children in a model adjusted for covariates. The odds for lifetime SB

were significantly higher among transgender children than cisgender children, with 19.0% and 2.0% reporting lifetime SB, respectively (OR = 11.64, 95% CI: 3.27, 41.41,  $p < 0.001$ ). Transgender children remained at significantly higher odds for lifetime SB (AOR = 12.64, 95% CI: 3.52, 45.41,  $p < 0.001$ ) compared with cisgender children in a model adjusted for covariates.

## DISCUSSION

The aim of this study was to compare the prevalence of lifetime and current SITBs between transgender and cisgender children in middle childhood (i.e., ages 9 and 10) in a US-based sample. Consistent with our hypothesis, rates of lifetime and past two-week SITBs were significantly elevated among transgender children compared to cisgender children, with the exception of lifetime NSSI. Although gender identity-based disparities in SITBs have been well-documented among adult and adolescent samples (Connolly et al., 2016; Reisner et al., 2015; Su et al., 2016), there is a lacuna of literature examining gender identity-based disparities in SITBs among children in middle childhood in large national samples, with the recent study conducted by Potter et al. (2021) being a notable exception.

Within the ABCD cohort, Potter et al. (2021) found that 17.9% of transgender children endorsed a lifetime history of NSSI versus 6.4% of their cisgender peers. Similarly, we found that 11.3% of transgender children endorsed a lifetime history of NSSI versus 4.0% of cisgender children, but this difference was not significant. Furthermore, Potter et al. (2021) found that 19.6% of transgender children aged 9 and 10 reported experiencing passive SI, compared to 6.4% of cisgender participants. Yet, we found that transgender children reported a lifetime SI (passive and active) prevalence of 31.1%, compared to 8.4% of cisgender children. The reasons for these differences in prevalence rates remain unclear, but one possible reason may lie in how lifetime NSSI and SI were operationalized. Potter et al. (2021) examined a compound measure of lifetime and past two-week NSSI, while we operationalized lifetime NSSI based on the sole item for lifetime NSSI. Regarding lifetime SI, Potter et al. (2021) investigated a compound measure of lifetime and past two-week passive SI, while we operationalized lifetime SI as a compound measure for endorsement of any of the lifetime SI items. Another explanation for the significant disparity in current, but not lifetime, NSSI, could lie in statistical, computational reasons. A post hoc test of equivalence revealed that the observed difference in odd ratios was within the equivalent bounds of  $-0.1$  and  $0.1$  ( $p = 0.045$ ).

**TABLE 2** Disparities in self-injurious thoughts and behaviors among transgender children compared to cisgender children.

Variables	Unadjusted		Adjusted for demographic variables <sup>a</sup>	
	OR	95% CI	AOR	95% CI
Non-suicidal self-injury				
Current	4.90	[1.30, 18.53]	6.34	[1.76, 22.90]
Lifetime	3.04	[0.80, 11.58]	3.92	[0.98, 15.71]
Any suicidal ideation				
Current	9.70	[3.07, 30.66]	13.03	[4.14, 40.96]
Lifetime	4.93	[2.16, 11.25]	5.39	[2.46, 11.79]
Any suicidal behavior				
Current	13.75	[1.43, 132.54]	14.21	[1.55, 129.91]
Lifetime	11.64	[3.27, 41.41]	12.64	[3.52, 45.41]

Note: Population weights applied; Corrected for clustered sampling.

Abbreviations: AOR, adjusted odds ratio with the odds among transgender children divided by the odds among cisgender children; CI, confidence interval.

<sup>a</sup>Adjusted for sex assigned at birth, race/ethnicity, and household income.

Despite investigating gender identity-based disparities in NSSI and passive SI, Potter et al. (2021) did not examine gender identity-based disparities in lifetime SB and current (i.e., past two-week) SITBs. Subsequently, a novel feature of our study is the investigation of the prevalence of SB among transgender and cisgender children ages 9 and 10 in a US-based sample. We found that 19.0% of transgender children reported a lifetime history of SB in comparison to 2.0% cisgender children. These findings expand on prior literature on gender identity-based disparities in SB among adolescents and adults by revealing that these disparities exist not only in adolescence and adulthood, but as early as age 9 and 10. Furthermore, we found a similar pattern for current SITBs, with transgender children reporting higher prevalence rates of SITBs than cisgender children. Specifically, we found that 10.2% of transgender children reported past two-week NSSI, 14.9% reported past two-week SI, and 5.6% reported past two-week SB in comparison to 2.3%, 1.8%, and 0.4% of cisgender children, respectively.

Consistent with our hypothesis, we found sizable differences in SITB prevalence rates between cisgender and transgender children. Accordingly, our results not only underscore the importance of starting suicide prevention and intervention efforts in childhood but also the need for evidence-based interventions adapted to prevent SITBs among transgender children. Given that access to gender-affirming medical care may be protective against mental health problems, including suicidality, among transgender youth and adults (Almazan & Keuroghlian, 2021; Green et al., 2022; Hughto et al., 2020; Turban et al., 2022), these results highlight the potential importance of having access to gender-affirming care among transgender children in middle childhood. Furthermore, our findings demonstrate the need for clinicians to assess gender identity when working with middle childhood-aged individuals, as gender minority status may be a robust risk factor for SITBs.

Although we found that transgender children are at elevated risk for SITBs, the mechanisms driving this association remain unclear. Young children who are already aware of their transgender identity may also already be conscious of, and have been exposed to, different forms of gender minority stigma and transphobia. Therefore, gender minority specific-risk factors (e.g., gender identity-based discrimination, identity rejection, and invalidation) may contribute to gender identity-based disparities in SITBs (Testa et al., 2015). Future research should examine pathways through which these gender minority-specific risk factors contribute to gender identity-based disparities among children in middle childhood.

This study has several strengths and limitations. A unique strength of this study is that it used a large sample matched to reflect US children on key sociodemographic variables. Indeed, the ABCD dataset is one of

the few datasets available that has been able to recruit a sample of children as young as 9 years old that is reflective of the US population on key sociodemographic variables. A further strength of this study is that we relied on child-reported SITBs, as research has demonstrated high discordance between child-reported and parent-reported SI/SB in the ABCD dataset, with a lack of parent agreement being observed in more than 75% of children reporting SI/SB (DeVillie et al., 2020). This suggests that the majority of caregivers of suicidal children are unaware of (or do not report) information regarding their child's suicidality, underscoring the value of asking children directly about SITBs, especially given that evidence suggests that children can reliably report SITBs (e.g., Hennefield et al., 2022; Luby et al., 2019; Whalen et al., 2015). Regarding limitations, despite the question "Are you transgender?" being face-valid, a noteworthy number of participants reported not understanding the question (39.5%) who were excluded from the analysis. Longitudinal data for this group showed that 65% and 78% of children indicated to start understanding the question in subsequent waves, respectively, while only 7% and 2% no longer understood the question. The uptake in understanding of the term transgender may align with the developmental timing of the gender identity formation process in this age group (Fast & Olson, 2017). Another limitation of using this item to assess gender identity is that it may have led to an underestimation of the number of gender minority participants in this sample as, for example, not all nonbinary individuals identify as transgender and therefore may have answered "No" to this question (Wilson & Meyer, 2021). Asking more inclusive questions assessing gender identity would enable researchers to better ascertain diverse gender identities. Conversely, our inclusion of those who responded "Maybe" in the transgender group likely captured those questioning their gender identity (vs already identifying as transgender) potentially leading to an overestimation of the number of gender minority participants in this sample. Despite this, analyses separating the "Yes" and "Maybe" groups and comparing them with those who responded "No" showed similar point estimates for their respective odd ratios. Most of these analyses were statistically significant but resulted in confidence intervals that were uninterpretable due to small and unstable cells and reduced statistical power. Therefore, the presented analyses with the combined "Yes" and "Maybe" groups resulted in more reliable findings. A further limitation is that we used a composite measure of SB, preventing us from examining gender-identity based disparities in different forms of SB separately. However, a composite measure of SB (i.e., SB subscale of the Columbia-Suicide Severity Rating Scale; Posner et al., 2011) has been

demonstrated to predict future suicide attempts among emergency department patients with a history of suicide attempts (although not with patients with SI only; Brown et al., 2020). These findings suggest that examining SB in general can still provide important information about suicide risk. Finally, the unweighted counts of transgender children were relatively small, resulting in wide confidence intervals for the prevalence of SITBs.

## CONCLUSION

In summary, the present findings provide strong evidence that gender identity-based disparities in SITBs may be present as early as 9 and 10, demonstrating the need for SITB prevention and intervention efforts tailored for gender minority children. Although we found that transgender children are at elevated risk for SITBs, the mechanisms driving this association remain unclear. Future research should examine pathways through which gender minority specific-risk factors contribute to the disparities between gender minority and their non-gender minority peers regarding SITBs.

## ACKNOWLEDGMENTS

Data used in the preparation of this article were obtained from the Adolescent Brain Cognitive Development (ABCD) Study (<https://abcdstudy.org>), held in the NIMH Data Archive (NDA). This is a multisite, longitudinal study designed to recruit more than 10,000 children age 9–10 and follow them over 10 years into early adulthood. The ABCD Study® is supported by the National Institutes of Health and additional federal partners under award numbers U01DA041048, U01DA050989, U01DA051016, U01DA041022, U01DA051018, U01DA051037, U01DA050987, U01DA041174, U01DA041106, U01DA041117, U01DA041028, U01DA041134, U01DA050988, U01DA051039, U01DA041156, U01DA041025, U01DA041120, U01DA051038, U01DA041148, U01DA041093, U01DA041089, U24DA041123, and U24DA041147. A full list of supporters is available at <https://abcdstudy.org/federal-partners.html>. A listing of participating sites and a complete listing of the study investigators can be found at [https://abcdstudy.org/consortium\\_members/](https://abcdstudy.org/consortium_members/). ABCD consortium investigators designed and implemented the study and/or provided data but did not necessarily participate in the analysis or writing of this report. This manuscript reflects the views of the authors and may not reflect the opinions or views of the NIH or ABCD consortium investigators. The ABCD data repository grows and changes over time. The ABCD data used in this report came from NIMH Data Archive Digital Object Identifier (DOI) [10.15154/1519007](https://doi.org/10.15154/1519007). DOIs can be found at <https://doi.org/10.15154/1519007>.

## FUNDING INFORMATION

No funding was obtained for this study.

## CONFLICT OF INTEREST

The authors have no conflicts of interest to disclose.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in the ABCD data repository at <https://nda.nih.gov/abcd>.

## PATIENT CONSENT

Data presented here are secondary analyses; however, consenting procedures were part of ABCD study protocol.

## ETHICAL APPROVAL

IRB approval was not required for this secondary analysis of deidentified data.

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**How to cite this article:** Randall, A. B., van der Star, A., Pennesi, J.-L., Siegel, J. A., & Blashill, A. J. (2022). Gender identity-based disparities in self-injurious thoughts and behaviors among pre-teens in the United States. *Suicide and Life-Threatening Behavior*, 00, 1–9. <https://doi.org/10.1111/sltb.12937>