

Emerging Adults' Stress and Health: The Role of Parent Behaviors and Cognitions

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Abstract Although parent behaviors and cognitions are important for stress/health outcomes throughout development, little research examines whether cognitions mediate the relationship between parent behaviors and stress/health outcomes. As a result, the current study examined the reports of 160 emerging adults regarding their mothers' and fathers' behaviors (via the Parental Bonding Instrument and Alabama Parenting Questionnaire), their cognitions (via the Stress Appraisal Measure, Negative Mood Regulation Scale, Life Orientation Test-Revised, General Self-Efficacy Scale, and Ruminative Response Scale-Abbreviated), and their stress/health outcomes (via the Perceived Stress Scale and Short-Form Health Survey). Results of this study suggested that emerging adults' cognitions partially mediated the relationship between their mothers' behaviors and their stress/health outcomes and fully mediated the relationship between their fathers' behaviors and their stress/health outcomes. Future research should examine parent behaviors as important distal variables in emerging adults' stress/health outcomes but should examine cognitions as more salient, immediate predictors of their stress/health outcomes.

Keywords Emerging adult · Stress · Health · Parent · Cognition

Introduction

Today's news media is replete with examples of health problems that are experienced by young people in the United States. Not surprisingly, research has demonstrated that stress

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plays a significant role in the onset and maintenance of such problems [1], with prolonged stress being detrimental to both health processes and behaviors (i.e., activities and lifestyle choices that impact physical disease processes) [2]. Current research also indicated that poor health behaviors and concomitant health problems increase from the late teen years through the early twenties [3], a developmental period called emerging adulthood [4]. Such findings suggest that it is important that we understand processes behind stress/health outcomes in this developmental group.

Parent behaviors and cognitions may play an important role in these processes, as they predict stress/health outcomes [5, 6] as early as childhood. Nonetheless, few studies have examined stress/health outcomes in the context of parent behaviors and cognitions, particularly in emerging adult populations. This dearth of literature is surprising given the health risks that emerging adults are experiencing as well as the salience of parent–child relationships throughout development and into emerging adulthood [7, 8]. In fact, parent behaviors and cognitions may serve as mechanisms of action in explaining stress/health outcomes, leading to the suggestion that controllable, epigenetic variables have the potential to increase prevention and intervention efforts for disease processes [9, 10]. As a result, these variables were examined in this study.

Parent Behaviors and Stress/Health

As already noted, research suggested that parent behaviors play a role in stress/health outcomes throughout children's development [11]. In fact, the relationship between parent behaviors and stress/health outcomes can be long-standing. For example, one study suggested that college males' perceptions of their relationships with their parents predicted their health outcomes (e.g., alcoholism, cardiovascular disease) 35 years later [12]. In this study, 91 % of participants who did not have a warm relationship with their mothers and 82 % of participants who did not have a warm relationship with their fathers had a diagnosed disease 35 years later (relative to 45 and 50 % of participants who had warm relationships with their mothers and fathers, respectively). In contrast, only 25 % of participants who had warm relationships with both their mothers and fathers had a diagnosed disease 35 years later (relative to 87 % of individuals who did not have such relationships). Surprisingly, these effects were independent of participants' marital, smoking, and family disease histories [12]. Given these findings, further understanding of parent behaviors in the realm of stress/health outcomes is warranted, particularly during high risk periods like emerging adulthood.

With regard to parent behaviors, attachment may be important to examine. Attachment first was described by Bowlby [13] and then categorized further by Ainsworth [14] and Main [15]. Although initial studies focused on attachment between infants and their parents, it is now understood that children, adolescents, and emerging adults maintain attachment to their parents as well. In fact, emerging adults' attachment to their parents predicts their stress responses, with college students who have better attachment to their parents exhibiting lower perceived stress and greater expected ability to manage their emotional functioning [16] as well as higher expectations for coping and mood regulation [10]. In turn, these expectations predicted lower stress outcomes, suggesting the importance of both parent behaviors and cognitions.

Beyond attachment, specific parent behaviors also may be important. Parent behaviors initially were categorized by Baumrind [17], with later individuals examining more specific parent behaviors [18]. Research suggested that both positive and negative parent behaviors are important for children's stress/health outcomes. With regard to positive

parent behaviors, consistency and predictability are likely key components in reduced stress responses, as less structure or consistency was related to increased anger, non-compliance, and stress-related hormones as well as to poorer health in children [19]. In addition, positive parenting and involvement increased experiences of mastery and perceptions of self-worth in children [20], both of which were important cognitive predictors of positive stress/health outcomes [21]. With regard to negative parent behaviors, severe punishment in the form of child abuse long has been recognized as a stressor for health and physiological development [22]. Harsh parenting also was associated with higher distress and higher heart rates in inner-city children [23]. Given such findings, emerging adults' perceptions of parent behaviors may be important to examine as well.

Cognition Mediators and Stress/Health Outcomes

Clearly, parent behaviors and children's cognitions are related. Research also noted that cognitions play an influential role in the onset of stress responses and health outcomes [24]. In particular, research suggested that the most important psychological component leading to stress is cognitive appraisal [25], especially individuals' evaluation of threat (i.e., primary appraisal) and ability to cope with threat (i.e., secondary appraisal) [24]. For example, one study of 81 men indicated that primary and secondary appraisals account for 35 % of the variance in their physiological stress response to the Trier Social Stress Test [9]. Primary and secondary appraisals also were related to particular stress/health variables (e.g., blood pressure reactivity, poorer health outcomes) [26], suggesting that appraisals may be important to consider here.

Beyond appraisals, research also examined outcome expectancies and other cognitions that can be related to individuals' interpretations of stress. For example, self-efficacy (i.e., whether individuals can manage situations using certain behaviors) [27] and locus of control (LOC; i.e., individuals' belief that an event's outcome is influenced by themselves [internal LOC] or by factors outside themselves [external LOC]) [28] may be important. Optimism also may be related to positive outcome expectancies as well as to mental and physical well-being [29], even over the long term (e.g., at two-year follow-up) [30]. In addition, Brosschot et al. [31] argued that perseverative cognitions or ruminating may lead to somatic and mental disease following perceived stressors, as research indicated that perseverative cognitions increase cardiovascular, immunological, and endocrinological markers of stress. It is still unclear, however, whether these outcome expectancies and other cognitions are important predictors of stress/health outcomes, particularly during emerging adulthood.

The Current Study

Given that epigenetic factors, such as parent behaviors and cognitions, interact with genetic expression and that early social variables have lasting effects on stress/health [32], uncovering the most salient predictors of emerging adults' stress/health is important for prevention and intervention over the long-term. Nonetheless, there is limited research on which parent behaviors and cognitions may be important predictors of emerging adults' stress/health outcomes. In addition, there is limited research examining these variables collectively and via path models, with no research having examined cognitions as mediators of the relationship between parent behaviors and stress/health outcomes. As a result, the current study (1) examined which parent behaviors and cognitions are important for predicting emerging adults' stress/health outcomes, (2) determined whether cognitions

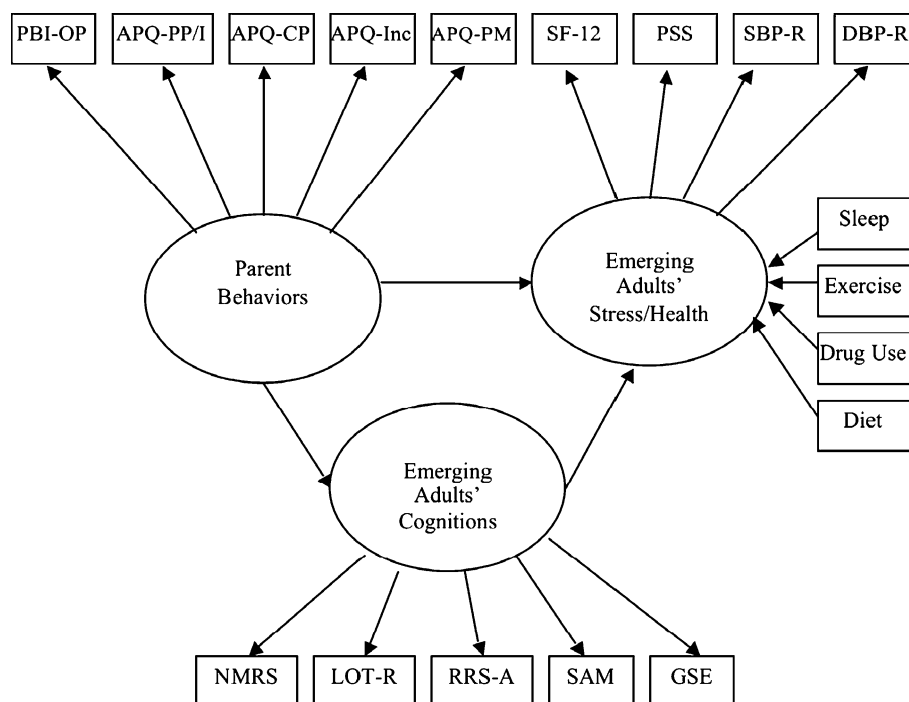


Fig. 1 Theoretical model. *PBI-OP* Overprotection, *APQ-PP/I* Positive Parenting/Involvement, *APQ-CP* Corporal Punishment, *APQ-Inc* Inconsistency, *APQ-PM* Poor Monitoring, *SF-12* 12-Item Short-Form Health Survey, *PSS* Perceived Stress Scale, *SBP-R* systolic blood pressure reactivity, *DBP-R* diastolic blood pressure reactivity, *NMRS* Negative Mood Regulation Scale, *LOT-R* Life orientation test-revised, *RRS-A* Ruminative response scale-abbreviated, *SAM* adjusted stress appraisal measure, *GSE* general self-efficacy scale

mediate the relationship between parent behaviors and stress/health outcomes, and (3) established a model of relationships among these variables.

To accomplish these goals, the pathways among parent behaviors, emerging adults' cognitions, and their stress/health outcomes were explored with structural equation modeling. The hypothesized model for this study is depicted in Fig. 1. In particular, it was hypothesized that parent behaviors would predict significantly emerging adults' stress/health outcomes, even when accounting for health behaviors. It also was hypothesized that more positive parent behaviors would predict more adaptive cognitions and that more adaptive cognitions would predict better stress/health outcomes. Finally, it was hypothesized that cognitions would mediate the relationship between parent behaviors and stress/health outcomes in path analyses.

Method

Participants

Participants were 181 18- to 20-year old undergraduates from a large Southeastern state university. Individuals in this age range were recruited because they were at the start of

emerging adulthood and likely still connected to their parents. Participation was not limited by any demographic characteristics, with the exception that participants had to be between 18- and 20-years of age. Some participants were excluded for other reasons, however. Five participants withdrew early, four participants did not provide answers to more than five of the cognition questions that were used, and 11 participants were excluded because they answered more than two validity questions incorrectly (see the “Measures” section). After these exclusions, 160 participants (114 females and 46 males; $M = 18.44$ -years, $SD = 0.71$ -years) provided complete data. This sample size was sufficient, as power analyses suggested that 140 participants were needed to provide adequate power for the path analyses that were conducted [33, 34].

The majority of participants self-reported their racial background to be Caucasian (67.5 %), with the remainder varying in their racial background (i.e., African American [13.1 %], Asian American [3.8 %], biracial [4.4 %], Indian [1.3 %], or some other background [10.0 %]). Participants also varied in their class standing (i.e., 73 % freshmen, 18 % sophomores, 7 % juniors, and 2 % seniors). Based on their average reports of health behaviors, participants were sleeping 7.5 hours per night ($SD = 1.22$) and exercising 54 minutes per day ($SD = 57.18$). For living situations, 53 % lived alone, 45 % lived with one or both of their biological parents, and 2 % lived with another relative or caregiver. Participants provided evidence that they were connected to their parents. For example, 45.0 % interacted with their mothers 0 to 30 minutes per day, 23.1 % interacted 30–60 minutes per day, 13.8 % interacted 1–2 hours per day, 7.5 % interacted 2–3 hours per day, and 6.3 % interacted 4 or more hours per day. Further, 62.5 % interacted with their fathers 0–30 minutes per day, 18.1 % interacted 30–60 minutes per day, 5.0 % interacted 1–2 hours per day, 6.3 % interacted 2–3 hours per day, and 3.1 % interacted 4 or more hours per day.

Measures

Validity Questions to Screen for Random Responding

Participants completed survey items designed to detect a random or quick response style. Ten statements were interspersed throughout the survey measures and consisted of statements such as “Select number two as your response to this item.” The statements were worded to be consistent in length and format with the Likert scales of adjacent survey questions. Participants who endorsed more than two responses that were incorrect based on the content of the item were excluded from data analyses.

Parent Behaviors

Participants completed the Overprotection scale from the *Parental Bonding Instrument (PBI)* [35, 36] as an indicator of *Parent Behaviors* in this study. The concurrent validity of the PBI is supported by strong associations with other parenting measures (e.g., Inventory of Parent and Peer Attachment, Parental Attachment Questionnaire) [35, 37]. The internal consistency of PBI subscales ranged from .87 to .94 in a previous study [38]. In this study, the Overprotection scale had a Cronbach alpha of .88 for mothers and .87 for fathers.

Participants also completed subscales from the child version of the *Alabama Parenting Questionnaire (APQ)* as a measure of their mothers and fathers’ behaviors [18] and also as indicators of *Parent Behaviors*. The child version has been used successfully with adolescents through the age of 18-years [39]. Given that parents continue to be important to

emerging adults [7, 8], it was felt that the APQ also would be helpful for assessing emerging adults' perceptions of their parents. The APQ had acceptable criterion, convergent, and discriminant validity in previous studies, showing parent-child correspondence and being able to discriminate those families with children who had disruptive behavior disorders from those who did not [18].

The Positive Parenting subscale, which had an internal consistency of .74 in a previous study [18], assesses parents' encouragement and reinforcement. The Involvement subscale, which had an internal consistency of .72 for ratings of mothers and .83 for ratings of fathers in a previous study, assesses the helpful and friendly time that parents spent with their children. The Positive Parenting and Involvement subscales have been correlated highly and may measure the same underlying construct [18]. Similarly, in the current study, they were correlated highly and were summed to create one Positive Parenting/Involvement subscale. This composite subscale had a Cronbach alpha of .91 for ratings of mothers and .90 for ratings of fathers.

The Poor Monitoring/Supervision subscale, which had an internal consistency of .69 in a previous study [18], assesses the degree to which parents supervise and monitor their children. In the current study, this subscale had a Cronbach alpha of .82 for mothers and .81 for fathers. Further, the Inconsistent Discipline subscale, which had an internal consistency of .56 in a previous study [18], measures parents' follow-through and consistency during discipline. In the current study, this subscale had a Cronbach alpha of .70 for mothers and .64 for fathers.

The Corporal Punishment subscale, which had an internal consistency of .44 in a previous study [18], assesses the frequency of hitting or spanking as part of discipline. Despite this subscale's low internal consistency, it contributed significantly to discriminating children with disruptive behavior disorders from those without such disorders. This subscale's low internal consistency may be related to its small number of items that assess three different physical punishments (i.e., spanking, slapping, and the use of objects for hitting). As a result, four additional items were created for the current study (i.e., having a hand smacked, having a bottom swatted, physical punishment being used, and being hit with a nearby object). In this study, this expanded subscale had a Cronbach alpha of .89 for mothers and .88 for fathers.

Cognitions

Participants completed the *Stress Appraisal Measure (SAM)* as a measure of their subjective, situation-specific perception of stress [40]. A total score derived from select items on the SAM served as an indicator of *Emerging Adults' Cognitions* and was scored so that a higher total SAM score indicated higher perceptions of threat, stressfulness, and an inability to cope. The 28 items on the SAM also can be used to derive three dimensions of appraisal (i.e., primary appraisal, secondary appraisal, stressfulness). The SAM has support for theoretical and psychometric validity [41], and Cronbach alphas are adequate (.65–.86) [40, 41]. For this study, the total SAM score had a Cronbach alpha of .88. In the current study, emerging adults' perceptions of the *Trier Social Stress Test (TSST)* [42] were assessed.

The TSST is a standardized protocol that induces physiological and psychological increases in stress scores, with cardiovascular responses being exhibited by 70–80 % of participants [9, 42]. The TSST consists of informing participants 10 minutes prior to the task that they will have to present an impromptu speech to a panel of unknown individuals regarding suitability for a desired job. Participants then are asked to complete a mental

arithmetic task aloud. For the purposes of this study, participants were asked to discuss their suitability for college in front of a video camera that purportedly fed to a panel of judges (rather than a live panel of judges). The impromptu speech and mental arithmetic task each lasted for 5 minutes.

Emerging adults completed the *Negative Mood Regulation Scale (NMRS)* as a measure of their outcome expectancy and emotional self-efficacy regarding regulation of negative moods [43] and as an indicator of *Emerging Adults' Cognitions*. The total NMRS score was scored such that higher scores indicated greater expectancies of coping. The 30 items of the NMRS also produce three subscales (i.e., the Cognitive subscale measures expectancies of coping with negative moods using effective thoughts, the Behavioral subscale measures expectancies of coping with negative moods using effective behaviors, and the General subscale measures expectancies of coping with negative moods). Measures for the internal consistency (.86–.92) and temporal stability (.67–.78 across a 6- to 8-week interval) of the NMRS were adequate in a previous study [43]. In this study, the Total NMRS scale had a Cronbach alpha of .88.

Participants completed the *Life Orientation Test-Revised (LOT-R)* as a measure of their dispositional optimism (or generalized expectancies of positive and negative outcomes) [44] and as an indicator of *Emerging Adults' Cognitions*. The LOT-R consists of six target items (and four filler items) rated on a 5-point Likert scale, with a higher overall score indicating higher optimism. The internal consistency of the revised scale during development was .78, and the test–retest reliability was .79 over a 28-month interval. In this study, the Cronbach alpha was .78.

Participants completed the *General Self-Efficacy Scale (GSE)* as a measure of their expectation of performing competently [45, 46] and as an indicator of *Emerging Adults' Cognitions*. This scale's original 20 German items were reduced to ten items and translated into English [46]. These items are rated on a 4-point Likert scale, with higher scores indicating higher self-efficacy. This measure had adequate internal consistency (.75–.91) and stability (.55–.75 over a year) in a previous study [45]. In this study, the GSE score had a Cronbach alpha of .83.

Finally, participants completed the 10-item *Ruminative Response Scale-Abbreviated (RRS-A)* as a measure of their perseveration about difficulty with stressors [47, 48] and as an indicator of *Emerging Adults' Cognitions*. The internal consistency of the RRS-A was .88 in a previous study. Further, both the distraction and rumination subscales of this measure were associated with distress [49]. In this study, the RRS-A total score had a Cronbach alpha of .88.

Stress/Health Outcomes

Participants completed the *Perceived Stress Scale (PSS)* as a measure of global appraised stress [50] and as an indicator of *Emerging Adults' Stress/Health*. Its internal consistency (.84–.86) and temporal stability (.55–.85 across a 6-week interval) was adequate in a previous study. The PSS was a better predictor of health outcomes than the number and impact of life events [50]. In this study, the PSS score had a Cronbach alpha of .79.

Participants also completed the *12-Item Short-Form Health Survey (SF-12)* as a brief measure of their physical and mental health [51] and as an indicator of *Emerging Adults' Stress/Health*. The 12 items of the SF-12 produce eight subscales (i.e., Physical Functioning, Role–Physical, Bodily Pain, General Health, Vitality, Social Functioning, Role–Emotional, and Mental Health) using norm-based scoring. Support was noted for the temporal stability of the SF-12 (.63–.91 across all subscales over a 2-week interval) [51].

The intraclass correlation coefficient ranged from .75–.84 in an online study of the SF-12 [52]. In this study, the eight subscales of the SF-12 were standardized and averaged to create one overall scale of physical and mental health. In the current study, the total SF-12 scale had a Cronbach alpha of .79.

Participants' *blood pressure reactivity* was measured both prior to and following the TSST [42]. Participants' systolic blood pressure (SBP) and diastolic blood pressure (DBP) were measured according to methodology in previous studies of blood pressure reactivity [53, 54]. Specifically, SBP and DBP were measured using an automated sphygmomanometer fitted to an appropriate sized arm cuff. To establish a baseline, blood pressure was measured every 2 minutes for 20 minutes while the participants were completing surveys. Baseline measures did not begin until participants had been completing surveys for 10 minutes to allow for acclimation to the laboratory. The baseline measures were averaged to produce one baseline score for each SBP and DBP. Blood pressure also was measured every 2 minutes during the preparation and execution of the TSST. The average of these responses was calculated to produce one blood pressure reaction score for each SBP and DBP. Blood pressure reactivity was calculated by subtracting the baseline score from the response score for each SBP and DBP. SBP and DBP scores were indicators of *Emerging Adults' Stress/Health*.

Participants completed the *Adult Health Behaviors Questionnaire (AHBQ)* as a measure of their health behaviors. The AHBQ is a subsection of the National Health Interview Survey, which was developed to assess a variety of factors related to health [55]. The AHBQ assesses specific health behaviors with 25 questions regarding cigarette use, sleep habits, alcohol use, body mass and height, and physical activity. Normative data on these health behaviors are provided by the USDHHS [56] based on a sample of 31,000 adults. These health behaviors significantly predict health outcomes [57]. Three scores were derived by combining three different domains of questions for drug-use, exercise habits, and sleep.

Demographic and Lifestyle Information

Participants completed a demographics measure to assess their demographic characteristics. In addition, this questionnaire included five questions about negative dietary habits (e.g., consumption of fried foods) to assess for nutritional influences on stress/health that were not on the AHBQ. Participants' responses were combined into one score representing their number of meals per week that contained unhealthy foods.

Procedure

After receiving Institutional Review Board (IRB) approval, participants were recruited from undergraduate psychology classes and scheduled their data collection session using an online system in the Department of Psychology. To control for extraneous influences on blood pressure readings, participants were asked to refrain from exercise, caffeine or alcohol consumption, and tobacco use in the 3 hours prior to the study. Upon arrival at the session, participants reviewed and signed a consent form. Next, they completed their measures via an online server in approximately 1 hour. Then, participants were informed about the TSST and completed the SAM about their appraisal of threat from this task. They were given scratch paper and 5 minutes to prepare their speeches. Finally, they performed the TSST task. At the end of the session, participants were debriefed and given extra credit toward a Psychology class.

Results

Using SPSS for Windows 11.5, all data were screened for violations of normality, outliers, missing data, linearity, and multicollinearity or singularity. SPSS was used to calculate correlations, and STATISTICA was used for structural equation modeling/path analyses. Analyses were conducted at alpha levels of .05, unless otherwise noted. Although some scores showed a slightly skewed or kurtotic distribution (values > 1), only the scores on the AHBQ and demographic health questions showed substantial skewness or kurtosis (values > 2). Nonetheless, the scores appeared typical given normative values [56] and were retained in the data analyses. Data screening revealed that, after removing cases with several omitted responses ($n = 4$), no case contained more than five omitted responses. Therefore, missing data points were replaced with the mean for endorsed items on each respective measure.

Descriptive Statistics

The central tendency and dispersion of all scores were examined. See Table 1. Regarding the PBI, participants rated their mothers and fathers moderately on the Overprotection scale relative to the range for this measure, with mothers scoring significantly higher than fathers. Although average scores on the APQ have not been established previously for this age group, participants in this study rated their mothers and fathers highly on the Positive

Table 1 Means and standard deviations for study measures

Variables	Range	<i>Mother</i>		<i>Father</i>		<i>t</i>	
		M	SD	M	SD		
<i>Emerging adults' ratings of parent behaviors</i>							
PBI-Overprotection (PBI-OP)	0–37, 0–37	27.28	7.58	25.94	7.48	2.02	*
APQ-Positive Parenting/Involvement (APQ-PP/I)	28–79, 18–77	59.12	11.56	52.64	11.91	7.08	***
APQ-Inconsistency (APQ-Inc)	7–26, 6–25	15.78	3.83	14.72	3.90	3.82	***
APQ-Expanded Corporal Punishment (APQ-CP)	7–32, 7–35	12.46	5.41	12.21	5.56	.27	
APQ-Poor Monitoring (APQ-PM)	10–43, 10–48	25.14	6.71	26.82	6.93	–4.40	***
<i>Emerging adults' ratings of their own cognitions</i>							
Total Negative Mood Regulation Scale (NMRS)	56–146	110.64	14.95				
Life Orientation Test-Revised (LOT-R)	6–24	16.37	3.80				
General Self-Efficacy Scale (GSE)	20–40	32.89	3.41				
Ruminative Response Scale-Abbreviated (RRS-A)	10–40	22.79	6.33				
Adjusted Stress Appraisal Measure (SAM)	23–75	43.07	9.91				
<i>Emerging adults' ratings of their own stress/health</i>							
Perceived Stress Scale (PSS)	3–44	21.62	6.25				
12-Item Short-Form Health Survey (SF-12)	42–97	82.65	9.55				

PBI Parental Bonding Instrument, *APQ* Alabama Parenting Questionnaire

Parenting/Involvement composite. Nonetheless, scores for mothers were higher than for fathers. Participants rated their mothers and fathers moderately on the Inconsistency and Poor Monitoring scales. Nonetheless, they rated their mothers higher on the Inconsistency scale but their fathers higher on the Poor Monitoring scale. Participants also rated their mothers and fathers low in Corporal Punishment, with mothers and fathers receiving similar scores.

Participants' NMRS scores indicated significantly higher self-efficacy and expectation of regulating negative mood, $t(159) = 9.50, p < .001$, than the average undergraduate respondent from the normative study ($M = 99.41, SD = 14.33$) [43]. Similarly, participants' LOT-R scores indicated significantly higher optimism, $t(159) = 6.78, p < .001$, than that experienced by the average undergraduate respondent in a previous study ($M = 14.33, SD = 4.28$) [44]. Participants' GSE scores also indicated significantly higher self-efficacy, $t(159) = 13.40, p < .001$, than that experienced by the average undergraduate respondent in a previous study ($M = 29.28, SD = 5.22$) [46]. In contrast, participants' RRS-A scores revealed similar self-reports of ruminative thinking relative to the average undergraduate respondent in a previous study ($M = 21.70, SD = 6.60, t[45] = 16.48, p < .001$ for males; $M = 23.60, SD = 6.20, t[113] = 20.00, p < .001$ for females) [47]. Finally, relative to the range for SAM scores, participants' average score was moderate.

Finally, participants' PSS scores indicated significantly lower perceived stress, $t(159) = -3.16, p < .002$, than that experienced by the average undergraduate respondent in a previous study ($M = 23.18, SD = 7.31$) [50]. On the SF-12, participants' reported significantly better health than that of the normative sample ($M = 76.82, SD = 24.93, t(159) = 7.73, p < .001$) [58].

Correlations Among Indicator Variables

Correlations were used to examine the relationships among the variables in this study. Only those that remained significant after a Bonferonni correction of $p < .0005$ are discussed. See Table 2. Consistent with hypotheses, some parent behaviors were correlated significantly with emerging adults' cognitions. For example, more maternal Positive Parenting/Involvement (APQ) was related significantly to greater expectancy of mood regulation (NMRS) and more optimism (LOT-R). Less paternal Overprotection (APQ) was related to less ruminative thinking (RRS-A). Also consistent with hypotheses, some parent behaviors were related significantly with emerging adults' stress/health outcomes. For example, less maternal Overprotection (APQ) was related significantly to lower perceived stress (PSS) and greater overall health (SF-12). Finally, the study hypotheses also were supported in that cognition measures were related to emerging adults' stress/health outcomes. For example, more optimism (LOT-R) and less ruminative thinking (RRS-A) were related to lower levels of participants' overall perceived stress (PSS), and greater expectancy of mood regulation (NMRS), more optimism (LOT-R), and less ruminative thinking (RRS-A) were related to greater overall health (SF-12).

Structural Equation Modeling

Latent Constructs and Their Indicators

To examine the hypotheses that parent behaviors would predict emerging adults' cognitions and stress/health outcomes and that the relationship between parent behaviors and

Table 2 Correlations among indicator variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. M.PBI-OP	–										
2. M.APQ-PP/I	–.21*	–									
3. M.APQ-CP	.29**	–.19*	–								
4. M.APQ-Inc	.13	–.23**	.01	–							
5. M.APQ-PM	–.18*	–.38**	–.02	.43**	–						
6. FPBI-OP	.39**	–.26**	.11	–.03	–.12	–					
7. F.APQ-PP/I	–.08	.51**	–.10	–.11	–.16*	–.19**	–				
8. F.APQ-CP	.01	–.13	.52**	.02	.08	.19**	–.15	–			
9. F.APQ-Inc	.11	–.06	–.07	.53**	.34**	–.01	.06	–.10	–		
10. F.APQ-PM	–.14	–.20**	.00	.33**	.80**	–.23**	–.31**	.10	.36**	–	
11. NMRS	–.21**	.34**	–.19*	–.10	–.11	–.29**	.26**	–.08	.03	–.13	–
12. LOT-R	–.19*	.34**	–.09	.04	–.12	–.20**	.27**	–.17*	.04	–.09	.56**
13. RRS-A	.27**	–.18*	.17*	.20**	.05	.36**	–.06	.01	.04	.01	–.65**
14. Adj-SAM	.09	–.20**	–.10	.08	.08	.14	–.26**	–.08	.07	.13	–.29**
15. PSS	.42**	–.24**	.17*	.12	.12	.29**	–.14	–.03	.13	.12	–.54**
16. SF-12	–.32**	.24**	–.20**	–.17*	–.15*	–.27**	.22**	–.02	–.16*	–.23**	.50**
17. SBP-R	–.06	.02	.06	.00	.01	–.14	.02	.01	–.06	.00	.05
18. DBP-R	–.06	–.01	.10	–.10	–.03	–.18*	–.02	.08	–.08	.01	.03
19. Sleep	–.17*	.10	–.21**	.00	.06	.02	–.16*	.08	–.01	.14	.04
20. Exercise	–.17*	.05	–.21**	.10	.15	–.15	–.02	.05	–.01	.08	.24**
21. Drug Use	–.06	–.09	–.15	.21**	.32**	.10	–.04	–.10	.12	.15	–.03
22. Poor Diet	.03	–.14	–.04	.03	.06	–.05	–.11	.01	–.07	–.02	–.02

Table 2 continued

	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.
1. M.PBI-OP											
2. M.APQ-PP/I											
3. M.APQ-CP											
4. M.APQ-Inc											
5. M.APQ-PM											
6. F.PBI-OP											
7. F.APQ-PP/I											
8. F.APQ-CP											
9. F.APQ-Inc											
10. F.APQ-PM											
11. NMRS											
12. LOT-R											
13. RRS-A	-.40**										
14. Adj-SAM	-.37**	.26**									
15. PSS	-.50**	.54**	.31**								
16. SF-12	.37**	-.45**	-.19*	-.67**							
17. SBP-R	.03	-.11	-.11	-.18*	.11						
18. DBP-R	-.06	-.14	-.10	-.16*	.10	.74**					
19. Sleep	.08	-.10	.09	-.20**	.16	-.11	-.04				
20. Exercise	.03	-.20**	-.09	-.21**	.21**	-.09	-.07	.17*			
21. Drug Use	-.05	.10	.03	.11	-.12	-.19*	-.15	.09	.14		
22. Poor Diet	-.09	.13	-.09	.05	-.05	-.03	-.08	-.09	.03	.15	

Scales regarding mothers are denoted with the prefix "M." and scales regarding fathers are denoted with the prefix "F."

PBI-OP Overprotection, *APQ-PP/I* Positive Parenting/Involvement, *APQ-CP* Corporal Punishment, *APQ-Inc* Inconsistency, *APQ-PM* Poor Monitoring, *NMRS* Negative Mood Regulation Scale, *LOT-R* Life Orientation Test-Revised, *RRS-A* Ruminative Response Scale-Abbreviated, *Adj-SAM* adjusted Stress Appraisal Measure, *PSS* Perceived Stress Scale, *SF-12* 12-Item Short-Form Health Survey, *SBP-R* systolic blood pressure reactivity, *DBP-R* diastolic blood pressure reactivity

* $p < .05$; ** $p < .01$. Those correlations that remain significant after a Bonferroni correction of $p < .0005$ is applied are in bold type

stress/health outcomes would be mediated by emerging adults' cognitions, structural equation modeling was used. The hypothesized path model consisted of three latent constructs (i.e., Parent Behaviors, Emerging Adults' Cognitions, and Emerging Adults' Stress/Health). The hypothesized model also contained four exogenous manifest variables related to Emerging Adults' Stress/Health (i.e., sleep, drug use, poor diet, and exercise). The PBI Overprotection subscale and four APQ subscales were indicators for *Parent Behaviors*. The total scores from the NMRS, LOT-R, GSE, RRS-A, and SAM were indicators for *Emerging Adults' Cognitions*. The scores from the PSS, SF-12, and blood pressure reactivity (both SBP and DBP) were indicators for *Emerging Adults' Stress/Health*, the dependent variable in the path model. Therefore, Parent Behaviors was indicated by five variables, Emerging Adults' Cognitions was indicated by five variables, and Emerging Adults' Stress/Health was indicated by four variables. See Fig. 1. Mother and father models were examined.

Model Analyses

The generalized least squares to maximum likelihood method of estimating population parameters was used. Goodness of fit was examined using three indicators of model fit. The comparative fit index (CFI) suggests acceptable model fit at .90 or greater [59]. A value of .10 or less was deemed acceptable for the root mean squared error of approximation (RMSEA) [34]. Finally, the parsimonious fit index (PFI) suggested sufficient parsimony at .60 or greater [60]. Chi-square tests were used to compare nested mediational models to non-mediated models. As recommended by Anderson and Gerbing [61], a two-stage modeling approach was used to avoid misinterpretations of relationships between latent constructs from inappropriate measurement. In stage one, latent constructs were permitted to correlate freely, creating a measurement model that was examined for adequate assessment of latent variables. In stage two, relationships among latent variables were tested using structural analysis.

Measurement and Structural Models

Correlation matrices served as the input data for all model analyses. The initial measurement models failed to fit the data adequately (RMSEA > .10, CFI < .90) or resulted in failure to run due to singularity. Therefore, the measurement models for both mothers and fathers were respecified by removing variables that did not relate clearly to their respective latent construct or that overlapped with other manifest variables. For example, the APQ Poor Monitoring scale was removed due to its theoretical overlap with the PBI Overprotection subscale, the GSE total score was removed as an indicator from the Cognitions latent variable due to its overlap with the NMRS total score, and all four health behaviors were removed because they did not relate significantly to Stress/Health (all $ps < .83$).

Blood pressure reactivity also related to several Stress/Health indicators, but in a direction that was opposite to what was predicted. This unexpected finding made interpretation of the Stress/Health construct unclear (i.e., PSS and SF-12 scores suggested that the construct represented positive stress/health, whereas blood pressure reactivity suggested that the construct represented poor stress/health). Therefore, blood pressure was removed during respecification.

Following respecification, the mother measurement model fit the data adequately. Further, all indicator variables related significantly to their respective latent constructs (all $p < .02$). Similarly, following respecification, the father measurement model fit the data

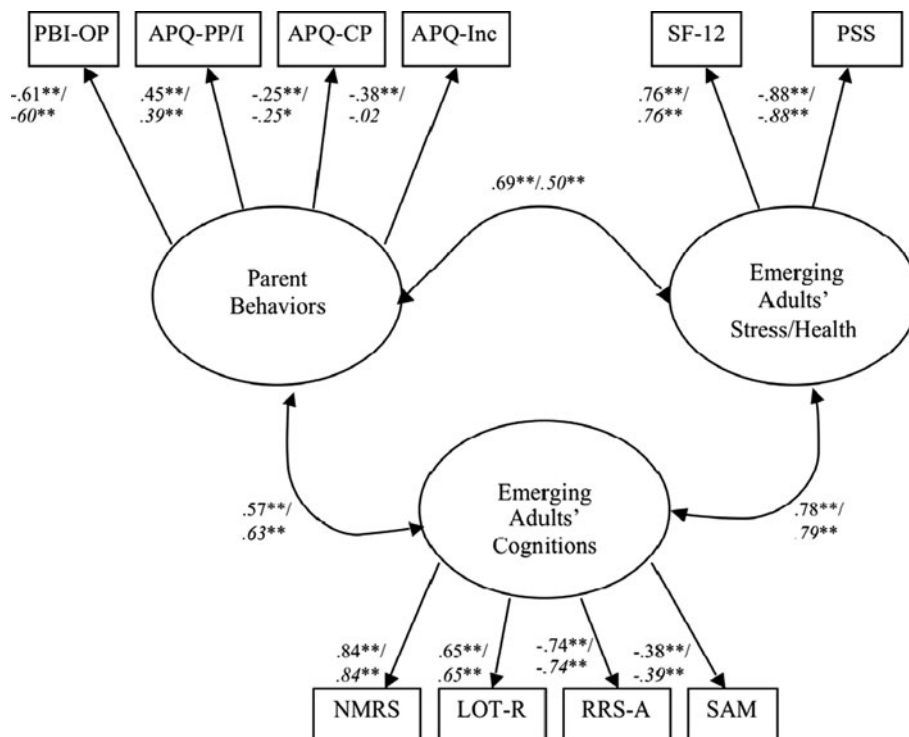


Fig. 2 Measurement model. $*p < .05$; $**p < .01$. Values for the mother model are in *regular type*, whereas values for the father model are *italicized*. Disturbances and measurement error effects are omitted for clarity. *PBI-OP* Overprotection, *APQ-PP/I* Positive Parenting/Involvement, *APQ-CP* Corporal Punishment, *APQ-Inc* Inconsistency, *SF-12* 12-Item Short-Form Health Survey, *PSS* Perceived Stress Scale, *NMRS* Negative Mood Regulation Scale, *LOT-R* Life orientation test-revised, *RRS-A* Ruminative response scale-abbreviated, *SAM* adjusted stress appraisal measure

adequately. All indicator variables related significantly to their respective latent constructs (all $p < .02$), with the exception of the APQ Inconsistency subscale ($p < .83$). As the model maintained adequate fit when the Inconsistency subscale remained in the analysis, the Inconsistency subscale was left in the model so that equitable comparisons could be made between the mother and father models. It should be noted that the indicator variables for Parent Behaviors were constrained so that Positive Parenting/Involvement loaded positively and Corporal Punishment, Inconsistency, and Poor Monitoring loaded negatively onto the construct. Thus, Parent Behaviors represents more positive parent behaviors. See Fig. 2 for the measurement model and Table 3 for fit indices.

Summary of Structural Equation Models

Correlations among the latent constructs in each model were examined to test the study hypotheses. All hypotheses were supported in the measurement models. More specifically, Parent Behaviors related significantly to Emerging Adults' Cognitions in both models ($r = .57$, $p < .001$, for mothers; $r = .63$, $p < .001$, for fathers), with more positive parent behaviors associated with more adaptive cognitions. Parent Behaviors also related significantly to Emerging Adults' Stress/Health in both models ($r = .69$, $p < .001$, for

Table 3 Fit indices for model analyses

Test	χ^2	df	RMSEA	CFI	PFI
<i>Measurement models</i>					
Respecified models					
Maternal model	64.74	32	.08	.93	.61
Paternal model	67.80	32	.08	.91	.60
<i>Structural models</i>					
Hypothesized models					
Maternal model	64.74	40	.06	.94	.77
Maternal nested model	72.40	41	.07	.93	.77
Paternal model	67.80	40	.07	.93	.75

$N = 159$ for the maternal models; $N = 154$ for the paternal models; nested models testing mediation provided significant improvement in model fit according to the Chi-square difference test ($\Delta\chi^2 = 7.66$, $df = 1$, $p < .01$)

mothers; $r = .50$, $p < .001$, for fathers), with more positive parent behaviors associated with healthier levels of stress/health. Finally, Emerging Adults' Cognitions related significantly to Emerging Adults' Stress/Health in both models ($r = .78$, $p < .001$, for mothers; $r = .79$, $p < .001$, for fathers), with more adaptive cognitions associated with healthier states in stress/health.

Using the path coefficients for the manifest variables determined by the measurement models, the structural models were analyzed for data fit, for significant pathways among latent constructs, and for mediation effects. See Fig. 3 for the measurement model. The mother-structural model fit the data adequately. Moreover, mothers' Parent Behaviors predicted significantly both Emerging Adults' Cognitions (path coefficient = .57, $p < .001$) and Emerging Adults' Stress/Health (path coefficient = .36, $p < .003$). Likewise, Emerging Adults' Cognitions predicted significantly Emerging Adults' Stress/Health (path coefficient = .58, $p < .001$). In other words, all paths among latent constructs were significant in the mother structural model.

A nested model was used to test whether Emerging Adults' Cognitions mediated the relationship between mothers' Parent Behaviors and Emerging Adults' Stress/Health. A model in which the path from mothers' Parent Behaviors to Emerging Adults' Stress/Health was constrained to zero was analyzed. This constrained model fit the data adequately and maintained significant paths from mothers' Parent Behaviors to Emerging Adults' Cognitions (path coefficient = .63, $p < .001$) and from Emerging Adults' Cognitions to Emerging Adults' Stress/Health (path coefficient = .82, $p < .001$). Moreover, the difference in Chi-square statistics between the constrained and non-constrained model was large ($\Delta\chi^2 = 7.66$, $df = 1$, $p < .01$), indicating a mediation effect. The significant relationship between mothers' Parent Behaviors to Emerging Adults' Stress/Health indicated, however, that Emerging Adults' Cognitions did not mediate this relationship fully. Thus, cognitions were a partial mediator.

The father structural model fit the data adequately. Fathers' Parent Behaviors did not predict significantly Emerging Adults' Stress/Health (path coefficient = .01, $p = .98$) but did predict significantly Emerging Adults' Cognitions (path coefficient = .63, $p < .001$). In addition, Emerging Adults' Cognitions predicted significantly Emerging Adults' Stress/Health (path coefficient = .78, $p < .001$). The relationship between fathers' Parent Behaviors and Emerging Adults' Stress/Health was non-significant in this model. This

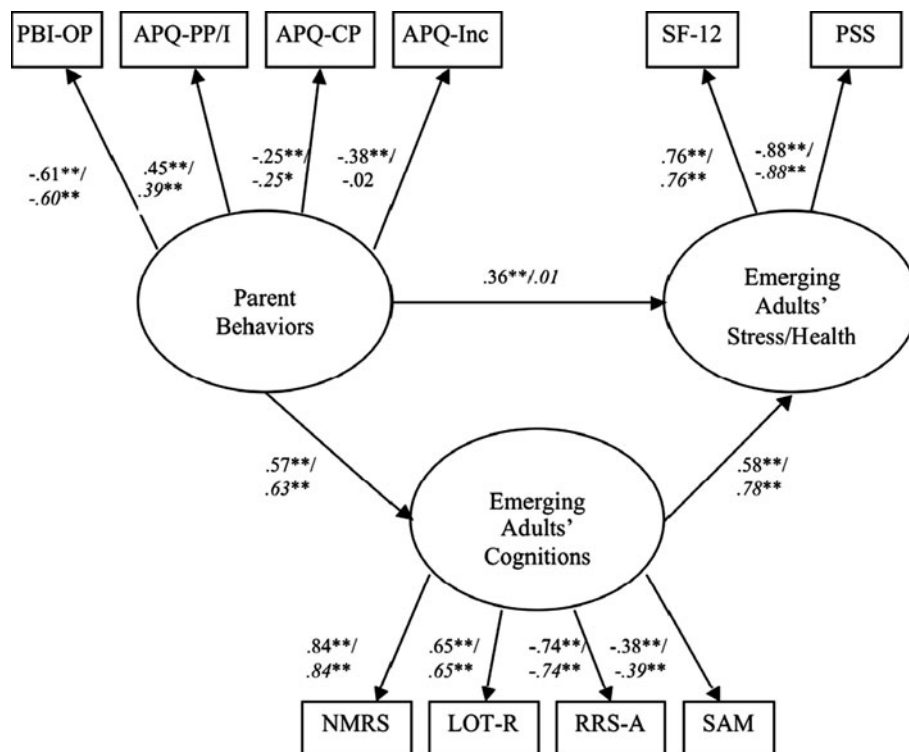


Fig. 3 Structural model predicting stress/health. * $p < .05$; ** $p < .01$. Values for the mother model are in *regular type*, whereas values for the father model are *italicized*. Disturbances and measurement error effects are omitted for clarity. *PBI-OP* Overprotection, *APQ-PP/I* Positive Parenting/Involvement, *APQ-CP* Corporal Punishment, *APQ-Inc* Inconsistency, *APQ-PM* Poor Monitoring, *SF-12* 12-Item Short-Form Health Survey, *PSS* Perceived Stress Scale, *NMRS* Negative Mood Regulation Scale, *LOT-R* Life orientation test-revised, *RRS-A* Ruminative response scale-abbreviated, *SAM* adjusted stress appraisal measure

pattern indicated that Emerging Adults' Cognitions fully mediated the relationship between Fathers' Parent Behaviors and Emerging Adults' Stress/Health. Therefore, nested mediation tests were not conducted.

Discussion

The current study examined relationships among parent behaviors, emerging adults' cognitions, and their stress/health outcomes. Results of this study generally supported the current body of literature. In particular, the findings of this study indicated that parent behaviors were correlated significantly with emerging adults' cognitions, such that more positive parenting was related to more adaptive cognitions. Further, parent behaviors were correlated with emerging adults' stress/health outcomes, such that more positive parenting was related to healthier stress/health outcomes. Likewise, the findings of this study suggested that emerging adults' cognitions were correlated significantly with their stress/health outcomes, such that more adaptive cognitions were related to healthier stress/health

outcomes. Thus, this study emphasized the important relationships among these variables for emerging adults.

Adding to the current body of research, this study examined mother and father path models and mediational effects using structural equation modeling. This study indicated that the proposed model adequately fit the data for both mothers and fathers. Across both mothers and fathers, positive parent behaviors were significant predictors of adaptive cognitions, and adaptive cognitions were significant predictors of less stress and better health. Although previous research indicated the importance of parent behaviors and cognitions separately for stress/health, few studies have examined these variables collectively [10]. The current study provided evidence that both parent behaviors and cognitions were important for emerging adults' stress/health outcomes. Additionally, behaviors of fathers, who often are underrepresented in the parenting literature [62], were related significantly to emerging adults' cognitions and stress/health.

Regarding mediation effects, path analyses revealed that emerging adults' cognitions partially mediated the relationship between mothers' behaviors and emerging adults' stress/health and fully mediated the relationship between fathers' behaviors and emerging adults' stress/health. These findings emphasized the importance of emerging adults' cognitions and suggested that they may be a more important proximal target of intervention than parent behaviors. When parent behaviors are the direct target of interventions, however, it may be more important to focus on mothers' behaviors, as mothers' behaviors maintained a significant relationship to emerging adults' stress/health in the context of emerging adults' cognitions. Future research should examine experimentally whether changes in parenting behaviors will impact children's stress/health throughout development and into emerging adulthood.

Some unexpected findings did occur, however. In particular, blood pressure reactivity either was unrelated to emerging adults' cognitions and stress/health or was related in a direction opposite to prediction. In particular, higher systolic and diastolic blood pressure reactivity was related to *less* perceived stress. In contrast, previous research suggested that blood pressure reactivity usually is associated with *higher* stress (even in children and emerging adults) [53, 54]. In addition, blood pressure reactivity was not related significantly to cognitions, even though previous research indicated that blood pressure reactivity should correlate with higher perceptions of threat, inability to cope, and ruminative thinking [63].

These non-significant findings may be related to participants reporting higher expectations of mood regulation, more optimism, greater self-efficacy, less stress, and better health than average participants in normative samples [43, 50, 64] as well as a generally healthy lifestyle. Thus, the current sample may be an unusually high-functioning group and, therefore, may show different patterns of blood pressure reactivity. These findings also may have resulted from biases in self-reports or a lack of definite association between self-reports of stress and physiological responses. For example, some studies indicated that self-reports of stress did not correspond with physiological measures of stress [48]. Finally, these participants may be called upon regularly to give impromptu speeches for professors (given their college student status), making the TSST less stressful than it might be for other types of samples.

Findings from this study need to be considered within the context of its limitations. First, this study had limited generalizability. Participants in this study ranged in age from 18- to 20-years and were students at a large Southeastern state university with generally healthy lifestyles. Therefore, the findings from this study may not apply to other age groups, more diverse samples, or emerging adults who are not in college. Second, all of the

measures included in the final analyses were based on self-report, which may not necessarily provide accurate indications of the targeted variables. Third, particularly for structural equation modeling, in which path coefficients change readily based on the constellation of variables that are entered into a model, it may be that the models supported by this study would change significantly if other parent behaviors, cognitions, or health measures were explored. Fourth, this study was limited by its correlational design, which cannot determine causal relationships. Finally, in selecting measures for this study, it was determined that most measures of health behaviors do not provide adequate information on reliability or validity and generally focus on a limited range of health behaviors. Therefore, the finding of this study may have been limited by the psychometrics of the measures used.

Despite the limitations of this study, the findings of this study lent support to the importance of parent behaviors as a distal point of intervention and emerging adults' cognitions as a proximal point of intervention for prevention and treatment efforts focusing on emerging adults' stress/health. Future experimentally designed studies should examine whether targeting these variables may cause long-term changes in stress/health outcomes for children, adolescents, and emerging adults throughout their development. If a causal relationship were found, such a finding could guide practitioners who are working with families as part of prevention and intervention programs for health problems to facilitate better stress/health outcomes for their emerging adults.

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