



# The Effects of Social Rank and Neighborhood and School Environment on Adolescent Depression and Suicidal Ideation: A Structural Equation Modeling Approach

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## Abstract

Depression and suicide constitute major public health problems, and their prevalence has been increasing among adolescents in the United States. More research is needed to understand the association between multilevel risk factors and depression and suicidal ideation in adolescents, particularly factors related to perceived social rank and environmental stress. The present study examined relationships among family mental history of mental illness, in-utero and perinatal complications, social rank factors, environmental factors, and depression and suicidal ideation in the past month in a clinical population of adolescents. A cross-sectional survey was administered in outpatient clinics to 197 adolescents ages 12–18 who were primarily Black and female. Findings from structural equation modeling showed the largest effects for the social rank factor on depression and suicidal ideation in the past month. These findings highlight the importance of preventive interventions for coping with social hierarchies to prevent depression and suicidal ideation.

**Keywords** Depression · Suicidal ideation · Sense of control · Subjective social status · Structural equation modeling

## Introduction

The United States (U.S.) has seen a surge in depression diagnoses [1] and suicidal behaviors [2] among adolescents over the past two decades. While suicide continues to be the second leading cause of death among 10–24-year olds [3], risk factors leading to suicide often go unidentified [4, 5]. The identification of suicide risk factors, including suicidal ideation and depression, both in the community and in settings such as primary care offices and emergency rooms, is key in designing interventions that prevent suicide.

The causes of the rise in depression and suicide are unclear. Social factors such as unemployment,

disengagement from education, and being from a single or no parent household are commonly associated with depression in adolescents [1]. Likewise, extensive research supports the involvement of physical, psychological, and environmental factors such as familial and social influences in suicide [6]. However, less is known about the effects of the stress caused by social hierarchies on depression and suicidal ideation in adolescents, which matters in a growing environment of income inequality [7] and opportunities for social comparisons with the expansion of social media use [8].

The mechanisms by which individual and environmental multilevel factors affect health outcomes were proposed by Cohen et al. (2016) [9] in a stage model of stress and disease. This model posits that environmental demands or stressful life events and perceived stress lead to negative emotional responses, which activate both biological systems of stress and negative coping mechanisms, ultimately leading to physiological changes and disease onset and progression.

Whitehead et al. (2016) [10] pointed out three levels in which control or autonomy affects health disparities. *The micro-level (personal) level*, in which people in lower ranks of society experience lower actual and perceived control over their destiny, causing chronic stress that leads to poorer

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health outcomes and negative behavioral responses ranging from substance abuse to ineffective coping, low self-efficacy or esteem [11], and metabolic disturbances [12]; *the meso (community) level*, focused on the social and built environments, that can act as a chronic stressor, damaging health over time; and *macro and societal level* that includes the various levels of exclusion and discrimination of certain sections of society and can lead to low status and control of these groups. These levels interact, influencing health outcomes [13], which highlights the importance of considering multilevel factors associated with health outcomes.

Following these models of stress related to social rank and health outcomes, we sought to examine multilevel risk factors associated with depression and suicidal ideation in the past month in an adolescent clinical sample. These multilevel risk factors included neighborhood and school environments, perceived social status and sense of control, family history of mental illness, and in-utero and perinatal complications.

### Role of Neighborhood and School Environment on Mental Health

Research on the risk factors associated with depression has generally focused on factors such as gender, exposure to stressful events, child abuse, and family history [14–17]. More recently, studies have focused on neighborhood factors [18–21] and aspects of the school environment, such as safety [22, 23], as potentially affecting health outcomes.

In schools, students who feel safe tend to exhibit lower levels of depressive symptoms [24]. Regarding neighborhood factors, perceived (rather than actual) neighborhood characteristics are more strongly associated with mental health [25]. Signs of potential danger in the neighborhood (i.e., graffiti, drug use and dealing, and violence) have been associated with poorer mental health outcomes [26], and this association has been maintained in longitudinal studies showing that perceptions of neighborhood disorder predicted symptoms of depression at a 9-month follow up interview, even after controlling for baseline depression [27]. Lack of control has been hypothesized as a factor to explain why some neighborhood factors are stressful [11].

### Subjective Social Status and Perceived Sense of Control and Their Association with Mental Health

There is a well-known association between socio-economic status (SES) and health in infants [28], children, [29] and adults [30], but this association is less clear among adolescents [31, 32]. Some studies have found inverse associations between SES and global health measures, acute conditions, and health behaviors [33, 34], while others have found little evidence of SES gradients in self-rated health, acute

illness, injuries, and mental health [35]. Goodman (1999) [36] found associations with certain health outcomes like self-rated health, depression, and obesity, but not with others like asthma, suicide attempts, and sexually transmitted diseases. These inconsistencies are thought to be related to the dynamic relationships between health and SES across the life span and across health outcomes, and to measurement limitations of SES during adolescence [37].

The limitations of using objective measures of social status in adolescents can be addressed by utilizing subjective social status as a measure of social rank in adolescence. In adolescents, a meta-analysis of 44 studies [37] examining the association between subjective social status and health outcomes found that higher subjective social status was associated with better health outcomes, with a similar magnitude than the findings in adults [38] and in studies examining associations between objective measures of SES and health [33], and with strongest associations with mental health outcomes, specifically depression. There is more limited evidence of a similar association between low subjective social status, and greater suicidal thoughts and behaviors both in adults [39] and adolescents [40].

In the observations of government workers in the United Kingdom with the Whitehall studies, Marmot (2004) [41] noted that a person's perceived social status and health gradient (or one's improved health status with higher social rank) were both associated with their degree of autonomy or sense of control as affected by their social rank and social conditions. This degree of autonomy was higher the higher social position, affecting health [41] (The Status Syndrome, pp. 46). Perceiving oneself as being in a subordinate rank and with less resources is associated with a diminished sense of control [42]. While subjective social status and sense of control are two distinct constructs, as sense of control is associated with social power whereas subjective social status is not, both are indicators of social rank. In their studies, Kraus et al. (2009) [43] concluded that perceived social status and perceived control are "related but independent constructs, with unique predictive power" (pp. 1002).

Sense of control is a heterogeneous construct and has been conceptualized as locus of control [44], learned helplessness [45], and self-efficacy [46] among others [47]. More recently, sense of control has been understood as a combination of attributional styles and self-efficacy [48], and learned helplessness and desire for control [49]. Previous studies have also revealed an association between a low sense of control and childhood depression [50, 51]. It is likely that sense of control is a combination of a personality component [52] and a more malleable component that shifts with context and age [53], the latter being more predictive of depression [54]. This dynamic calls for a better understanding of the sense of control construct and its association with depression and suicide at different age periods and settings.

The proposed association between self-control, and depression and suicidal thoughts and behaviors is based on findings proposed by the cognitive adaptation theory that posits that when confronted with life-threatening events, people adapt by adjusting their sense of control, optimism, and self-esteem to the new situation [55]. One mechanism of this adaptation involves making downward comparisons or comparing themselves with people that are in a worse situation [56]. This increased sense of control has been proven to be associated with better physical and psychological quality of life in patients with late-stage cancer [57].

### **Predisposing Factors Increasing Vulnerability to Depression and Suicide**

There is strong evidence that a family history of depression is a risk factor for depression. In a robust 30-year-long longitudinal study, biological children of parents with depression had a twofold increase risk of major depression and suicidal ideation when compared to children of non-depressed parents. Those children who also had a grandparent with depression were at highest risk for depression but not suicide [58]. Family history of mental illness and suicide are well-known risk factors for suicide as shown in the largest case–control longitudinal study on number of suicides and suicide risk factors [59].

Adverse in-utero and perinatal conditions such as pregnancy problems and low birth weight are another individual predisposing factor for overall psychopathology [60] and suicide risk [61]. The mechanisms for these associations are thought to be related to insults in a period of development of the stress-regulation systems [61] that may have affect later development and health outcomes [60].

The aim of this study was to explore environmental stressors related to the school and neighborhood environments, measures of social rank including overall sense of control and subjective social status, and predisposing factors such as a family history of mental illness and in-utero and perinatal complications, and their associations with depression and suicidal ideation in the past month in a clinical largely urban sample of adolescents. We hypothesized that having a family history of mental illness and in-utero/perinatal complications, and poor environmental factors would be associated with depression and suicidal ideation, whereas higher perceived sense of control and subjective social status would jointly be associated to less depression and suicidal ideation.

## **Materials and Methods**

### **Procedures and Participants**

The data were collected from adolescents in outpatient primary care and mental health outpatient centers between

February and September of 2016 in an Eastern U.S. city. The cross-sectional survey administered via paper assessed respondents' self-reports of mental health (e.g., depression, suicidal ideation) and biopsychosocial factors (e.g., family history of mental illness, sense of control, subjective social status, school/neighborhood environments). A chart review was also conducted to obtain information related to participant's in-utero and perinatal complications. Potential participants referred by medical staff were provided information regarding the purpose of the study and were given an option to provide assent and participate in the survey or quit the survey. Parents of assenting adolescents provided written consent. A research staff oversaw the completion of the survey in the waiting room or in a conference room provided by the clinics. This study only included adolescents (1) ages between 12 and 18, (2) being able to speak and read English and/or Spanish, and (3) being accompanied by a parent or guardian who could provide consent. Based on previous studies on sample size requirements for SEM [62], a sample of 180 participants is sufficient (estimated power > 0.80), but we aimed to recruit more to account for potential (20%) incomplete data. Of 205 potential participants, the final data analytic sample for the present study included 197 cases of adolescents who met all inclusion criteria. The study was approved by the University's Institutional Review Board (IRB) where this study was conducted.

### **Measures**

#### **Outcome Variables: Depression and Suicidal Ideation in the Past Month**

The participants reported their symptoms of depression during the last two weeks on the Patient Health Questionnaire-Adolescent Version (PHQ-A) [63] that used the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM–IV) diagnostic criteria to assess depressive symptomatology (i.e., low mood, anhedonia, trouble with sleep and appetite, lack of energy, trouble concentrating, psychomotor retardation, and suicidal ideation). Adequate internal consistency and validity have been identified in previous research [64], and the Cronbach's alpha of this scale was 0.90 in the present study. For the main analysis, PHQ-A, measured with a 4-point Likert type scale (0 = *not at all* to 3 = *nearly every day*), was summed into a single variable with an overall score ranging from 0 to 27. Higher scores indicate more severe depression. For the descriptive analyses, the variable depression was dichotomized with scores 10 or above indicating the presence of moderate to severe depressive symptoms [65]. For the main analyses, to avoid overlap between the two variables related to suicidality, we removed the suicide item (“Thoughts that you would be better off dead, or of hurting yourself”) from the depression

variable and used a continuous variable for depression with eight items. To evaluate recent suicidal ideation [63], we used an additional item, “Has there been a time in the *past month* when you have had serious thoughts about ending your life?”

### Independent Variables

The participants were asked to report a *family history of mental illness* (i.e., depression, anxiety, schizophrenia, bipolar disorder). *In-utero and perinatal complications* extracted from the medical chart were assessed by exposure to substances in-utero and pregnancy problems or birth complications.

**Social Rank Factor** The 17-item self-reported *Overall Sense of Control (OSOC)* scale [66] measured both positive (nine items) and negative (eight items) sense of control, consisting of statements related to having control over own’s life (e.g., “I am in control of my life”) or lacking control over own’s life (e.g., “I lose control over myself”). An average of the items for positive sense of control and the reverse-coded negative items (i.e., lack of control) was calculated, where higher scores indicate a higher overall sense of control (ranged from 1.18 to 5.00). Cronbach’s alpha of this scale was 0.90 in the present study. Subjective perceptions of social stratification were assessed by the MacArthur Scale of *Subjective Social Status—Youth Version* [67] pictorially presenting two versions of the ladder (society and school ladders) with ten steps. The participants marked where their family was located in the social hierarchy in comparison to the general society and where they were located in their school from 1 to 10, with higher scores representing a higher perceived rank. These two variables were used as continuous variables.

**Environmental Factor** *Negative Neighborhood Scale* [25] assessed adverse events occurred in their neighborhood in the past 6 months, including drug dealing, shooting, murders, abandoned buildings, homeless people on the street, prostitution, business closing, bad schools, and graffiti and/or vandalism (0 = *none*, 1 = *some*, 2 = *a lot*). A sum score was calculated, with higher scores corresponding to a more negative neighborhood environment (ranging from 0 to 19). *Negative School Scale* [25] measured adverse events in their school that occurred in the past 6 months, including drug dealing, shooting or knifings, teachers injured by students, school equipment damage, and anger/stress. A total score was calculated, with higher numbers corresponding to a more negative school environment (ranging from 0 to 10). *Prior exposure to traumatic events* was assessed by the 14 items derived from part 1 of the UCLA Reaction Index Scale [68] including traumatic events related to environmen-

tal disasters, accidents, domestic and community violence, physical and sexual abuse, and death of a loved one (0 = *yes, having ever experienced the listed traumatic event*, 1 = *no, having not experienced it*). The number of traumatic events experienced by the participant at the time of the survey was summed (ranging from 0 to 9).

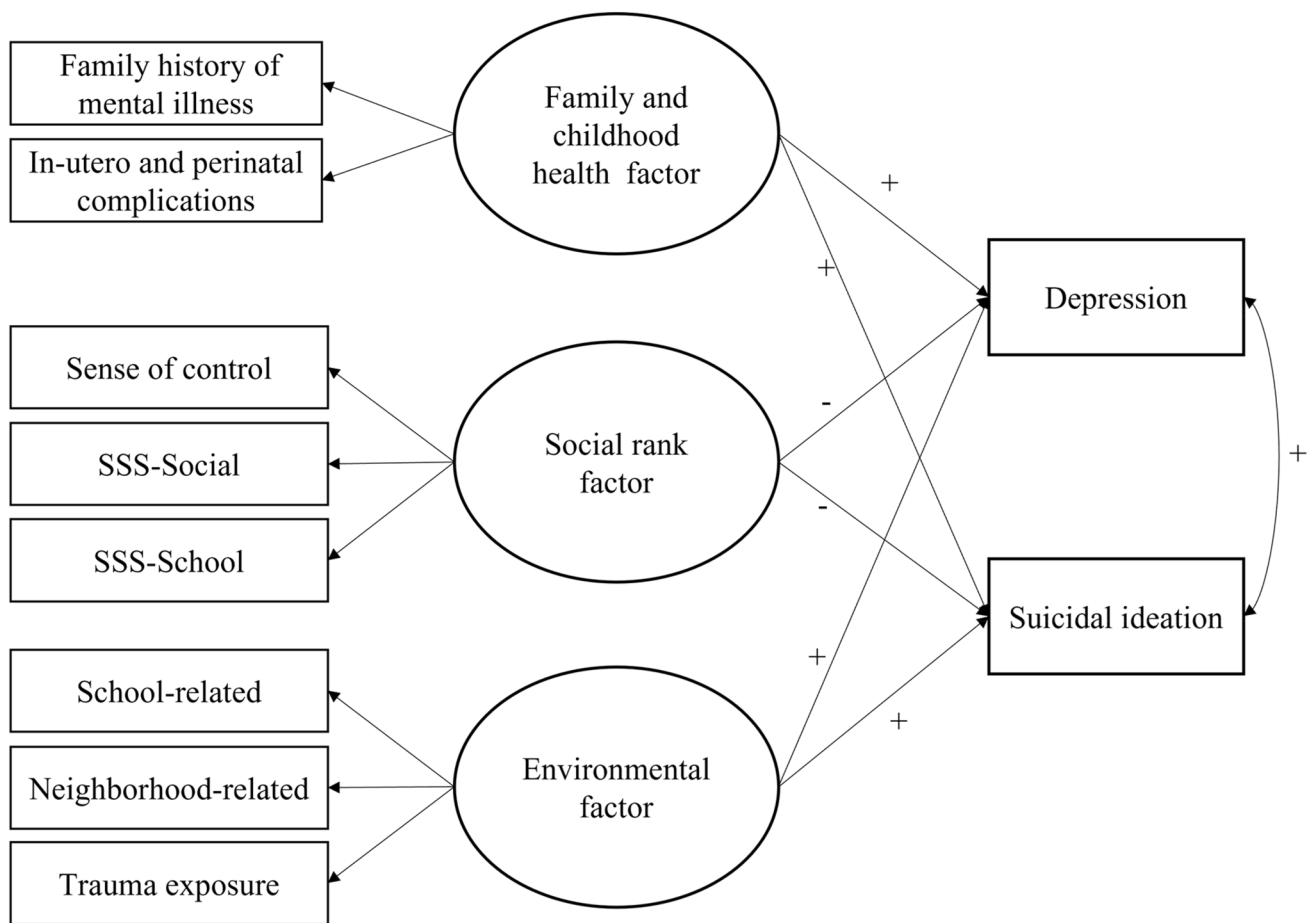
### Covariates

*Socio-demographic measures* abstracted from the medical record included age upon interview, sex at birth (0 = *male*, 1 = *female*), and self-identified race (0 = *White*, 1 = *Black*, 2 = *other races or mixed race*). For the data analytic purpose, each of the race categories was dummy-coded. *Socio-economic status (SES)* was calculated using standardized z-scores of parental employment, education, and household income, with higher scores indicating higher family SES [69].

### Data Analysis

Descriptive analyses explored the characteristics of the sample, the variables of interest, and the distribution of the study variables using SPSS software version 28. Missing data for all study variables were calculated with linear interpolation. Mplus version 7.31 [70] was used for confirmatory factor analysis (CFA) and structural equation modeling (SEM). Prior to conducting the main analysis, we checked the assumptions of SEM, none of which were found to be violated. SEM is theory driven, allowing us to identify whether a prior theoretical model could be applied to observed data by testing the relations of all variables and underlying constructs simultaneously [71]. SEM was conducted in the recommended two-step approach [72]. First, a measurement model was assessed with all relevant paths set free to vary using CFA to identify the factor structure of independent variables (i.e., family and childhood health factors, social rank factors, and environmental factors). Individual items with significant factor loadings were retained only in the final CFA to obtain a well-fitting parsimonious model [73]. Then, the hypothesized structure model (Fig. 1) included constructs validated by the measurement model was tested, wherein all hypothesized paths were estimated freely (i.e., all parameters were allowed to vary in the model to simultaneously test without any equality constraints on any parameters). We evaluated which factors were associated with depression and suicidal ideation among adolescents while adjusting for relevant sociodemographic and socioeconomic covariates.

We hypothesized that having a family history of mental illness and in-utero/perinatal complications, and poor environmental factors would be associated with an



**Fig. 1** Conceptual model that hypothesizes the effects of family and childhood health, social rank, and environmental factors on depression and suicidal ideation. Plus (+) and minus (-) signs indicate paths with positive and negative associations, respectively

increase in the risk of depression and suicidal ideation, whereas greater social rank factors would be associated with a decrease of depression and suicidal ideation. The final model was re-specified from the hypothesized model based on prior literature and modification indices (MIs) [71]. All SEM analyses were conducted using weighted least squares mean and variance adjusted (WLSMV) estimator due to categorical observed variables (e.g., binary or ordinal). Two standardization options were used simultaneously to obtain standardized parameter estimates and standard errors of continuous (STDYX) and binary (STDY) covariates [74]. Goodness of fit was assessed by multiple-fit indices [71, 75]: chi-square ( $\chi^2$ ) goodness-of-fit index, the Comparative Fit Index (CFI) and the Tucker–Lewis index (TLI)  $\geq 0.95$ ; the Root Mean Square Error of Approximation (RMSEA)  $\leq 0.06$ ; Weighted Root Mean Square Residual (WRMR)  $< 1.0$ ; Standardized Root Mean Square Residual (SRMR)  $< 0.08$ . Path coefficients less than 0.1 indicate a small effect, those around 0.3 a

medium effect, and those greater than 0.5 a large effect [71].

## Results

### Descriptive Statistics

Table 1 presents descriptive statistics with whole sample ( $N=197$ ). The average age of the respondents was 14.6 years ( $SD=1.5$ ). A majority of the respondents were female (63%) and Black (63%) and reported a family history of mental illness (68%) and in-utero and perinatal complications (52%). More than one-third of the sample met the criteria for moderately severe to severe depression (39%) and reported suicidal ideation (33%). Table 2 shows the bivariate relationships of moderate/severe depression and suicidal ideation in the past month by sociodemographic, family and in-utero and perinatal health, perceived control and status, social rank, and environmental variables. Adolescents with

**Table 1** Sample characteristics (N = 197)

	Number, M	%, SD
Sociodemographics		
Age <sup>a</sup>	14.58	1.54
Sex at birth		
Female	124	62.9
Male	73	37.1
Race		
White	47	23.9
Black	124	62.9
Others	26	13.2
SES <sup>a</sup> (z-score)	.00	3.02
Family and childhood health factors		
Family history of mental illness		
No	64	32.5
Yes	133	67.5
In-utero and perinatal complications		
No	94	47.7
Yes	103	52.3
Social rank factors		
Overall sense of control <sup>a</sup>	3.80	.70
Subjective social status—social <sup>a</sup>	6.23	1.55
Subjective social status—school <sup>a</sup>	6.45	2.17
Environmental factors		
Negative neighborhood scale <sup>a</sup>	4.73	4.93
Negative school scale <sup>a</sup>	2.84	1.99
Exposure to traumatic events <sup>a</sup>	1.77	1.79

Values for <sup>a</sup>present mean (M), standard deviation (SD)

a family history of mental illness and lower perceived sense of control were more likely to report moderate or severe depression and suicidal ideation in the past month than those with no family history of mental illness or higher perceived sense of control ( $p < 0.05$ ). Table 3 displays the correlations between all variables of interest.

## Measurement Model

An initial three-factor CFA model (family and childhood health, social rank, and environmental factors) demonstrated good fit ( $\chi^2 (17) = 17.31, p = 0.433$ ; CFI = 1.00, TLI = 1.00, RMSEA = 0.01 [90% CI 0.00–0.07,  $p = 0.84$ ], WRMR = 0.58); however, a latent variable of the family and childhood health factor had only two observed variables (i.e., family history of mental illness, in-utero and perinatal complications), indicating that those two indicators would not be appropriate to be included as a latent variable and hence the posited three-factor CFA model did not appear reasonable. Based on these findings, we decided to use each of the sub-items of the family history of mental illness and in-utero/perinatal complications as a separate observed

variable. The revised two-factor CFA model with social rank and environmental factors yielded an excellent fit ( $\chi^2 (7) = 7.71, p = 0.359$ ; CFI = 0.99, TLI = 0.98, RMSEA = 0.02 [90% CI 0.01–0.09,  $p = 0.67$ ], SRMR = 0.03). All standardized factor loadings were statistically significant (ranging from 0.3 to 0.8,  $p < 0.01$ ) with the anticipated directions. Thus, this revised measurement model appeared reasonable and was adopted for the present study.

## Structural Model

SEM was conducted to assess the effects of family history of mental illness and in-utero/perinatal complications variables, social rank factors, and environmental factors on depression and suicidal ideation in the past month, while adjusting for all relevant covariates. The full structural model demonstrated a good fit to the data ( $\chi^2 (44) = 49.69, p = 0.257$ ; CFI = 0.97, TLI = 0.94, RMSEA = 0.03 [90% CI 0.00–0.06,  $p = 0.89$ ], WRMR = 0.62). As shown in Fig. 2, the social rank factor was negatively associated with both depression ( $\beta = -0.58, p < 0.000$ ) and suicidal ideation in the past month ( $\beta = -0.53, p < 0.001$ ), indicating that high perceived social rank was associated with a decrease risk of depression and suicidal ideation in the past month. A significant direct effect of the environmental factor on depression ( $\beta = 0.26, p < 0.05$ ), and suicidal ideation in the past month was found ( $\beta = 0.42, p < 0.01$ ), indicating that negative environmental factors were associated with an increased risk of depression and suicidal ideation in the past month. Family history of mental illness had a significant positive association with depression ( $\beta = 0.29, p < 0.01$ ) and suicidal ideation in the past month ( $\beta = 0.25, p < 0.05$ ). In-utero and perinatal complications were positively associated with depression ( $\beta = 0.19, p < 0.05$ ), but not with suicidal ideation in the past month (Table 4). No correlation was found between a latent variable of social rank and environmental factors in this sample.

## Discussion

Following Cohen's stage model [9] that attempts to explain the effects of stress on disease by integrating individuals' experiences, perceptions, and physiological circumstances, the present study examined the relationships among family mental health history and in-utero/perinatal complications, social rank factor, environmental factor, and depression and suicidal ideation in the past month in a clinical sample of adolescents. The majority of participants in this sample were Black and female. Two factors (latent variables) were confirmed based on the measurement model: a *social rank* factor and an *environmental* risk related factor.

**Table 2** Depression and suicidal ideation in the past month by sociodemographic and biopsychosocial factors

	Moderate or severe depression					Suicidal ideation (past month)				
	No (n = 121)		Yes (n = 76)		$\chi^2$	No (n = 132)		Yes (n = 65)		$\chi^2$
	N	%	N	%		N	%	N	%	
<b>Sociodemographics</b>										
Age <sup>a</sup>	14.4	1.5	15.0	1.5	2.38*	14.6	1.5	14.6	1.5	.70
Sex at birth					4.71*					.94
Female	69	55.6	55	44.4		80	64.5	44	35.5	
Male	52	71.2	21	28.8		52	71.2	21	28.8	
Race					.97					4.21
White	28	59.6	19	40.4		26	55.3	21	44.7	
Black	79	63.7	45	36.3		89	71.8	35	28.2	
Others	14	53.8	12	46.2		17	65.4	9	34.6	
SES <sup>a</sup> (z-score)	.0	2.8	.0	3.3	.86	-.1	2.7	.2	3.6	.98
<b>Family and childhood health factor</b>										
Family history of mental illness					5.78*					5.30*
No	47	73.4	17	26.6		50	78.1	14	21.9	
Yes	74	55.6	59	44.4		82	61.7	51	38.3	
In-utero and perinatal complications					.44					2.29
No	60	63.8	34	36.2		58	61.7	36	38.3	
Yes	61	59.2	42	40.8		74	71.8	29	28.2	
<b>Social rank factor</b>										
Overall sense of control <sup>a</sup>	4.0	.6	3.5	.7	1.94**	4.0	.7	3.4	.6	1.77**
Subjective social status—social <sup>a</sup>	6.4	1.5	6.0	1.7	1.00	6.4	1.5	5.9	1.6	1.77
Subjective social status—school <sup>a</sup>	6.7	2.2	6.1	2.1	1.32	6.7	2.1	5.9	2.2	1.10
<b>Environmental factor</b>										
Negative neighborhood scale <sup>a</sup>	4.7	5.1	4.8	4.7	1.04	4.5	5.0	5.2	4.9	1.28
Negative school scale <sup>a</sup>	2.8	1.8	3.0	2.2	1.19	2.7	1.9	3.1	2.1	1.34
Exposure to traumatic events <sup>a</sup>	1.6	1.7	2.0	1.9	.68	1.4	1.6	2.5	1.9	2.68**

Values for <sup>a</sup>present mean, standard deviation, and F-value instead of  $\chi^2$ . \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Table 3** Correlations for study variables

Variable	Age	SES	OSC <sup>a</sup>	SSS—social <sup>b</sup>	SSS—school <sup>c</sup>	NNS <sup>d</sup>	NSS <sup>e</sup>	ETE <sup>f</sup>	Depression
SES	-.06								
OSC <sup>a</sup>	-.02	-.08							
SSS—Social <sup>b</sup>	-.14*	.16*	.13						
SSS—School <sup>c</sup>	-.02	-.03	.38**	.22**					
NNS <sup>d</sup>	.07	-.33**	.04	.06	.05				
NSS <sup>e</sup>	-.01	-.08	-.15*	-.03	-.04	.39**			
ETE <sup>f</sup>	-.03	-.12	-.15*	.01	-.00	.35**	.31**		
Depression	.12	.06	-.55***	-.19*	-.16*	-.05	.13	.24**	
Suicidal ideation	.02	.04	-.37**	-.17	-.19**	.07	.10	.28**	.48**

OSC<sup>a</sup>: overall sense of control

SSS—social<sup>b</sup>: subjective social status—social

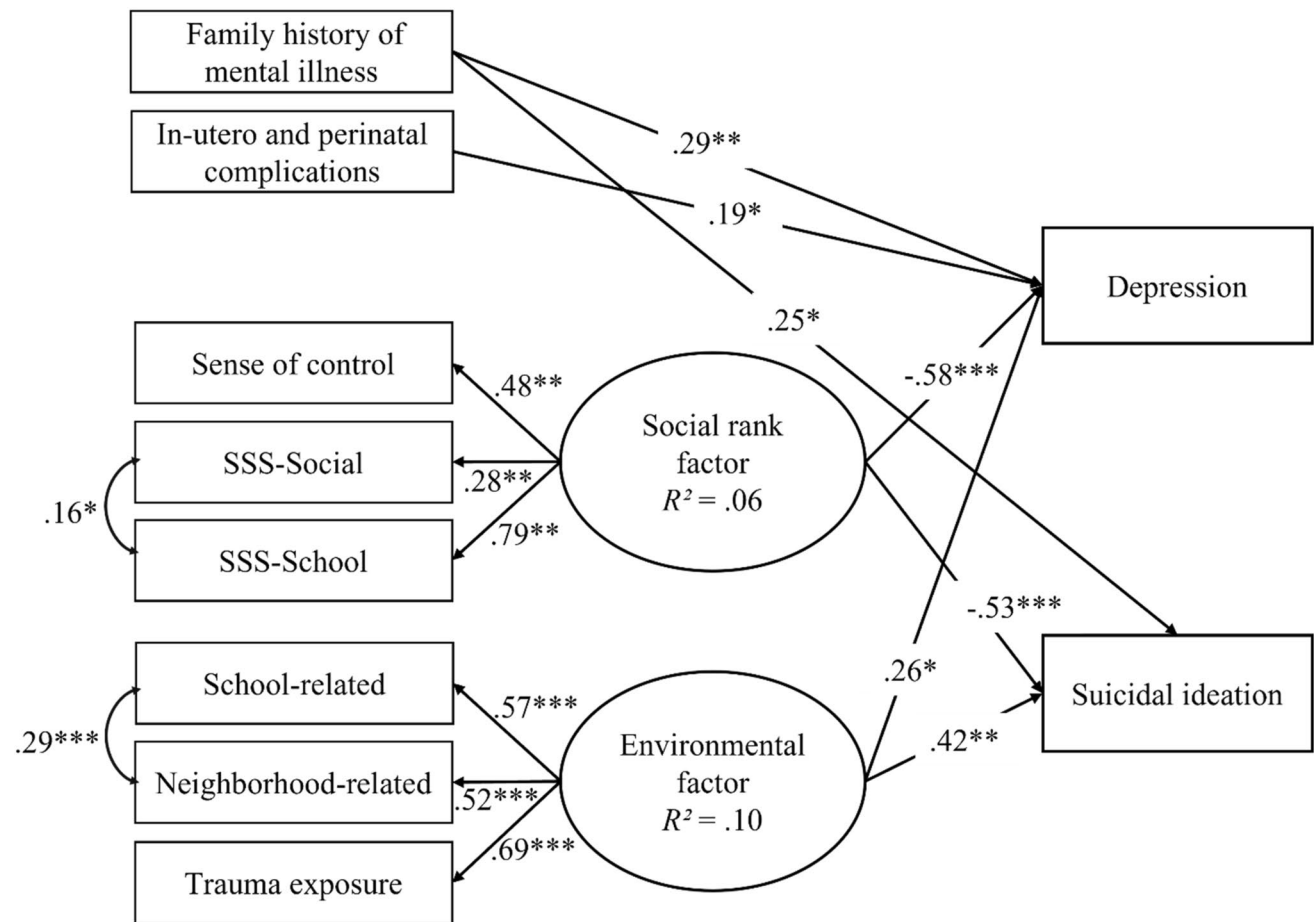
SSS—school<sup>c</sup>: subjective social status—school

NNS<sup>d</sup>: negative neighborhood scale

NSS<sup>e</sup>: negative school scale

ETE<sup>f</sup>: exposure to traumatic events

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$



**Fig. 2** Full structural model that assessed the effects of family and childhood health variables (family history of mental illness, in-utero/perinatal complications), social rank factors, and environmental factors on depression and suicidal ideation. Ovals present the latent vari-

ables and rectangles present the observed variables. Only significant coefficients are presented for display purposes. The standardized coefficients are presented. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

The current study explored the mechanisms of social rank on depression and suicidal ideation in the past month. Measures of sense of control and subjective social status merged into a single *social rank* factor that included variables related to subjective social status of the adolescent in their school, the adolescent's family in the larger society, and the adolescent's sense of control. In this study, greater *perceived social rank* was significantly and inversely associated with depression and suicidal ideation in the past month. Sense of control is associated with social rank position [43, 67] and health [42]. Prior research has also shown a significant association between low sense of control and depressive symptoms, with one fourth to half of the variation in depressive symptoms associated with family wealth being accounted for by low sense of control [76, 77]. Furthermore, a higher sense of control can be protective of depression [76] and may serve as a buffer for socio-economic status risk [78, 79].

Status indices such as the person's sense of control and the placement in community rank hierarchy are associated

with higher levels of multisystem physiological dysregulation (including the cardiovascular, endocrine, and autonomic nervous systems) [12]. There are also age differences in the connection between social ranking and allostatic load in adults, with stronger effects in younger than older adults [12]. This finding emphasizes the need to include individual- and community-level interventions related to social rank, notwithstanding the need to address macro factors of social rank [43].

A second factor, the *environmental risk* factor was significantly associated with depression and suicidal ideation in the past month. The association between the environmental factor that included traumatic experiences and exposure to violence in the school and the community, and suicidal ideation in the past month was consistent with prior research showing increased suicidal ideation [80] and attempts [81–83] in individuals with a history of adverse events in childhood [83, 84], especially violence-related events [85] and sexual and physical abuse [86–88]. In this study, the effects of the



**Table 4** Parameter estimates of depression and suicidal ideation in the past month

Parameter estimates	<i>Unst</i>	<i>St</i>	<i>SE</i>	<i>p</i>
Measurement model				
Social rank factor				
Overall sense of control	1.00	.48	.15	.001
Subjective social status—social	1.27	.28	.09	.003
Subjective social status—school	5.09	.79	.24	.001
Environmental factor				
Negative neighborhood scale	1.00	.69	.10	.000
Negative school scale	2.98	.57	.10	.000
Exposure to traumatic events	.81	.52	.10	.000
Structural model				
Family history of mental illness → depression	1.78	.29	.10	.004
Family history of mental illness → suicidal ideation	.24	.25	.12	.035
In-utero/perinatal complications → depression	1.16	.19	.09	.034
In-utero/perinatal complications → suicidal ideation	−.14	−.14	.12	.251
Social rank factor → depression	−6.18	−.58	.09	.000
Social rank factor → suicidal ideation	−.91	−.53	.10	.001
Environmental factor → depression	2.15	.26	.11	.033
Environmental factor → suicidal ideation	.56	.42	.13	.005
Social rank factor ↔ environmental factor	−.00	−.01	.15	.946
Depression ↔ suicidal ideation	.52	.17	.21	.478
Modification indices				
SSS—social <sup>a</sup> ↔ SSS—school <sup>b</sup>	.46	.16	.06	.020
NNS <sup>c</sup> ↔ NSS <sup>d</sup>	2.30	.29	.06	.000

*Unst.* unstandardized; *St.* STDY standardized. *SE* standardized error

SSS social<sup>a</sup>: subjective social status—social

SSS—school<sup>b</sup>: subjective social status—school

NNS<sup>c</sup>: negative neighborhood scale

NSS<sup>d</sup>: negative school scale

environment were weaker than those of the *social rank* factor. This finding could be due to the cumulative effects of chronic environmental stress having more long- and less short-term effects on individuals. Additionally, adolescents who lived in relatively safe homes as children, become more exposed to larger and potentially more violent environments in larger schools and neighborhoods as they grow [89, 90].

The U.S. is experiencing historically high levels of income inequality [7], which may heighten the subjective experience of social class as powerful in predicting social outcomes. In this climate, understanding stress related to social rank and to deprivation and violence in the school and neighborhood environment is important to design appropriate interventions that can buffer the effects of inequality. An encouraging finding in our study was that psychological factors related to social rank (sense of control and status) appeared to have significant weight on depression and suicidal ideation even in adverse environments, and these more malleable risk factors could be addressed in therapy. Interventions to build resilience through adolescence, such as parenting interventions, promotion of early detection of

stress-related disorders, and self-help for mood and anxiety disorders (e.g., through digital apps) [91], as well as the delivery of psychological therapies by non-specialists in low-resource settings [92] could all contribute to improvements in psychological distress related to social rank. Therapeutic interventions could focus on the social comparisons leading to feelings of worthlessness [93, 94]. Third-wave psychological therapies that include components of self-validation to counter social defeat and worthlessness associated with depression and suicidality [95] are now being adapted to extreme poverty settings [96]. These initiatives need to be accompanied by efforts to reduce social inequalities in our communities, as we know that macro and structural factors such as access to education and income inequality are the strongest determinants of adolescent health [97].

Despite its strengths, this study also presents several limitations related to methodology. It is a cross-sectional study, and as such, causal relationships among the variables included cannot be drawn. Longitudinal studies looking at long-term effects and variation of one's subjective social status, sense of control, and school

and neighborhood environments would help determine causal mechanisms. Additionally, in-utero and perinatal complications were determined as part of a chart review. These complications could have been underreported, and the data collected may have been limited by recall bias. The rest of the measures were self-reported in the survey, which may increase the risk of social desirability. Additionally, the data were oversampled from a Black and female population, which limits generalizability. While this was a relatively small sample, many studies conducted previously have not had a sufficient sample size of minority youth. There could have been differences in reporting of symptoms in this population. Furthermore, a limitation to the study of suicidal ideation was the use of a single item. Finally, the chances of a bidirectional relationship between measures of perceived social rank with depression and suicidal ideation may be higher than for the environmental risk variables and account for the stronger association. In other words, people who are depressed may perceive themselves to be of a lower social rank, and those who see themselves as lower in the social hierarchies may also tend to feel more depressed. While the same could be said about the environmental variables, these questions elicited more objectivity as they are not focused on the respondent but on the environmental factors, and the bidirectional effect may have been lower, appearing as a weaker association in the model.

Another important finding was that stress factors related to one's environment had a stronger association to suicidal thoughts in the past month than to depression, and that perceived social rank had a strong association with both depression and suicidal ideation in the past month. Although evidence supports an association between depression and suicide, the best fitting model did not reveal a correlation between the level of depressive symptoms and suicidal ideation in the past month. This finding is key in clinical settings as it stresses the need to assess and address social rank perceptions and environmental stressors in clinical interviews beyond the focus on depressive symptoms. Further, these measures may have a role as less stigmatizing proxy for suicide risk.

In conclusion, perceptions of social rank were associated to depression and suicidal ideation and may be worthy of exploration in future longitudinal studies. In our study, these social rank factors were more strongly associated with depression and suicidal ideation than environmental risk factors related to the school and the neighborhood and family mental health history and in-utero/perinatal complications. Individual and environmental interventions that give adolescents a greater sense of control and status may be beneficial in treating depression and suicide risk.

## Summary

There has been a surge in depression diagnoses and suicide among adolescents in the U.S. over the past two decades. Previous research highlights physical, psychological, and environmental factors such as familial and social influences as implicated in depression and suicide. However, less is known about the effects of the stress caused by social hierarchies on depression and suicide in adolescents, which matters in a growing environment of income inequality and opportunities for social comparisons with the expansion of social media use. Following models of stress-related to social rank and health outcomes, we sought to examine multilevel risk factors associated with depression and suicidal ideation in a clinical sample of adolescents. We hypothesized that family history of mental health, in-utero and perinatal complications, and adverse environmental factors related to the neighborhood and school would be associated with an increase in the risk of depression and suicidal ideation in the past month, whereas greater perceived control and higher subjective social status would be associated with a decrease in depression and suicidal ideation.

Data collected in outpatient primary care and mental health outpatient centers in an Eastern U.S. city between February and September of 2016 using a cross-sectional survey assessed respondents' self-reports of mental health (e.g., depression, suicidal ideation in the past month) and biopsychosocial factors (e.g., family history of mental illness, sense of control, subjective social status, and school/neighborhood environments). A chart review was also conducted to obtain information related to in-utero and perinatal complications. The final data analytic sample included 197 cases of adolescents who were primarily Black and female.

Two factors (latent variables) were confirmed based on the measurement model: a *social rank* factor and an *environmental risk* factor. Our measures of sense of control and subjective social status merged into one single factor of social rank, which included variables related to subjective social status of the adolescent in their school, the adolescent's family in the larger society, and the adolescent's sense of control. A greater *social rank* factor was significantly associated with a decreased risk of depression and suicidal ideation, consistent with prior research showing an association between low sense of control and depressive symptoms. We conclude that perceptions of social rank are linked to depression and suicidal ideation. In our sample, perceived control and social status factors were more strongly associated with depression and suicidal ideation than environmental risk factors related to the school and the neighborhood environment.

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## Declarations

**Conflict of interest** All authors declare that they have no conflict of interest.

## References

- Mojtabai R, Olfson M, Han B (2016) National trends in the prevalence and treatment of depression in adolescents and young adults. *Pediatrics* 138(6):120161878
- Miron O, Yu K-H, Wilf-Miron R, Kohane IS (2019) Suicide rates among adolescents and young adults in the United States, 2000–2017. *JAMA* 321(23):2362–2364
- Curtin SC, Heron M (2019) Death rates due to suicide and homicide among persons aged 10–24: United States, 2000–2017 (NCHS Data Brief No. 352). National Center for Health Statistics, Hyattsville, MD
- Hawton K, Rodham K, Evans E, Weatherall R (2002) Deliberate self-harm in adolescents: self-report survey in schools in England. *BMJ* 325(7374):1207–1211
- Madge N, Hewitt A, Hawton K, de Wilde EJ, Corcoran P, Fekete S, Ystgaard M (2008) Deliberate self-harm within an international community sample of young people: comparative findings from the Child & Adolescent Self-harm in Europe (CASE) Study. *J Child Psychol Psychiatry* 49(6):667–677
- Evans E, Hawton K, Rodham K (2004) Factors associated with suicidal phenomena in adolescents: a systematic review of population-based studies. *Clin Psychol Rev* 24:957–979
- Phillips K (2002) *Wealth and democracy: a political history of the American rich*. Broadway Books, New York
- Blease CR (2015) Too many friends, too few likes? Evolutionary psychology and Facebook depression. *Rev Gen Psychol* 19(1):1–13
- Cohen S, Gianaros PJ, Manuck SB (2016) A stage model of stress and disease. *Perspect Psychol Sci* 11(4):456–463
- Whitehead M, Pennington A, Orton L, Nayak S, Petticrew M, Sowden A, White M (2016) How could differences in ‘control over destiny’ lead to socio-economic inequalities in health? A synthesis of theories and pathways in the living environment. *Health Place* 39:51–61
- Ross CE, Mirowsky J (2013) The sense of personal control: Social structural causes and emotional consequences. In: Aneshensel CS, Phelan JC, Bierman A (eds) *Handbooks of sociology and social research. Handbook of the sociology of mental health*. Springer Science + Business Media, Berlin, pp 379–402
- Seeman M, Merkin S, Karlamangla A, Koretz B, Seeman T (2014) Social status and biological dysregulation: the “status syndrome” and allostatic load. *Soc Sci Med* 118:143–151
- Dahlgren G, Whitehead M (1993) Tackling inequalities in health: what can we learn from what has been tried? Working paper prepared for the King’s Fund International Seminar on Tackling Inequalities in Health, Ditchley Park, Oxfordshire King’s Fund, London. In: Dahlgren G, Whitehead M (eds), 2007. *European Strategies for Tackling Social Inequities in Health: Levelling up*. Part 2. WHO Regional office for Europe, Copenhagen ([http://www.euro.who.int/\\_data/assets/pdf\\_file/0018/103824/E89384.pdf](http://www.euro.who.int/_data/assets/pdf_file/0018/103824/E89384.pdf)).
- Brown J, Cohen P, Johnson JG, Smailes EM (1999) Childhood abuse and neglect: Specificity of effects on adolescent and young adult depression and suicidality. *J Am Acad Child Adolesc Psychiatry* 38:1490–1496
- Dunn EC, Uddin M, Subramanian SV, Smoller JW, Galea S, Koenen KC (2011) Gene-environment (GxE) interaction research in youth depression: a systematic review with recommendations for future research. *J Child Psychol Psychiatry* 52(12):1223–1238
- Dunn EC, Gilman SE, Willett JB, Slopen NB, Molnar BE (2012) The impact of exposure to interpersonal violence on gender differences in adolescent-onset major depression: results from the national comorbidity survey replication (NCS-R). *Depress Anxiety* 29(5):392–399
- Hammen C (2005) Stress and depression. *Annu Rev Clin Psychol* 1:293–319
- Beard JR, Cerdá M, Blaney S, Ahern J, Vlahov D, Galea S (2009) Neighborhood characteristics and change in depressive symptoms among older residents of New York City. *Am J Public Health* 99(7):1308–1314
- Galea S, Ahern J, Nandi A, Tracy M, Beard J, Vlahov D (2007) Urban neighborhood poverty and the incidence of depression in a population-based cohort study. *Ann Epidemiol* 17(3):171–179
- Julien D, Richard L, Gauvin L, Kestens Y (2012) Neighborhood characteristics and depressive mood among older adults: an integrative review. *Int Psychogeriatr* 24(8):1207–1225
- Paczkowski MM, Galea S (2010) Sociodemographic characteristics of the neighborhood and depressive symptoms. *Curr Opin Psychiatry* 23(4):337–341
- Flay BR, Graumlich S, Segawa E, Burns JL, Holliday MY (2004) Effects of 2 prevention programs on high-risk behaviors among African American youth: a randomized trial. *Arch Pediatr Adolesc Med* 158(4):377–384
- Resnick MD, Bearman PS, Blum RW, Bauman KE, Harris KM, Jones J, Ireland M et al (1997) Protecting adolescents from harm. *JAMA* 278(10):823–832
- Stevenson HC (1998) Raising safe villages: cultural-ecological factors that influence the emotional adjustment of adolescents. *J Black Psychol* 24(1):44–59
- Hadley-Ives E, Stiffman A, Elze D, Johnson SD, Doré P (2000) Measuring neighborhood and school environments perceptual and aggregate approaches. *J Hum Behav Soc Environ* 3:1–28
- Aneshensel CS, Sucoff CA (1996) The neighborhood context of adolescent mental health. *J Health Soc Behav* 37(4):293–310
- Latkin CA, Curry AD (2014) Stressful neighborhoods and depression: a prospective study of the impact of neighborhood disorder. *J Health Soc Behav* 44(1):34–44
- Kramer MS, Séguin L, Lydon J, Goulet L (2000) Socio-economic disparities in pregnancy outcome: why do the poor fare so poorly? *Paediatr Perinat Epidemiol* 14(3):194–210. <https://doi.org/10.1046/j.1365-3016.2000.00266.x>
- Chen E, Matthews KA, Boyce WT (2002) Socioeconomic differences in children’s health: How and why do these relationships change with age? *Psychol Bull* 128:295–329. <https://doi.org/10.1037/0033-2909.128.2.295>
- Adler NE, Ostrove JM (1999) Socioeconomic status and health: What we know and what we don’t. *Ann N Y Acad Sci* 896:3–15. <https://doi.org/10.1111/j.1749-6632.1999.tb08101.x>
- Currie C, Molcho M, Boyce W, Holstein B, Torsheim T, Richter M (2008) Researching health inequalities in adolescents: the development of the Health Behaviour in School-Aged Children (HBSC) family affluence scale. *Soc Sci Med* 66(6):1429–1436
- Chen E, Martin AD, Matthews KA (2006) Socioeconomic status and health: Do gradients differ within childhood and adolescence? *Soc Sci Med* 62:2161–2170. <https://doi.org/10.1016/j.socscimed.2005.08.054>

33. Chen E, Paterson LQ (2006) Neighborhood, family, and subjective socioeconomic status: How do they relate to adolescent health? *Health Psychol* 25:704–714. <https://doi.org/10.1037/0278-6133.25.6.704>
34. Lowry R, Kann L, Collins JL, Kolbe LJ (1996) The effect of socioeconomic status on chronic disease risk behaviors among US adolescents. *JAMA* 276:792–797. <https://doi.org/10.1001/jama.1996.03540100036025>
35. West P, Sweeting H, Young R, Kelly S (2010) The relative importance of family socioeconomic status and school-based peer hierarchies for morning cortisol in youth: an exploratory study. *Soc Sci Med* 70:1246–1253. <https://doi.org/10.1016/j.socscimed.2009.12.006>
36. Goodman E (1999) The role of socioeconomic status gradients in explaining differences in US adolescents' health. *Am J Public Health* 89:1522–1528. <https://doi.org/10.2105/AJPH.89.10.1522>
37. Quon EC, McGrath JJ (2014) Subjective socioeconomic status and adolescent health: a meta-analysis. *Health Psychol* 33(5):433–447
38. Singh-Manoux A, Marmot MG, Adler NE (2005) Does subjective social status predict health and change in health status better than objective status? *Psychosom Med* 67:855–861. <https://doi.org/10.1097/01.psy.0000188434.52941.a0>
39. Wetherall K, Robb KA, O'Connor RC (2019) An examination of social comparison and suicide ideation through the lens of the integrated motivational–volitional model of suicidal behavior. *Suicide Life-Threat Behav* 49(1):167–182
40. Vidal C, Latkin C (2020) Perceived family and individual social status and its association with depression and suicidality in an adolescent clinical sample. *J Commun Psychol* 48:2504–2516
41. Marmot M (2004) *The status syndrome: how social standing affects our health and longevity*. Bloomsbury Publishing, London
42. Lachman ME, Weaver SL (1998) The sense of control as a moderator of social class differences in health and well-being. *J Pers Soc Psychol* 74(3):763–773. <https://doi.org/10.1037/0022-3514.74.3.763>
43. Kraus MW, Piff PK, Keltner D (2009) Social class, sense of control, and social explanation. *J Pers Soc Psychol* 97(6):992–1004. <https://doi.org/10.1037/a0016357>
44. Rotter JB (1966) Generalized expectancies for internal versus external control of reinforcement. *Psychol Monogr Gen Appl* 80:1–28
45. Seligman MEP (1975) *Helplessness*. Freeman, San Francisco, CA
46. Bandura A (1989) Human agency in social cognitive theory. *Am Psychol* 44:1175–1184
47. Skinner E (1996) A guide to constructs of control. *J Pers Soc Psychol* 7(3):549–570
48. Thompson SC (2002) The role of personal control in adaptive functioning. In: Snyder CR, Lopez SJ (eds) *Handbook of positive psychology*. Oxford University Press, London, England, pp 202–213
49. Shapiro DH Jr (1994) *Shapiro control inventory*. Behaviordata, San Jose, CA
50. Donnelly M (1999) Factors associated with depressed mood among adolescents in Northern Ireland. *J Commun Appl Soc Psychol* 9:47–59
51. Muris P, Meesters C, Schouten E, Hoge E (2004) Effects of perceived control on the relationship between perceived parental rearing behaviors and symptoms of anxiety and depression in nonclinical preadolescents. *J Youth Adolesc* 33:51–58
52. Wolffe LM, List JH (2004) Temporal stability in the effects of college attendance on locus of control, 1972–1992. *Struct Equ Model* 11(2):244–260
53. Sirignano SW, Lachman ME (1985) Personality change during the transition to parenthood: the role of perceived infant temperament. *Dev Psychol* 21(3):558–567
54. Keeton CP, Perry-Jenkins M, Sayer AG (2008) Sense of control predicts depressive and anxious symptoms across the transition to parenthood. *J Fam Psychol* 22(2):212–221
55. Taylor SE (1983) Adjustment to threatening events: a theory of cognitive adaptation. *Am Psychol* 38(11):1161–1173. <https://doi.org/10.1037/0003-066X.38.11.1161>
56. Taylor SE, Lobel M (1989) Social comparison activity under threat: Downward evaluation and upward contacts. *Psychol Rev* 96(4):569–575. <https://doi.org/10.1037/0033-295X.96.4.569>
57. Christianson HF, Weis JM, Fouad NA (2013) Cognitive adaptation theory and quality of life in late-stage cancer patients. *J Psychosoc Oncol* 31(3):266–281. <https://doi.org/10.1080/07347332.2013.778936>
58. Weissman MM, Berry OO, Warner V, Gameroff MJ, Skipper J, Talati A, Pilowsky DJ, Wickramaratne P (2016) A 30-year study of 3 generations at high risk and low risk for depression. *JAMA Psychiat* 73(9):970–977. <https://doi.org/10.1001/jamapsychiatry.2016.1586>
59. Qin P, Agerbo E, Bo Mortensen P (2003) Suicide risk in relation to socioeconomic, demographic, psychiatric, and familial factors: a national register-based study of all suicides in Denmark, 1981–1997. *Am J Psychiatry* 160(4):765–772. <https://doi.org/10.1176/appi.ajp.160.4.765>
60. Suarez GL, Morales S, Metcalf K, Pérez-Edgar KE (2019) Perinatal complications are associated with social anxiety: Indirect effects through temperament. *Inf Child Dev* 28:e2130. <https://doi.org/10.1002/icd.2130>
61. Orri M, Gunnell D, Richard-Devantoy S, Bolanis D, Boruff J et al (2019) In-utero and perinatal influences on suicide risk: a systematic review and meta-analysis. *The Lancet Psychiatry* 6(6):477–492. [https://doi.org/10.1016/S2215-0366\(19\)30077-X](https://doi.org/10.1016/S2215-0366(19)30077-X)
62. Wolf EJ, Harrington KM, Clark SL, Miller MW (2013) Sample size requirements for structural equation models: an evaluation of power, bias, and solution propriety. *Educ Psychol Measur* 76(6):913–934
63. Johnson JG, Harris ES, Spitzer RL, Williams JBW (2002) The patient health questionnaire for adolescents: validation of an instrument for the assessment of mental disorders among adolescent primary care patients. *J Adolesc Health* 30(3):196–204
64. Burdzovic AJ, Brunborg GS (2017) Depressive symptomatology among Norwegian adolescent boys and girls: the patient health Questionnaire-9 (PHQ-9) psychometric properties and correlates. *Front Psychol* 8:887
65. Kroenke K, Spitzer RL, Williams JB (2001) The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med* 16(9):606–613
66. Jose PE, Weir KF (2013) Adolescent sense of control: a downward extension of the shapiro control inventory to pre- and early adolescents. *J Genet Psychol Res Theory Hum Dev* 174(5):494–513
67. Goodman E, Adler NE, Kawachi I, Frazier AL, Huang B, Colditz GA (2001) Adolescents' perceptions of social status: development and evaluation of a new indicator. *Pediatrics* 108(2):e31
68. Steinberg AM, Brymer MJ, Decker KB, Pynoos RS (2004) The University of California at Los Angeles post-traumatic stress disorder reaction index. *Curr Psychiatry Rep* 6(2):96–100
69. Bradley RH, Corwyn RF (2002) Socioeconomic status and child development. *Annu Rev Psychol* 53:371–399
70. Muthén LK, Muthén BO (2014) *Mplus (version 7.3) [computer software]*. Author, Los Angeles, CA
71. Kline RB (2016) *Principles and practice of structural equation modeling*, 4th edn. Guilford Publications, New York
72. Anderson JC, Gerbing DW (1988) Structural equation modeling in practice: a review and recommended two-step approach. *Psychol Bull* 103(3):411–423

73. Hair JF, Anderson RE, Babin BJ, Black WC (2010) *Multivariate data analysis: a global perspective*, vol 7. Pearson, Upper Sadler River, NJ
74. Muthén LK, Muthén BO (1998–2012) *Mplus user's guide* (7th ed.). Muthén & Muthén, Log Angeles, CA
75. Hu LT, Bentler PM (1999) Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Struct Equ Model* 6(1):1–55
76. Ibrahim AK, Kelly SJ, Adams CE, Glazebrook C (2013) Socioeconomic status and the risk of depression among UK higher education students. *Soc Psychiatry Psychiatr Epidemiol* 48:1491–1501
77. Steptoe A, Tsuda A, Tanaka Y, Wardle J (2007) Depressive symptoms, socio-economic background, sense of control and cultural factors in University students from 23 countries. *Int J Behav Med* 14(2):97–107
78. Farhood LF, Dimassi H (2021) Prevalence and predictors for post-traumatic stress disorder, depression and general health in a population from six villages in South Lebanon. *Soc Psychiatry Psychiatr Epidemiol* 47(4):639–649
79. Huurre T, Rahkonen O, Komulainen E, Aro H (2005) Socioeconomic status as a cause and consequence of psychosomatic symptoms from adolescence to adulthood. *Soc Psychiatry Psychiatr Epidemiol* 40:580–587
80. Stansfeld SA, Clark C, Smuk M, Power C, Davidson T, Rodgers B (2017) Childhood adversity and midlife suicidal ideation. *Psychol Med* 47(2):327–340
81. Dube SR, Anda RF, Felitti VJ, Chapman DP, Williamson DF, Giles WH (2001) Childhood abuse, household dysfunction, and the risk of attempted suicide throughout the life span: findings from the adverse childhood experiences study. *JAMA* 286(24):3089–3096
82. Enns MW, Cox BJ, Afifi TO, De Graaf R, Ten Have M, Sareen J (2006) Childhood adversities and risk for suicidal ideation and attempts: a longitudinal population-based study. *Psychol Med* 36(12):1769–1778
83. Ford JD, Gomez JM (2015) The relationship of psychological trauma and dissociative and posttraumatic stress disorders to non-suicidal self-injury and suicidality: a review. *J Trauma Dissoc* 16(3):232–271
84. Afifi TO, Taillieu T, Zamorski MA, Turner S, Cheung K, Sareen J (2016) Association of child abuse exposure with suicidal ideation, suicide plans, and suicide attempts in military personnel and the general population in Canada. *JAMA Psychiat* 73(3):229–238
85. Bruffaerts R, Demyttenaere K, Borges G, Haro JM, Chiu WT, Hwang I, Alonso J et al (2010) Childhood adversities as risk factors for onset and persistence of suicidal behaviour. *Br J Psychiatry* 197(1):20–27
86. Stein DJ, Chiu WT, Hwang I, Kessler RC, Sampson N, Alonso J, Florescu S et al (2010) Cross-national analysis of the associations between traumatic events and suicidal behavior: findings from the WHO World Mental Health Surveys. *PLoS ONE* 5(5):e10574
87. Madge N, Hawton K, McMahon EM, Corcoran P, De Leo D, de Wilde EJ, Arensman E et al (2011) Psychological characteristics, stressful life events and deliberate self-harm: findings from the Child & Adolescent Self-harm in Europe (CASE) Study. *Eur Child Adolesc Psychiatry* 20(10):499–508
88. O'Connor RC, Rasmussen S, Hawton K (2010) Predicting depression, anxiety and self-harm in adolescents: the role of perfectionism and acute life stress. *Behav Res Ther* 48(1):52–59
89. Feiring C, Lewis M (1991) The transition from middle childhood to early adolescence: Sex differences in the social network and perceived self-competence. *Sex Roles* 24:489–509. <https://doi.org/10.1007/BF00289335>
90. Finkelhor D, Turner H, Ormrod R, Hamby S, Kracke K (2009) Center for disease control and prevention. U.S. Department of Justice Office of Justice Programs Office of Juvenile Justice and delinquency prevention. Children's exposure to violence: a comprehensive national survey. <https://www.ojp.gov/pdffiles1/ojdp/227744.pdf>
91. Naslund JA, Aschbrenner KA, Araya R, Marsch LA, Unützer J, Patel V, Bartels SJ (2017) Digital technology for treating and preventing mental disorders in low-income and middle-income countries: a narrative review of the literature. *Lancet Psychiatry* 4:486–500
92. Singla DR, Kohrt BA, Murray LK, Anand A, Chorpita BF, Patel V (2017) Psychological treatments for the world: lessons from low- and middle-income countries. *Annu Rev Clin Psychol* 13:149–181
93. Griffith JL (2018) Hope modules: brief psychotherapeutic interventions to counter demoralization from daily stressors of chronic illness. *Acad Psychiatry* 42(1):135–145
94. Noordhof A, Kamphuis JH, Sellbom M, Eigenhuis A, Bagby RM (2018) Change in self-reported personality during major depressive disorder treatment: a reanalysis of treatment studies from a demoralization perspective. *Personal Disord Theory Res Treat* 9(1):93–100
95. Hayes SC (2004) Acceptance and commitment therapy, relational frame theory, and the third wave of behavioral and cognitive therapies. *Behav Ther* 35:639–665
96. Ramaiya MK, Fiorillo D, Regmi U, Robins CJ, Kohrt BA (2017) A cultural adaptation of dialectical behavior therapy in Nepal. *Cogn Behav Pract* 24(4):428–444
97. Viner RM, Ozer EM, Denny S, Marmot M, Resnick M, Fatuis A, Currie C (2012) Adolescence and the social determinants of health. *The Lancet* 379(9826):1641–1652

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