



# Childhood Adversity and Illness Appraisals as Predictors of Health Anxiety in Emerging Adults with a Chronic Illness

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## Abstract

Emerging adults with a chronic medical condition (CMC) are at increased risk for developing health anxiety (HA). Adverse childhood experiences (ACEs) have been linked to developing HA. CMCs and ACEs frequently co-occur among emerging adults. However, no known research has examined ACEs and HA within this critical developmental period. Further, increased negative illness appraisals (e.g., uncertainty, intrusiveness) may partially explain the relation between ACEs and HA. The present study examined the following mediation model:  $ACEs \rightarrow illness\ appraisals \rightarrow HA$ . Emerging adults ( $N=121$ ) with a CMC completed self-report measures of demographics, ACEs, illness appraisals, and HA. Regression analyses were conducted to test each illness appraisal as a mediator between ACEs and HA. Results demonstrated significant indirect effects for both illness appraisals. Findings demonstrate greater ACEs may increase negative illness appraisals which heightens overall HA. Thus, these associations support trauma-informed care approaches to support emerging adults.

**Keywords** Early adverse experiences · Health anxiety · Emerging adulthood · Illness appraisals

Approximately, 6.4% of emerging adults in the United States have been diagnosed with a chronic medical condition (CMC) including cancer, diabetes, and autoimmune disorders, affecting over 11,000 individuals (ACHA, 2018). For these individuals transitioning to college, increased independence and responsibilities may contribute to increased stress and negative health outcomes (e.g., Beiter et al., 2015; Compas et al., 1986; Hudd et al., 2000; Weinstein & Laverghetta, 2009). More specifically, college students with a CMC are at increased risk for a range of negative psychosocial outcomes including depression and anxiety. Importantly, they are also at risk for increased health anxiety, or the presence of excessive health-related fear (Barsky & Ahern, 2004; Widiger, 2000). Among college-aged youth with a CMC, the presence of health anxiety has been

demonstrated to negatively impact both quality of life and health-related outcomes (e.g., Marcus et al., 2008; Murphy et al., 2017). As such, research exploring predictors of health anxiety is needed, particularly in the context of emerging adults with a CMC. Currently, there is a lack of research examining the negative impact of health anxiety or, importantly, salient predictors of health anxiety that may be critical to intervention efforts.

Theoretical models underlying the development of health anxiety (Alberts & Hadjistavropoulos, 2014) suggest a critical interplay between childhood trauma and interpersonal health experiences (e.g., parental illness) in the development of health-related anxiety via an insecure attachment leading to an increase of reassurance-seeking from healthcare providers. Childhood trauma and early household dysfunction, also conceptualized as adverse childhood experiences (ACEs), can include experiences of domestic violence, child abuse and neglect, and caregiver substance abuse (Felitti et al., 1998). It is well established that ACEs are related to long-term health risks (Dong et al., 2005; Garrido et al., 2018; Hughes et al., 2017; Kalmakis & Chandler, 2015; Lanier et al., 2018), with recent research suggesting that this increased risk can begin as early as adolescence (Burke et al., 2011; Flaherty et al., 2009, 2013; Thompson et al., 2015). Furthermore, the diagnosis and treatment of a CMC

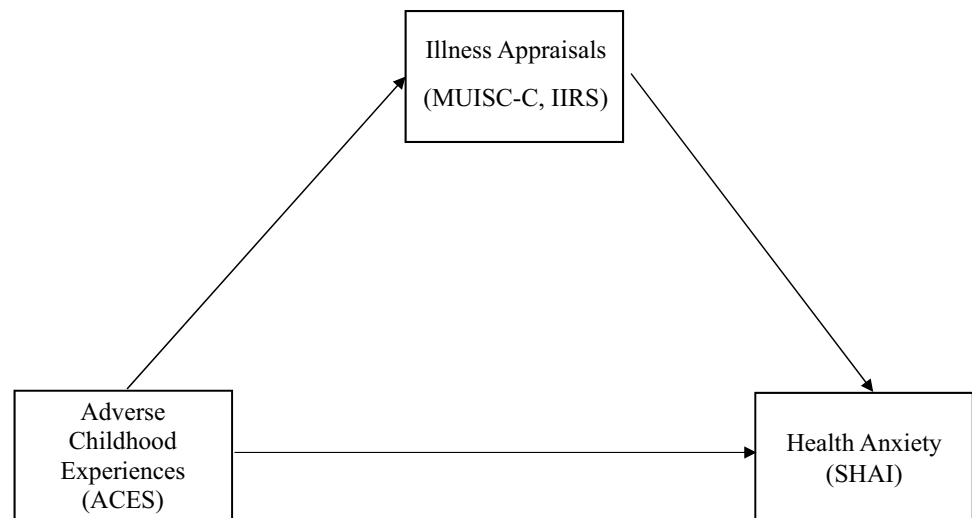
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**Fig. 1** Mediation model demonstrating adverse childhood experiences predicting health anxiety through illness appraisal variables, illness uncertainty and illness intrusiveness



during adolescence can be a stressful, and potentially a *traumatic experience* (Barakat & Wodka, 2006) and therefore, has been suggested to be conceptualized as a unique ACE (Espeleta et al., 2020a; Herts et al., 2014; Sharkey et al., 2017). Estimates suggest that up to 85% of college students have experienced at least one ACE (Service, 2015; Smyth et al., 2008; Son et al., 2020) and that ACEs and CMCs often co-occur. In fact, research has associated ACEs with a 21% increased risk of having a CMC (Kerker et al., 2015). Thus, with their frequent co-occurrence in adolescents and young adults and independent links to negative health outcomes, ACEs and CMCs may be particularly salient predictors of health anxiety.

Individually, ACEs and CMCs have been linked to an increased risk for long-term mental health problems, characterized by higher rates of depression (e.g., McKee-Lopez et al., 2019) and anxiety (e.g., Cobham et al., 2020). Notably, college students with both ACEs and a CMC are at one of the *highest* risks for mental health concerns compared to their peers (e.g., Espeleta et al., 2020a, b). Sharkey et al. (2020) recently found that individuals with ACEs and a CMC had significantly higher rates of depressive and anxious symptoms compared to those experiencing either ACEs or a CMC alone. Given the co-occurring nature of ACEs and CMCs, as well as their individual and combined impact on mental health adjustment, research is needed to understand the role of these collective experiences on long-term physical and mental health adjustment, particularly as it concerns the development of health anxiety.

It is also largely unknown how the experience of ACEs and a CMC diagnosis together may predispose college students to develop negative illness appraisals and subsequent health anxiety. Previous research has shown that ACEs are associated with cognitive risk factors (e.g., repetitive negative thinking styles) associated with anxiety (Espeleta,

2020a, b; Taylor et al., 2021). It may be that college students who have experienced early trauma in addition to a CMC have increased negative cognitions about their illness and health, and therefore experience increased health anxiety. Negative meta-cognitive beliefs about one's illness are highly associated with health anxiety (Bailey & Wells, 2013, 2015; Bilani et al., 2019; Melli et al., 2016). Common illness-specific cognitive appraisals, hereafter termed *illness appraisals*, include viewing one's illness as uncertain, unpredictable, or as interfering with daily life activities such as work and social engagement. Research on adolescents and young adults with a CMC consistently demonstrates that two specific illness appraisals, namely illness uncertainty and illness intrusiveness, are related to negative adjustment outcomes across multiple types of chronic illnesses (Bakula et al., 2019; Fortier et al., 2013; Hoff et al., 2002; Hommel et al., 2003; Mishel et al., 2005; Mullins et al., 2001, 2017). Notably, Horenstein et al. (2019) linked anxiety sensitivity to health anxiety as well as healthcare utilization among young adults both with and without a CMC but *only in the context of* greater intolerance of uncertainty. Together, these findings suggest that for emerging adults with a CMC, health anxiety may be linked to increased negative appraisals of their CMC (e.g., increased uncertainty and unpredictability).

The present study sought to examine how ACEs are associated with negative illness appraisals and subsequent health anxiety during the critical adolescent and young adulthood developmental period for individuals with a CMC. Our primary aim was to examine how illness appraisals (i.e., illness uncertainty and illness intrusiveness) mediate the relation between ACEs and health anxiety ( $ACEs \rightarrow illness\ appraisals \rightarrow health\ anxiety$ ; Fig. 1). We hypothesized that illness appraisals would indeed mediate the relation between ACEs and health anxiety, such that early childhood trauma would be associated with a greater perception of an illness as

uncertain and intrusive, which would, in turn, be associated with greater health anxiety.

## Methods

### Procedures

The current study was part of a larger project investigating the psychosocial and health outcomes of emerging adult college students with a CMC. Participants included college students at a large Midwestern, public university enrolled in a psychology course who completed a battery of online surveys on demographic information, health, and psychosocial adjustment. Students self-selected into the study and were provided course credit as compensation for participation. All study procedures adhered to American Psychological Association's ethical guidelines and were approved by the university's institutional review board. Participants were included in the current study if they: (1) were enrolled as a current student, (2) completed survey measures within an appropriate amount of time (i.e., > 15 min), (3) self-reported at least one CMC, not including a mental disorder diagnosis, (4) were fluent in English, (5) were between 18 and 24 years of age, and (6) had complete survey data.

### Participants

The final sample with complete data included 121 college students who ranged from 18 to 23 years of age. ( $M = 19.6$ ,  $SD = 1.4$ ) and predominantly identified as non-Hispanic/non-Latinx White/Caucasian (80%), female (84%), and as undergraduates (54%). The most common illnesses represented included asthma (43%), allergies (28%), and irritable bowel syndrome (8%), with the remaining illnesses represented being highly heterogeneous (e.g., diabetes, cancer). The

number of chronic medical condition diagnoses per participant ranged from 1 to 8, with the majority of participants reporting one (44%) or two medical diagnoses (24%). Please see further information on demographic and characteristics in Table 1.

### Measures

#### Demographic and Illness Characteristics

Participants provided socio-demographic information including their age, sex, gender, education level, race, and ethnicity. Illness characteristics were also measured via self-report. Participants responded to a dichotomized question: "Do you have a chronic illness?" If participants indicated "yes," they were then asked to indicate their chronic illness(es) from a checklist of 20 common conditions generated by the study team, with write-in options also available.

#### Adverse Childhood Experiences-Short Form (ACEs-SF)

Childhood adversity was measured via an 8-item version of the ACEs-SF, which assesses the respondent's exposure to adverse childhood events including abuse, neglect, family member mental illness or suicide, and the death of a parent. Response options are on a dichotomous scale (i.e., yes/no) for whether or not the participant experienced each adverse event prior to age 18. Measure items are summed to create a total score, with higher scores noting greater cumulative childhood adversity.

#### Short Health Anxiety Inventory (SHAI)

Health anxiety was measured using the SHAI (Salkovskis et al., 2002), a 14-item measure of health-related worry, awareness of physical sensations and experiences, and fear

**Table 1** Participant demographic information

	<i>N</i> (%)		<i>N</i> (%)
Sex		Chronic medical condition	
Female	102 (84.3%)	Asthma	52 (43.0%)
Male	19 (15.7%)	Type I diabetes	7 (5.8%)
Race		Cystic fibrosis	1 (0.8%)
Caucasian	97 (80.2%)	Obesity	1 (0.8%)
African American/Black	1 (0.8%)	Fibromyalgia	3 (2.5%)
Hispanic	4 (3.3%)	Juvenile rheumatic disease	1 (0.8%)
Asian	1 (0.8%)	Allergies	34 (28.1%)
Native American	14 (11.6%)	Cancer	1 (0.8%)
Multi-racial	4 (3.3%)	Inflammatory bowel disease	8 (6.6%)
		Irritable bowel syndrome	10 (8.3%)
		Celiac disease	2 (1.7%)
		Epilepsy	1 (0.8%)

of illness over the previous 6 months. Items include statements reflecting components of health anxiety on a Likert scale of 0 to 3. Participants are instructed to select the option that best reflects their feelings. An example response range is, “I do not have any difficulty taking my mind off thoughts about my health” to “Nothing can take my mind off thoughts about my health.” The SHAI total score reflects the sum of selected responses, with higher scores indicating greater levels of health anxiety. Internal reliability for the total score ranged from acceptable to good in previous work (Abramowitz et al., 2007; Salkovskis et al., 2002) and was good in the current study ( $\alpha=0.90$ ).

### Mishel Uncertainty in Illness-Community form (MUIS-C)

Illness uncertainty was measured with the MUIS-C (Mishel, 1981). This 23-item measure is designed to measure the extent that community-dwelling individuals feel uncertain with regard to their illness and its meaning or course. Responses are recorded on a 5-point Likert scale (“*Strongly Agree*” to “*Strongly Disagree*”). Example items include “I don’t know what is wrong with me” and “My symptoms continue to change unpredictably.” Items are summed to create the total score, with higher scores reflecting greater uncertainty. Similar to prior work (Sharkey et al., 2019), reliability was good in the present study ( $\alpha=0.91$ ).

### Illness Intrusiveness Rating Scale (IIRS)

The IIRS (Devins, 2010) is a 13-item measure of illness intrusiveness that evaluates the extent that respondents feel their medical condition(s) interferes with their daily life (e.g., activities, interests). Participants respond on a 1 to 7 Likert scale (“Not Very Much” to “Very Much”). The total score for the IIRS reflects the sum of all items, with higher scores corresponding to higher levels of illness intrusiveness. Internal reliability has been good in prior research (Devins, 2010; Mullins et al., 2017), with good reliability in the current study ( $\alpha=0.91$ ).

### Data Analytic Plan

Data was collected from a 163 total participants that self-identified as having a chronic medical condition. Prior to analyses, data were examined for validity and completeness. Participants with incomplete data ( $N=42$ ) across all study variables and covariates were excluded from the study, resulting in a final sample of 121 participants. To examine potential differences across racial groups, participant race was dummy coded and examined for differences across analysis variables prior to primary analyses. Independent samples *t*-tests were conducted to determine potential differences of main analysis variables based on participant

race and timing of study participation (e.g., prior to versus during COVID-19 global pandemic). Descriptive statistics and bivariate correlations for analysis variables were then conducted.

Then, two regression analyses via the PROCESS macro (Model 4; Hayes, 2017) on SPSS version 25 examined illness appraisal variables as mediators between ACEs and health anxiety among individuals with a CMC. Two separate mediation analyses were utilized to test each cognitive appraisal variable (illness uncertainty and illness intrusiveness). All analyses incorporated bias-correcting bootstrapping procedures, set at 5000, with participant sex entered as a covariate.

## Results

### Descriptive Statistics

Approximately 31% of the sample reported experiencing no ACEs ( $M=2.0$ ,  $SD 1.9$ ), with the remaining sample reporting between 1 and 8 ACEs. The most prevalent ACE within the sample was having a caregiver with a mental health concern (52%). Participants reported moderate levels of health anxiety ( $M=17.6$ ,  $SD 7.8$ ). See Table 2 for descriptive statistics of primary analysis variables.

### Preliminary Analyses

Preliminary analyses examining racial differences across main analysis variables via a dummy coded “Race” variable suggested that those identifying as multiracial reported higher ACE total scores ( $M=4.4$ ,  $SD 0.96$ ) than those who did not identify as multiracial ( $M=1.9$ ,  $SD 2.0$ ,  $t[100] = -2.37$ ,  $p = .02$ ,  $d = 1.9$ ). Given this difference, multiracial identification was entered as a covariate in subsequent analyses. There were no significant differences on analysis variables for individuals identifying as Hispanic or Latinx ( $p$ 's = .06–.99), African American ( $p$ 's = .24–.71), Asian ( $p$ 's = .19–.95), or Native American/Alaska Native ( $p$ 's = .16–.92).

**Table 2** Descriptive statistics for main analysis variables

	<i>M</i>	<i>SD</i>	Range
Age	19.6	1.3	18–23
ACEs	2.0	1.9	0–8
Health anxiety	17.6	7.9	1–42
Illness uncertainty	62.1	17.7	23–98
Illness Intrusiveness	38.8	18.4	13–81

ACEs represents cumulative adverse childhood experience scores

Due to the global pandemic (COVID-19) occurring during data collection procedures, all analysis variables were examined for differences between those participating prior to the pandemic ( $N=89$ , 73.6%) and those after the onset of the pandemic ( $N=27$ , 22.3%). There were no significant differences on health anxiety, illness intrusiveness, or illness uncertainty for those participating before or after the onset of the pandemic ( $p$ 's = .11 to .95).

## Correlations

Bivariate correlations were first utilized to explore initial correlations between primary analysis variables. See Table 3 for complete results.

## Mediation Analyses

Mediation analyses were then conducted to examine the indirect effect of ACEs on health anxiety through two cognitive appraisal mechanisms, illness uncertainty and illness intrusiveness. Two separate mediation analyses were conducted. Given the significant associations between sex and health anxiety and between ACEs and multiracial participants in preliminary analyses, participant sex and multiracial status were entered as covariates. The first mediation model ( $ACEs \rightarrow illness\ uncertainty \rightarrow health\ anxiety$ ) was significant ( $R^2 = .12$ ,  $F[3, 97] = 4.5$ ,  $p < .01$ ). In this model, higher cumulative ACEs were significantly associated with greater illness uncertainty ( $\beta = 3.38$ ,  $p = .001$ ), and greater illness uncertainty was associated with increased health anxiety ( $\beta = 0.23$ ,  $p < .001$ ). Although the direct effect of ACEs on health anxiety was not significant (Effect =  $-0.38$ , SE 0.87, 95% confidence interval =  $-1.13$  to 0.38), the indirect effect through illness uncertainty was significant (Effect = 0.78, Boot SE 0.23, 95% Boot confidence interval = 0.39–1.31), indicating a mediating effect (see Table 4 for complete results). Lastly, female sex was significantly associated with greater illness uncertainty ( $\beta = 14.93$ ,  $p < .001$ ).

The second mediation model ( $ACEs \rightarrow illness\ intrusiveness \rightarrow health\ anxiety$ ) was significant ( $R^2 = .35$ ,  $F[3,$

$97] = 4.5$ ,  $p < .01$ ). Similar to the first mediation, cumulative ACEs and female sex were significantly associated with increased perceptions of illness intrusiveness ( $\beta = 4.03$ ,  $p < .001$  and  $\beta = 10.99$ ,  $p = .01$ , respectively) and increased illness intrusiveness was associated with increased health anxiety ( $\beta = 0.24$ ,  $p < .001$ ). The direct effect of ACEs on health anxiety was not significant (Effect =  $-0.55$ , SE 0.38, 95% confidence interval =  $-1.30$ –0.19), however, the indirect effect through illness intrusiveness was significant (Effect = 0.96, Boot SE 0.35, 95% Boot confidence interval = 0.42–1.79; see Table 5 for complete results), suggesting a mediating effect.

## Discussion

The present study examined the association between ACEs, illness appraisals, and subsequent health anxiety among emerging adults with a CMC. Our primary aim was to assess how ACEs relate to health anxiety via the role of illness appraisals (i.e., illness uncertainty and illness intrusiveness;  $ACEs \rightarrow illness\ appraisals \rightarrow health\ anxiety$ ). Findings demonstrate that both illness appraisals (i.e., *illness uncertainty* and *illness intrusiveness*) mediated the relationship between ACEs and health anxiety among emerging adults with a CMC. Thus, emerging adults with comorbid chronic medical concerns and greater early childhood adversity were more likely to appraise their illness as more uncertain or interfering in their daily activities than those with less or no early childhood adversity. Further, these increased appraisals of their illness are associated with increased anxiety surrounding health. In other words, early childhood adversity may indeed predispose individuals to appraise their illness more negatively—more uncertain and/or intrusive—thereby increasing anxiety surrounding health.

Although early childhood adversity has been directly linked to health anxiety in previous research (Reiser et al., 2019), the present study did not find a direct association. Instead, illness appraisals were found to be a *mechanism* by which ACEs affect emerging adults' health-related

**Table 3** Bivariate correlation across main analysis variables

		1	2	3	4	5	6
1.	Age	1.0	0.002	0.072	0.017	0.090	– 0.091
2.	Sex	–	1.0	0.065	0.318**	0.252**	0.301**
3.	ACEs	–	–	1.0	0.382**	0.419**	0.090
4.	Illness Uncertainty	–	–	–	1.0	0.671**	0.533**
5.	Illness Intrusiveness	–	–	–	–	1.0	0.550**
6.	Health Anxiety	–	–	–	–	–	1.0

Participant sex was coded on a dichotomous scale in which male was coded as 0 and female was coded as 1. ACEs represents cumulative adverse childhood experience scores

\*\*Indicates significance at a  $p$ -value  $< .001$

**Table 4** Mediation analyses examining the role of illness uncertainty in the relation between ACEs and health anxiety

Outcome: illness uncertainty (model summary)				
<i>R</i>	<i>R</i> <sup>2</sup>	<i>F</i>	<i>df</i> 1, <i>df</i> 2	<i>p</i>
.51	.26	11.14	3, 97	.000
	$\beta$	SE	<i>t</i>	<i>p</i>
Constant	28.93	7.62	3.80	.003
ACEs	3.38	.80	4.24	.000
Sex	14.92	4.06	3.68	.000
Multiracial identity	− 4.92	8.18	− .60	.55
Outcome: health anxiety (model summary)				
<i>R</i>	<i>R</i> <sup>2</sup>	<i>F</i>	<i>df</i> 1, <i>df</i> 2	<i>p</i>
.56	.31	10.97	4, 96	.000
	$\beta$	SE	<i>t</i>	<i>p</i>
Constant	− 1.96	3.59	− .54	.59
Illness uncertainty	.23	.04	5.17	.000
ACEs	− .38	.38	− .98	.33
Sex	7.00	2.01	3.48	.007
Multiracial identity	− 2.43	4.05	− .60	.55
Direct effect of X on Y				
Effect	SE	<i>p</i>	LLCI	ULCI
− .38	.38	.33	− 1.13	.38
Indirect effect of X on Y				
	Effect	Boot SE	Boot LLCI	Boot ULCI
Illness uncertainty	.78	.23	.39	1.31

ACEs represents cumulative adverse childhood experience scores, and multiracial identity refers to a dummy coded race variable comparing those that do and do not identify as multiracial)

adjustment. This possible causal chain is consistent with extant empirical and theoretical findings suggesting that both early childhood environmental factors and cognitive mechanisms coalesce to impact the development of health anxiety (Alberts & Hadjistavropoulos, 2014). Though previous research (Alberts & Hadjistavropoulos, 2014) did not report a statistical interaction (i.e., hierarchical multiple regression) between early childhood and cognitive factors on health anxiety nor examine ACEs specifically, our study utilized ACEs to examine a mediation relationship of these factors, which may explain the different findings across these studies. As such, individuals who experience early childhood adversity may be uniquely impacted to interpret their environment (Beck, 2008; Ehlers & Clark, 2000) and health (Karatzias & Chouliara, 2009) as less predictable and safe and overall more negatively (Spinhoven et al., 2015), thereby increasing not only overall anxiety but also health anxiety.

Together, these results highlight the roles of early childhood adversity and illness appraisals in the development of health anxiety among emerging adults with a CMC. This

increased health anxiety is likely to affect how emerging adults engage with healthcare providers—either seeking reassurance through frequent medical care or, conversely, avoiding healthcare encounters altogether (Jones et al., 2020). Thus, illness appraisals may provide a key touchpoint for providers to address trauma- and illness-related issues impacting illness care and management. Therefore, the present study reinforces the need for trauma-informed care approaches among emerging adults with CMC diagnoses that incorporate coping with negative illness appraisals and health anxiety (Cooper et al., 2017) to maximize health and quality of life outcomes.

### Limitations

The current study is not without limitations. Data collected were from a predominantly White/Caucasian, female college student convenience sample lacking in diversity (e.g., racial/ethnic, socioeconomic status, gender identity). Therefore, results may not be representative of the larger AYA

**Table 5** Mediation analyses examining the role of illness intrusiveness in the relation between ACEs and health anxiety

Outcome: illness intrusiveness (model summary)				
<i>R</i>	<i>R</i> <sup>2</sup>	<i>F</i>	<i>df</i> 1, <i>df</i> 2	<i>p</i>
.49	.24	10.22	3, 97	.000
	$\beta$	SE	<i>t</i>	<i>p</i>
Constant	11.23	8.20	1.37	.17
ACEs	4.03	.86	4.70	.000
Sex	10.99	4.37	2.52	.013
Multiracial identity	-2.10	8.87	-2.4	.81
Outcome: health anxiety (model summary)				
<i>R</i>	<i>R</i> <sup>2</sup>	<i>F</i>	<i>df</i> 1, <i>df</i> 2	<i>p</i>
.60	.36	13.40	4, 96	.000
	$\beta$	SE	<i>t</i>	<i>p</i>
Constant	2.04	3.27	.62	.53
Illness Intrusiveness	.24	.040	5.94	.000
ACEs	-.55	.38	-1.48	.14
Sex	4.38	1.78	2.46	.015
Multiracial identity	-1.93	3.48	-.556	.58
Direct effect of X on Y				
Effect	SE	<i>p</i>	LLCI	ULCI
-.55	.38	.14	-1.30	.19
Indirect effect of X on Y				
	Effect	Boot SE	Boot LLCI	Boot ULCI
Illness intrusiveness	.96	.35	.42	1.79

ACEs represents cumulative adverse childhood experience scores, and multiracial identity refers to a dummy coded race variable comparing those that do and do not identify as multiracial)

population, particularly for those from historically marginalized backgrounds and how systemic-based injustices associated with these identities impact health-related and adjustment factors. Additionally, the present sample demonstrated relatively low endorsement of ACEs and potentially less severe CMC diagnoses and health anxiety than may be present in more functionally impaired groups (e.g., more severe trauma history). Relatedly, the present study examined ACEs and CMCs in a singular group, collapsing across all types and diagnoses, respectively. Although our data provide preliminary evidence for trauma-exposed and health-compromised individuals as a group, future research should examine the differential impact of event (e.g., interpersonal, community) and illness type (e.g., cancer, asthma, diabetes) on these mediational relationships. It is possible that some medical conditions, particularly those with increased stigma (e.g., HIV, inflammatory bowel disease) uniquely intersect with trauma history or illness appraisals, which may result in stronger findings. Future research should consider person-centered analyses (e.g., latent class analysis)

to further examine how these subgroup differences intersect and differ across outcomes. Further, data were cross-sectional in nature and therefore limit the ability to draw causal conclusions. Lastly, data were based on participant self-report, therefore medical diagnosis information was not confirmed by participants' medical providers. However, this study is the first to our knowledge that examines both CMCs and ACEs in the context of health anxiety and thus is an important preliminary step in understanding the role of illness appraisals in health anxiety for AYA college students with early adversity and a CMC.

### Future Directions

Future research should examine these associations among a more diverse, representative sample of emerging adults, as well as those endorsing greater ACEs and health anxiety using longitudinal approaches. Research integrating systems-based barriers to care among historically marginalized populations (e.g., medical mistrust) would strengthen

understanding of early childhood adversity, illness appraisals, health anxiety and coping. Further, examining these factors among more severe groups in terms of trauma history and/or health anxiety as well as among specific diagnostic groups may provide a more nuanced understanding of these factors in impacting the development of health anxiety. Additionally, family-based methodologies may further elucidate the critical periods and mechanisms by which negative illness cognitions and anxiety surrounding health develop. Future research should also examine the implications of these findings for healthcare use and cost. Lastly, statistical approaches with the power to detect within group heterogeneity (e.g., class analyses) may help to identify unique subgroups of emerging adults with CMCs who respond to and cope with early childhood adversity and appraise their illness differently.

## Conclusion

In sum, the present study expands on the theoretical and empirical understanding of the development of health anxiety, integrating both early childhood events and cognitive mechanisms among emerging adults with CMC diagnoses. Findings indicate that emerging adults with a CMC and greater ACEs are more likely to interpret their illness negatively as more uncertain and/or intrusive, and that these negative appraisals increase health-related anxiety. These observed associations provide support for integrating trauma-informed clinical care approaches that incorporate support for emerging adults in coping with their illness and treatment and comorbid health anxiety to support optimal adjustment.

**Author Contributions** All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by KT and HE. The first draft of the manuscript was written by KT, HE, TD, and RF, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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**Data Availability** The data that support the findings of this study are available from the corresponding author, K.A.T., upon reasonable request.

## Declarations

**Conflict of interest** Authors Katherine A. Traino, Hannah C. Espeleta, Taylor M. Dattilo, Rachel S. Fisher, Larry L. Mullins declare that they have no conflict of interest.

**Ethical Approval** The present study was approved by the Oklahoma State University Institutional Review Board and was performed in accordance with the ethical standards as laid down in the 1964 Dec-

laration of Helsinki and its later amendments or comparable ethical standards.

**Informed Consent** Informed consent was obtained from all individual participants included in the study.

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