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Behavioral and psychosocial correlates of hope among youth

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ABSTRACT

Introduction: Hope plays a crucial role in the well-being of youth, impacting various aspects of their lives. However, less is known about the role of hope in pre-adolescents. This study aims to explore the psychosocial and behavioral correlates of hope in 9–10-year-old pre-youth transitioning into adolescence.
Methods: Using data from the Adolescent Brain Cognitive Development (ABCD) study, 4631 youth entered our study. The investigation follows these individuals for up to 36 months, specifically observing the initiation of marijuana and tobacco use. The methods employed include bivariate correlations.
Results: Baseline high hope offered protection against marijuana and tobacco use over the following 36 months. Elevated levels of hope could be seen in pre-youth with higher family income and those experienced lower levels of stressful life events and financial difficulties. High hope was also linked to lower behavioral problems, improved emotional function, lower impulsivity, lower sensation seeking, and higher cognitive function. Notably, hope was not correlated with parental education, neighborhood income, family conflict, blood pressure, body mass index, grade point average, prosocial behaviors, or puberty.
Conclusion: In conclusion, the findings suggest a close interplay between hope and various dimensions of resilience including lower tobacco and marijuana use. Higher levels of hope, influenced by factors such as family income and life events, may be a mechanism that connects hope to enhanced emotional and cognitive functioning and acts as a protective factor against early initiation of substance use. These findings underscore the potential utility of fostering hope as a strategy to promote positive development and reduce tobacco and marijuana use.

1. Introduction

Hope is a vital component of well-being and flourishing [1]. Hope acts as a protective shield against various undesirable outcomes [2]. High hope plays a crucial role in bolstering mental and emotional resilience, nurturing positive attitudes, and contributing to overall life satisfaction [3]. Emotional resilience, fortified by hope, serves as a robust defense against stress and adversity [4]. Those with a hopeful outlook are better equipped to navigate life's challenges and rebound from setbacks [5,6], a resilience that is fundamental to maintaining mental well-being and guarding against the risk of depression and suicide [7,8].

Additionally, hope is a pivotal positive emotion and attitude [9].

Individuals embracing a hopeful mindset exhibit positivity across a broad spectrum of issues [10]. Believing in the potential for positive outcomes encourages an optimistic approach to life, fostering increased motivation, enhanced problem-solving skills, and improved adaptability to change [11]. Hope serves as a motivational force, propelling individuals to set and pursue goals, envisioning a brighter future, and taking proactive steps to realize it. This sense of purpose and direction contributes significantly to a fulfilling and meaningful life.

Research underscores the association between hope and both current and future physical [12,13] and mental health [14,15]. Those with a hopeful outlook are inclined to adopt healthier behaviors, such as regular exercise and proper nutrition, contributing to overall well-being and longevity [16]. Hope emerges as a predictor of improved

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cardiovascular health and reduced mortality [17]. Furthermore, hopeful individuals are more likely to initiate and sustain social connections, a key factor in promoting health [18]. In the face of uncertainty, hope acts as a guiding light [19], aiding individuals in navigating ambiguity, providing a sense of direction and purpose even amid challenges or unknown outcomes[6]. These positive effects collectively serve as a deterrent against negative and destructive behaviors, including suicide, drug use, and violence [20–24].

Hope has consistently been associated with reduced substance use, acting as a potential buffer against the use of tobacco [25], marijuana [26], and alcohol [27]. The concept of hopelessness, on the other hand, may serve as one of the critical mechanisms through which depression fosters an increased likelihood of substance use. Individuals, both youth and adults, who possess a sense of hope are often found to be safeguarded against the initiation and continued use of these substances [27]. This protective role of hope suggests a vital area for intervention and support, highlighting the importance of fostering hopefulness as a preventive measure against substance abuse [28]. Despite this understanding, there remains a significant gap in our knowledge regarding the impact of hope on substance use among pre-adolescents. The scarcity of research in this particular demographic underscores the need for further studies to explore how early interventions aimed at cultivating hope could potentially deter the onset of tobacco, marijuana, and alcohol use in younger populations, setting the stage for healthier developmental trajectories.

This study aims to explore the psychosocial and behavioral correlates of hope in 9–10-year-old youth using data from the Adolescent Brain Cognitive Development (ABCD) study [29–33]. We first tested if hope correlates with future substance use. Then we investigated how age, gender, socioeconomic status, and various domains of stress correlate with hope. Next, we investigated whether hope is associated with behavioral problems, impulsivity, sensation seeking, cognitive function. Finally, we explored if hope correlates with blood pressure or body mass index.

2. Methods

2.1. Design and settings

This cross-sectional study was a secondary analysis of the ABCD study data [29–33]. Our analysis used data from wave 1 of the ABCD study, a national brain imaging study of adolescents [29,34]. The ABCD study includes a large, diverse national sample [29–33].

2.2. Participants and sampling

In the ABCD study, pre-adolescent participants were recruited from multiple cities across different states. The ABCD sample primarily relied on the recruitment of pre-adolescents from US school systems. Schools were selected based on their race, ethnicity, gender, socioeconomic status, and urbanicity data. More details of ABCD sampling are published elsewhere [35]. The original ABCD sample included 11,875 White, non-Hispanic Black, Hispanic, Asian, and mixed/other race/-ethnic groups of 9–10-year-old adolescents. A total number of 4631 youth entered our analysis.

2.3. Study variables

2.3.1. Hope

Using the kiddie schedule for affective disorders and schizophrenia (KSADS) [36], we used parental report regarding present hopelessness at baseline. This variable was coded as a dichotomous variable 1 for hope and 0 for lack of hope (hopelessness in the present). KSADS is commonly used as a structured interview for diagnosis of psychiatric disorders based on elements such as hopelessness and many other signs and symptoms [37].

2.3.2. Suicidal attempt

Past suicidal attempts were collected using parent reports, using KSADS [36].

2.3.3. Depression

Past history of depression was measured at baseline based on parent reports, using KSADS [36].

2.3.4. Substance use

Annual assessments of tobacco, marijuana, and alcohol use involved the iSay Sipping Inventory [38] for recent or first experimentation with nicotine products [32]. Follow-up questions on circumstances surrounding first use were administered at one time-point, however, such information was not included in our analysis. At Baseline (Y0), adolescents reported lifetime use of substances with a web-based Timeline Follow-Back (TLFB) [39] interview for substances used in the past six months (only for baseline evaluation at time 0) or since the last study session (for measures at months six, twelve, eighteen, twenty four, and thirty months). The analysis covered various substances, and Mid-Year phone follow-ups contributed to a comprehensive past-year substance use for each yearly follow-up. For the current analyses, substance use variables were defined as follows: Substance use at the level of experimentation included low-level tobacco (puffing), alcohol (sipping), or marijuana use (e.g., puffing). Substance use initiation, which was the outcome considered here, was reporting >1 puff of nicotine, marijuana, or more than a sip of alcohol. We created three separate variables that reflected new onset of tobacco, marijuana, and alcohol use that were captured six months or later after baseline.

Race. Race was a self-identified variable and a categorical variable: White (reference), Black, Asian, and Other/Mixed Race.

2.3.5. Age

Age was a continuous variable ranging from 9.01 to 10.99 years. Parents reported the age of the adolescents.

2.3.6. Gender

Gender was 1 for boys and 0 for girls. Family structure was 1 for married / partner and 0 for other.

2.3.7. Parental education

Parental education was a continuous measure ranging from 1 to 21. Participants were asked "What is the highest grade or level of school you have completed or the highest degree you have received?" Responses were 0 = Never attended/Kindergarten only; 1 = 1st grade; 2 = 2nd grade; 3 = 3rd grade; 4 = 4th grade 4; 5 = 5th grade; 6 = 6th grade 6; 7 = 7th grade 7; 8 = 8th grade; 9 = 9th grade; 10 = 10th grade 10; 11 = 11th grade; 12 = 12th grade; 13 = high school graduate; 14 = GED or equivalent diploma; 15 = some college; 16 = associate degree: occupational; 17 = associate degree: academic program; 18 = bachelor's degree; 19 = master's degree; 20 = professional school degree; and 21 = doctoral degree. This variable was an interval measure with a range between 1 and 21, with a higher score indicating higher parental educational attainment.

2.3.8. Family income

Family income was a 1–10 interval measure, where a higher score indicated a higher income. The total combined family income in the past 12 months was asked. Responses were 1 = less than $5000; 2 = $5000; 3 = $12,000; 4 = $16,000; 5 = $25,000; 6 = $35,000; 7 = $50,000; 8 = $75,000; 9 = $100,000; and 10 = $200,000.

2.3.9. Neighborhood income and disorder

Two Census based SES markers of residential areas were used for this study. Median neighborhood income (divided by USD5000) and Area Deprivation Index (ADI) [40]. These variables were available in the residential history file of the ABCD.

2.3.10. Neighborhood income

Derived from the ABCD residential history file, we used the neighborhood's median family income (for the first residential address as neighborhood SES). This is a component of the area deprivation index (ADI) developed by the Health Resources & Services Administration (HRSA). This is based on the neighborhood income of the county-level/census block group/neighborhood. Extensive research suggests that neighborhood income (median family income in the neighborhood) is a predictor of health.

2.3.11. Grade point average (GPA)

A five-item Likert scale was used for self-reported GPA. Higher scores were indicative of higher and lower scores were indicative of lower GPA.

2.3.12. Prosocial behaviors

The following three items were used to measure prosocial behaviors. I try to be nice to other people. I care about their feelings. I am helpful if someone is hurt, upset, or feeling sick. I often offer to help others (parents, teachers, children). Response items were on a three-level scale: 0 = Not True; 1 = Somewhat True; 2 = Certainly True. We calculated the mean of all items. This variable was treated as a continuous variable with a higher score indicative of more prosocial behaviors. This measure is a shortened measure of the Strengths and Difficulties Questionnaire (SDQ) by Goodman and colleagues [41].

2.3.13. Financial strain

Financial strain was measured by the following seven items: "In the past 12 months, has there been a time when you and your immediate family experienced any of the following:" 1)"Needed food but could not afford to buy it or could not afford to go out to get it?"; 2) "Were without telephone service because you could not afford it?"; 3)" Did not pay the full amount of the rent or mortgage because you could not afford it?"; 4) "Were evicted from your home for not paying the rent or mortgage?"; 5)"Had services turned off by the gas or electric company, or the oil company would not deliver oil because payments were not made?"; 6) "Had someone who needed to see a doctor or go to the hospital but did not go because you could not afford it?"; and 7) "Had someone who needed a dentist but could not go because you could not afford it?" Responses to each item were either 0 or 1. We calculated a sum score, a continuous measure with a potential range between 0 and 1, where a higher score showed higher financial strain (lower socioeconomic status) [42–48].

2.3.14. Discrimination

Discrimination was measured using seven items, at the end of one year follow up. One example item was "How often do the following people treat you unfairly or negatively because of your ethnic background?" Items ranged from 1 to5, with 1 referring to = almost never and 5 referring to very often. Participants were allowed to say they don't know or refuse to answer. The total score was an average of the items, ranging from 1 to 5, with a higher score indicating more discrimination [49].

2.3.15. Family conflict

Family conflict in this study was measured using the Family Environment Scale with nine items [50]. To complete this measure, adolescents report negative aspects of their relations with their parents and family. Items of this questionnaire measure the extent of fighting, anger, criticism, competitiveness, yelling, and/or loss of temper within the family [50]. The measure provides a continuous score with a higher score indicating higher conflict in the family. Cronbach's alpha of the family conflict measure was 0.681 overall. We calculated a mean score where high score was indicative of conflicting relation with the family [51].

2.3.16. Trauma (life adversities)

Parents were interviewed regarding the trauma experienced by the child. The Kiddie Schedule for Affective Disorders and Schizophrenia (K-SADS) [52] was used to measure trauma. This is a semi-structured interview aimed at the early detection of high-risk youth. The items included: (1) "A car accident in which your child or another person in the car was hurt bad enough to require medical attention", (2) "Another significant accident for which your child needed specialized and intensive medical treatment", (3) "Witnessed or caught in a fire that caused significant property damage or personal injury", (4) "Witnessed or caught in a natural disaster that caused significant property damage or personal injury", (5) "Witnessed or present during an act of terrorism (e. g., Boston marathon bombing)", (6) "Witnessed death or mass destruction in a war zone", (7) "Witnessed someone shot or stabbed in the community", (8) "Shot, stabbed, or beaten brutally by a non-family member", (9) "Shot, stabbed, or beaten brutally by a grown up in the home", (10) "Beaten to the point of having bruises by a grown up in the home", (11) "A non-family member threatened to kill your child", (12) "A family member threatened to kill your child", (13) "Witness the grownups in the home push, shove or hit one another", (14) "A grown up in the home touched your child in his or her privates, had your child touch their privates, or did other sexual things to your child", (15) "An adult outside your family touched your child in his or her privates, had your child touch their privates or did other sexual things to your child", (16) "A peer forced your child to do something sexually", and (17) "Learned about the sudden unexpected death of a loved one". Response items for each item were 0 (no) or 1 (yes). We counted the number of traumatic events, and, given the extreme skewness of the count of traumatic events, we calculated a variable as zero traumatic events, one traumatic event, and two or more traumatic events (Cronbach's alpha = 0.637) [53].

2.3.17. Impulsivity

We utilized the UPPS-P Impulsive Behavior Scale to measure 1) Negative Urgency, 2) Positive Urgency, 3) Sensation Seeking, 4) Lack of Planning, and 5) Lack of Perseverance [54]. Higher scores on these dimensions indicate greater impulsivity, reduced inhibition, and compromised emotion regulation [55].

2.3.18. Reward seeking

Employing the BIS/BAS Scales, we assessed BIS Sum (Behavioral Inhibition System), Reward Responsiveness, Drive, and Fun Seeking. Higher scores on these scales signify increased reward salience and sensitivity to reward [56–58].

2.3.19. Cognitive function

The Adolescent Brain Cognitive Development (ABCD) study utilizes the NIH Toolbox for the Assessment of Neurological and Behavioral Function (NIHTBX) to measure various aspects of cognition in participants [59]. This comprehensive battery of tests includes: 1) Picture Vocabulary, assessing receptive vocabulary and semantic knowledge; 2) Flanker, evaluating attention and inhibitory control; 3) List, measuring episodic memory through immediate and delayed recall tasks; 4) Card Sort, testing cognitive flexibility and problem-solving skills; 5) Pattern Comparison, assessing processing speed by requiring quick determination of whether two patterns are identical; 6) Picture Sequence Memory, evaluating episodic memory and sequential reasoning by having participants remember and reorder sequences of pictures; 7) Reading, measuring reading decoding skills, including phonemic awareness and word recognition; 8) Fluid Composite, assessing fluid intelligence through tasks that require problem-solving skills, pattern recognition, and logical thinking; 9) Crystallized Composite, reflecting accumulated knowledge and verbal abilities; and 10) Total Composite, providing an overall measure of cognitive function, combining elements from both fluid and crystallized intelligence tests. In the ABCD study, uncorrected scores for age are used, with higher scores indicating superior cognitive

functions. These measures are key to assessing memory and learning, general cognitive function and IQ, and executive function [60]. The broad and detailed cognitive testing battery enables researchers to gain a nuanced understanding of the cognitive profiles of youth, exploring the relationships between cognitive functions and a wide array of behavioral, environmental, and genetic factors.

2.3.20. Behavioral problems

The Child Behavior Checklist (CBCL) [61] is a widely used tool for assessing behavioral and emotional problems in children and adolescents. Developed by Achenbach, the CBCL provides a comprehensive evaluation of a wide range of behaviors, allowing for the identification of specific patterns of emotional and behavioral difficulties. It is designed for use with individuals aged 6–18 years and consists of various items that parents, caregivers, or teachers rate based on the child's behavior over the past six months. The checklist covers multiple domains, including internalizing problems (such as anxiety and depression), externalizing problems (such as aggression and rule-breaking behavior), and other problems, offering insights into social, thought, and attention problems. This tool is widely used and validated for clinical, research, and educational settings [62].

2.3.21. Body mass index (BMI) and blood pressure

Body mass index (BMI) was measured at baseline, Blood pressure was measured using conventional equipment, for up to three times. Average systolic and blood pressure was used.

2.4. Data analysis

We used Statistical Package for the Social Sciences (SPSS) for data analysis. A p-value equal or less than 0.05 was considered significant. For univariate analysis, n (%) and mean [standard deviations (SDs)] were reported for continuous and categorical variables respectively. We first explored associations between our predictor and outcomes in the overall sample using Pearson correlation test. The Mann-Whitney U test [63] was used for comparison of youth based on level of hope. The Mann-Whitney U test, also known as the Wilcoxon rank-sum test, is a non-parametric statistical test that is used to compare differences between two independent groups when the dependent variable is either ordinal or continuous, but not normally distributed. This test is an alternative to the independent samples t-test when the assumptions of the t-test are not met, particularly regarding the normality of distribution [64]. The Mann-Whitney U test is useful because it doesn't require the assumption of normality and is less affected by outliers and skewed distributions compared to the t-test. It provides a way to test the hypothesis that two samples come from the same distribution against the alternative hypothesis that they come from different distributions.

2.5. Ethical aspect

Our analysis was exempt from a full review. The ABCD study protocol, however, was approved by the University of California, San Diego (UCSD) Institutional Review Board (IRB) [34].

3. Results

Overall, 4631 youth entered our analysis. From this, 2389 (51.6%) participants were non-Latino White, 692 (14.9%) participants were non-Latino Black, 964 (20.8%) were Latino, 87 (1.9%) were Asian, 487 (10.5%) were mixed/other race, and 12 (.3%) were missing on race/ethnicity.

Table 1 shows descriptive data of the participants in the study overall and also based on past hope. Participants were 9,5 years old on average at baseline.

As shown by Table 2, baseline hopelessness was positively associated with tobacco (r = 042, p < 0.01) and marijuana (r = 057, p < 0.01) use.

Table 1

Descriptive data overall and by hope.

	Hopeful		Hopeless		All	
	Mean	SD	Mean	SD	Mean	SD
Age (Year)	9.51	0.51	9.38	0.49	9.51	0.51
Socioeconomic Status						
Parental Education	16.46	2.79	15.94	2.96	16.46	2.79
Income (1−10) *	7.11	2.45	6.06	2.72	7.10	2.46
Neighborhood Income	0.71	0.45	0.62	0.49	0.71	0.45
Neighborhood Area Deprivation Index*	92.91	24.89	97.76	27.55	92.94	24.91
Stress						
Financial Strain (n) *	0.07	0.16	0.12	0.18	0.07	0.16
Trauma (n) *	0.58	1.23	1.26	2.94	0.58	1.25
Family Conflict	0.73	1.02	1.00	1.23	0.74	1.02
Discrimination	1.22	0.46	1.47	0.84	1.22	0.46
Cognition (NIHTBX)						
Picture Vocabulary	84.30	8.07	82.32	8.12	84.29	8.07
Flanker	94.04	9.31	91.12	12.22	94.02	9.34
List	96.21	12.11	93.74	12.95	96.19	12.12
Card sort	92.57	9.54	83.15	13.81	92.51	9.62
Pattern	88.14	14.48	83.94	15.64	88.11	14.49
Picture	102.68	12.02	97.85	12.04	102.65	12.02
Reading	90.82	6.89	88.38	7.44	90.81	6.90
Fluid Composite	91.42	10.74	84.76	13.17	91.37	10.77
Crystal	86.25	7.00	84.30	7.35	86.24	7.00
Total composite	86.08	9.12	80.74	10.71	86.04	9.15
Grade Point Average (1−5)	4.36	1.09	4.29	0.83	4.36	1.09
Child Behavior Checklist (CBCL)						
Anxiety & Depression*	2.83	3.29	4.76	4.43	2.85	3.30
Withdraw Depressed*	1.13	1.81	2.53	2.45	1.14	1.82
Somatic Complaints	1.56	2.03	1.68	1.93	1.56	2.03
Social Problems*	1.69	2.32	3.71	3.00	1.71	2.33
Thought Problems*	1.65	2.23	3.79	3.45	1.66	2.25
Rule Breaking*	1.31	1.95	2.32	2.79	1.32	1.96
Attention Problems*	5.63	5.58	10.21	6.39	5.67	5.60
Aggressive Behaviors*	3.57	4.67	7.47	6.37	3.59	4.69
Total Behavioral Problems*	19.38	19.37	36.47	25.28	19.50	19.47
Prosocial Behaviors	5.06	1.10	4.94	1.15	5.06	1.10
UPPS-P						
Negative Urgency*	8.72	2.72	10.25	3.15	8.73	2.73
Positive Urgency*	8.29	3.08	9.36	3.25	8.30	3.08
Sensation Seeking*	9.79	2.74	10.29	2.51	9.80	2.74
Lack of Planning*	7.84	2.50	8.79	3.48	7.84	2.51
Lack of Perseverance*	7.12	2.34	7.96	3.10	7.12	2.35
BIS-BAS						
BIS Sum*	9.85	3.91	12.29	3.80	9.87	3.92
Reward Responsiveness	11.13	2.96	11.75	3.89	11.14	2.97
Drive	4.43	3.14	4.71	3.53	4.44	3.14
Fun Seeking*	5.90	2.74	6.43	2.97	5.90	2.74
Physical Health						
Body Mass Index (BMI)	19.62	44.45	20.06	4.86	19.62	44.29
Blood Pressure Systolic (mean)	102.76	10.60	101.62	8.77	102.75	10.59
Blood Pressure Diastolic (mean)	60.51	8.79	61.15	8.22	60.51	8.78

* p <0.05
Mann Whitney Test
UPPS-P: Urgency, Premeditation, Perseverance, Sensation Seeking, and Positive Urgency

BIS-BAS: Behavioral Inhibition and Behavioral Activation Scales
CBCL: Child Behavior Checklist

Table 2

Correlations between hopelessness, depression, and suicidality with substance use.

	Baseline Hopelessness	Baseline Depression	Baseline Suicidality
Future Tobacco Use	.042**	.024	.093**
Future Marijuana Use	.057**	−.002	.106**
Future Alcohol Use	.010	−.010	.041*

*p <0.05
**p <0.001
Pearson Correlation Test

Hopelessness was not associated with alcohol use of youth. Baseline depression was not correlated with future use of tobacco, marijuana, or alcohol. However, suicidality was positively associated with use of all substances over the follow up period.

As shown by Table 3, hope, depression, and suicidality were associated with each other.

As shown by Table 4, hope was associated with household income but not neighborhood income or neighborhood disorder, family structure, and parental education. Also, hope was not associated with age, gender, or puberty status.

As shown by Table 5, hope was associated with card sorting, fluid composite and total composite but not other aspects of cognitive function. Hope was also not correlated with youth GPA.

As shown by Table 6, Hope was found to be correlated with emotional adjustment measured by CBCL. The only CBCL domain with no correlation with hope was somatic complaints. Hope was not associated with Prosocial Behaviors

As Table 7 shows, hope was not associated with BMI, systolic blood pressure, or diastolic blood pressure.

As Table 8 shows, hope was not associated with BMI ($p > 0.05$), systolic blood pressure ($p > 0.05$), or diastolic blood pressure ($p > 0.05$). Baseline suicidality was associated with higher BMI ($r = .045$; $p < 0.01$).

4. Discussion

The study explored psychosocial and behavioral correlates of hope in pre-youth. Our study revealed that hope is inversely correlated with instances of marijuana and tobacco use over the following 36 months. We also found links between hope and high income (socio-economic factor), lower behavioral problems, higher cognitive function, and lower exposure to stressful life events and financial difficulties. Elevated hope was also linked to reduced impulsivity and sensation seeking.

First and foremost, our study established a longitudinal association between baseline level of hope and reduced instances of marijuana and tobacco use in the future. This significant observation indicates that higher levels of hope act as a protective factor against early initiation of substance use, emphasizing the potential preventive role of hope in deterring risky behaviors during adolescence. Studies have documented the protective effects of hope on hope; for example, in one study, hope

Table 3

Correlations between hopelessness, depression, and suicidality.

	Baseline Hopelessness	Baseline Depression	Baseline Suicidality
Hopeless, Present	1	.044**	.091**
Depression Past	.044**	1	.082**
Suicide Attempt Past	.091**	.082**	1

* p <0.05
**p <0.001
Pearson Correlation Test

Table 4

Correlations between hopelessness, depression, and suicidality with socioeconomic status, stressors, and demographic factors.

	Baseline Hopelessness	Baseline Depression	Baseline Suicidality
Married/ partnered	−.024	−.041**	−.057**
Parent education (1−21)	−.016	−.049**	−.039*
Household Income (1−10)	−.036*	−.054**	−.098**
Residential Household Income (Median)	−.017	−.063**	−.067**
Residential ADI	.017	.056**	.063**
Financial Strain	.028	.074**	.069**
Trauma (n)	.048**	.019	.035*
Family Conflict	.022	.024	.086**
Discrimination	.049**	.132**	.097**
Age	-.021	.008	-.007
Male	.027	.022	-.007
Puberty (Any)	.008	.048**	.057**

*p <0.05
**p <0.001
Pearson Correlation Test

Table 5

Correlations between hopelessness, depression, and suicidality with cognitive functions and school performance.

	Baseline Hopelessness	Baseline Depression	Baseline Suicidality
Picture Vocabulary	−.021	−.069**	−.036*
Flanker	−.027	−.026	−.011
List	−.018	−.057**	−.042**
Card Sort	−.084**	−.043**	−.069**
Pattern	−.025	−.029*	−.012
Picture	−.035*	−.033*	−.044**
Reading	−.030*	−.050**	−.029
Fluid Composite	−.053**	−.058**	−.052**
Crystal	−.024	−.068**	−.037*
Total Composite	−.050**	−.071**	−.052**
Grade Point Average (1−5)	−.007	−.039	.029

* p <0.05
** p <0.001
Pearson Correlation test

Table 6

Correlations between hopelessness, depression, and suicidality with behavioral problems and prosocial behaviors.

	Baseline Hopelessness	Baseline Depression	Baseline Suicidality
Anxiety & Depression	.050**	.072**	.071**
Withdraw Depressed	.066**	.051**	.060**
Somatic Complaints	.005	.045**	.046**
Social Problems	.074**	.090**	.092**
Thought Problems	.081**	.063**	.074**
Rule Breaking	.044**	.064**	.091**
Attention Problems	.070**	.074**	.084**
Aggressive Behaviors	.071**	.066**	.091**
Total Problems	.075**	.083**	.098**
Prosocial Behaviors	-.009	-.016	-.026

* p <0.05
** p <0.001
Pearson Correlation Test

was protective against a wide range of behavioral risks such as substance use [65]. Similarly, future orientation, a close correlated factor of hope, is associated with less substance use [66].

Our results also suggested that family income and exposure to stressful life events may predict hope levels. Higher family income associated with increased hope highlights socio-economic determinants influencing hope levels and emphasizes the potential impact of

Table 7

Correlations between hopelessness, depression, and suicidality with impulsivity and sensation seeking.

	Baseline Hopelessness	Baseline Depression	Baseline Suicidality
UPPS-P			
Negative Urgency	.051[**]	.127[**]	.134[**]
Positive Urgency	.031	.114[**]	.091[**]
Sensation Seeking	.016	.033	.070[**]
Lack of Planning	.034[*]	.008	.090[**]
Lack of Perseverance	.033	.009	.073[**]
BIS/BAS			
BIS Sum	.056[**]	.120[**]	.049[*]
Reward Responsiveness	.019	.084[**]	.034
Drive	.008	.088[**]	.073[**]
Fun Seeking	.018	.098[**]	.080[**]

* p <0.05
** p <0.001
Pearson Correlation Test

Table 8

Correlations between hopelessness, depression, and suicidality with blood pressure and body mass index.

	Baseline Hopelessness	Baseline Depression	Baseline Suicidality
Body Mass Index (BMI)	.001	.002	.045[**]
Blood Pressure Systolic (Mean)	−.010	.009	.025
Blood Pressure Diastolic (Mean)	.007	.008	.053

* p <0.05
** p <0.001
Pearson Correlation Test

mitigating trauma on fostering hope in youth. Thus, social context may be linked to hope and hopelessness [67–69]. Past research has also shown lower hope in low SES individuals and reduced hope in victims of trauma [70–72].

Another key finding underscores the relationship between hope and lower levels of impulsivity and sensation seeking. The study reveals that children with higher hope exhibit lower impulsivity and sensation-seeking behaviors, implying that instilling hope may play a role in shaping more measured and thoughtful decision-making processes during pre-adolescence. Past research has also shown that depression and associated hopelessness are associated with impulsivity and sensation seeking [73,74].

An interesting aspect of the study is the positive association between hope and cognitive function in specific domains. Another noteworthy observation pertains to the positive impact of hope on emotional well-being in 9–10-year-olds. The study indicates that higher levels of hope are linked with improved multiple domains of emotional functioning within this age group. This suggests that fostering hope early on could serve as a protective factor, contributing to a more positive emotional landscape during a critical developmental period. Past research has also shown a link between hopelessness and psychological distress [75]. Hopelessness theory of depression posits that hopelessness is core to depression [76]. Beck has also shown that negative view toward future (hopelessness) is a core element of depression [77].

However, we found no significant link between hopelessness and various indicators of physical health, such as BMI, blood pressure, or puberty in pre-youth. This absence of association, despite the well-documented connection between hopelessness, poor metabolic health, and depression in broader research [78], suggests that the detrimental health impacts of hopelessness may develop gradually over time. It implies that the negative effects on physical health associated with hopelessness become more pronounced and observable later in life [79], rather than during the early stages among youth. This conclusion points to the possibility that the consequences of hopelessness on physical

health emerge and intensify throughout the life course, highlighting a critical window during youth where interventions could potentially prevent the long-term health effects associated with hopelessness. One study suggested that hope is only linked to BMI in individuals with high in depression and anxiety [78]. These underscore the importance of early preventive measures and mental health support to mitigate the risk of developing serious health conditions associated with hopelessness as individuals age.

Finally, we should also acknowledge some other negative findings in this study. Hope was not associated with parental education, neighborhood income, perceived discrimination, or family conflict. As some research has shown that hope is linked to discrimination [80] and negative family relations [81], more research is needed on these issues.

4.1. Clinical and policy implications

The findings of this study bear significant implications for both policy and clinical practices. Clinically, interventions promoting hope could be integrated into youth mental health strategies to enhance emotional well-being and reduce the risk of substance use [82]. Public health programs may also use single-item measures of hopelessness as a screening tool for a wide range of social, behavioral, and emotional problems at schools and other settings where youth are available and can be targeted [83]. Public health programs may incorporate programs aimed at fostering hope in youth, especially those from lower-income families or exposed to traumatic events [84]. Hope is a key factor in fostering resilience, and implementing interventions and programs aimed at cultivating and bolstering hope can significantly enhance the resilience of young individuals in facing adversities. Given that low SES is linked to hopelessness, it is imperative to devise strategies for promoting healthy hope and optimism while mitigating pessimism among youth. Instead of relying on wishful thinking ("hopium"), concerted efforts should be made to instill genuine hope within low SES communities and schools. It is crucial to prioritize the enhancement of hope in clinics and services that cater to the needs of traumatized youth. Interventions focused on trauma may find additional benefits by incorporating curriculum elements designed to foster hope. Additionally, screening measures for substances such as tobacco should be particularly targeted towards youth exhibiting lower levels of hope. This comprehensive approach aims to build a foundation of hope and resilience, empowering young individuals to navigate challenges more effectively.

4.2. Limitations and strengths

It is essential to acknowledge a few limitations of the study. While the ABCD data provides valuable insights, the observational nature of our analysis limits our ability to establish causation [85]. Except for tobacco, marijuana, and alcohol use, other outcomes were measured simultaneously with hope. Additionally, other unexplored variables such as wealth, genetics, friends, or parenting may have influenced the observed associations [86]. Our study's key strengths included a substantial sample size, a diverse cohort, national coverage, a longitudinal approach, and a comprehensive investigation of numerous variables and constructs.

4.3. Future directions

Long-term follow-up studies and controlled experiments could provide more nuanced insights on the utility of hope as a resilient factor for prevention of youth substance use [87]. Research is also needed on the role of policies and school-based interventions that promote hope or screen hopelessness in youth [88,89]. There are still questions regarding gendered and racialized effects of hope in youth and adults [90]. Finally, neurobiological mechanisms by which hope protects individuals against substance use are still understudied [91].

5. Conclusion

In conclusion, this study made a significant contribution to our existing understanding of the role of hope on a wide range of well-being and behavioral measures of 9–10-year-old American youth. The identified associations between hope with socio-economic factors and traumatic events suggest that low SES youth in stressful contexts need most attention. Our results on the links between hope and emotional behavioral outcomes emphasize the potential for targeted interventions to foster hope for prevention of tobacco and marijuana use among youth. As we move forward, integrating these insights into both policy and clinical practice can pave the way for hope-based interventions as a strategy for substance use prevention of youth. The spillover effects of increasing youth hopefulness on their positive development should also be investigated.

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Declaration of Competing Interest

None.

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