



Childhood Adversity, Emotional Well-Being, Loneliness, and Optimism: a National Study

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Abstract

Optimism and loneliness, which reflect the expected inverse associations with excess morbidity and mortality, are theoretically and empirically associated with early adversities and offer potential avenues for clinical support. The current study first estimates latent classes of adverse childhood experiences and, second, assesses the role of these experiences on later reports of optimism and loneliness in late adolescence and emerging adulthood, and the role of emotional regulation and common mental disorders. Surveys were conducted in a longitudinal household sample of adolescents recruited in 2013 (average age of 20 at wave 6 follow-ups). The analytic sample included 1177 female and male respondents representative of their age group in the USA at baseline. Latent classes were estimated based on 10 indicators of childhood adversity. Respondents were assigned to classes using posterior probabilities of latent class membership, and class membership was used to predict psychological outcomes in multivariable models. Three latent classes of childhood adversity were identified in the current sample, representing low childhood adversity (81.5%), higher probability of family dysfunction with lower levels of interpersonal abuse (13.4%), and high adversity including higher probabilities of parental discord and violence as well as child abuse (5.1%). Both classes of respondents who faced greater childhood adversity were more likely to report greater loneliness and lower optimism in emerging adulthood. Results were attenuated by measures of emotional well-being. Addressing adolescent loneliness and supporting optimistic outlooks in emerging adulthood are two pathways with potential benefits to reduce mental and physical morbidities.

Keywords Loneliness · Optimism · Adverse childhood experiences · Emotional regulation · Emotional well-being

Introduction

Shifts in environmental contexts and behavioral norms can impact individual developmental trajectories and outcomes. As of late in the first decade of this century, the adoption of smartphones along with increasingly popular social media platforms, while nominally expanding social connections,

in practice resulted in reduced time spent face to face and increasing reports of adolescent loneliness (Twenge et al., 2019). Then, as of March 2020, the onset of social distancing protocols to mitigate the COVID-19 pandemic in the USA created greater risks for loneliness and mental health problems among youth and young adults (Loades et al., 2020). While young people facing both external and internal challenges have the advantage of being buoyed by higher levels of optimism than they might have at other points in life (Chopik et al., 2020), they still require resilience given the range of childhood adversities to which they may have been exposed. Behavioral Risk Factor Surveillance Survey data suggest that, as of 2009–2012, 44% of US adults experienced adverse childhood events (ACEs) before age 18 and cohort analyses suggest the risks are greater for younger cohorts (Logan-Greene et al., 2014). The current study examines the impact of ACEs on the loneliness and optimism of a nationally representative cohort, addressing the minimal attention to these psychological outcomes with longitudinal

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analyses for the purpose of supporting clinical screening and interventions.

Theoretical Background

Aspects of youth neurobiology have been identified with emotional health outcomes (Luby et al., 2017). In addition to biological propensity for selected emotional health traits (Bartels et al., 2008; Mavioğlu et al., 2015; Waaktaar & Torgersen, 2012), environmental exposures—such as exposure to ACEs—are increasingly understood to have an impact on children’s neurodevelopment (Sheridan & McLaughlin, 2014; Teicher & Samson, 2016) and, in a separate body of research, mental health disorders (Sahle et al., 2021). Specifically, there is evidence of identifiable brain regions associated with positive thought and optimism (Rosenfeld, 2019) as well as various neural structures related to feelings of loneliness (Lam et al., 2021).

Multiple theoretical explanations for emotional health outcomes following exposures to ACEs have been put forth. For example, exposed children may form insecure attachment to caregivers (Bowlby, 1988) and thus experience deficits in social skills over time (DiTommaso et al., 2003). Alternatively or additionally, inflammatory responses to early adversity may interact with neurological changes resulting in a propensity for heightened physiological arousal in response to perceived stressors (Nusslock & Miller, 2016). These interactions, as conceptualized through the biosocial vulnerability model, highlight the interplay between physiological functions and cognitive, emotional, and interpersonal processes (Scarpa, 2015). Summarizing the complexity of human development through a neuro-ecosocial approach, individuals’ ecological and relational niches, their interpretation of sensory inputs, their resulting behavioral impulses, and their continual co-shaping of collective niches over time are integral to mental states (Rose et al., 2021). Consequently, early adversities and subsequent stressors may be reflected in diminished social communications and emotional regulation skills (Mitchell & Beech, 2011), defensive attitudes (Deater-Deckard et al., 2003), and avoidant coping strategies that lead to anxiety, mood, personality, and other disorders (Sheffler et al., 2020). This neurophysiological background, while not the subject of the current study, informs our research questions regarding ACE profiles and associations with subsequent loneliness and optimism—directly and indirectly via emotional well-being—in late adolescence and emerging adulthood.

Childhood Adversity

The study of childhood adversity as predictors of problematic outcomes is not new, but the focus on poly-exposures has soared in the past two decades (Sahle et al., 2021). Felitti

and colleagues (1998) launched the study of a set of adverse childhood events as a collection of social experiences (prior to age 18) associated with negative consequences. Since then, researchers have used a range of measures collected from different reporters to assess ACEs. For example, reports by adults pointed to four ACE profiles of youth (ages 6 to 17) distinguished by divorce, income hardship, mental illness and substance abuse, and a class of high risk of multiple ACEs (9 ACE items; Lew & Xian, 2019), whereas caseworker/caregiver reports on adolescents involved with welfare services resulted in three latent profiles of ACEs: a high physical/emotional abuse and household dysfunction class, a similar class with somewhat less physical abuse, and an emotional abuse/caregiver divorce class (10 ACE items; Brown et al., 2019). In research using the National Longitudinal Study of Adolescent and Adult Health (Add Health) sample, adolescents and young adults self-reporting on ACEs inclusive of community violence experienced prior to age 18 were classified in four profiles (child maltreatment, household dysfunction, and community violence vs. low adversity) (12 ACE items; Lee et al., 2020).

The value of estimating latent classes to identify ACE profiles is the opportunity to improve clinical screening and thus mitigate problematic sequelae that develop over time (Lew & Xian, 2019). Methodological treatment of ACE measures has ranged from creating a score count of the number of exposures (e.g., Cloitre et al., 2019; Duke et al., 2010; Espeleta et al., 2018; Poole et al., 2018) to creating an indicator of at least a certain number of exposures, usually four or more (e.g., Crandall et al., 2019; Rudenstine et al., 2019). Another approach has been to examine dimensions of childhood adversity through a priori categorization (e.g., Auslander et al., 2016). Each of these methodological approaches has distinctive value for interpretation, but none capture the probability of exposure to each ACE indicator, as is possible through a latent modeling approach (Cohen et al., 2017).

Sociodemographic Correlates

Individual, interpersonal, and social structures are likely correlates of childhood experiences and psychological outcomes. Developmental age plays a role in communication and coping skills (Bishop et al., 2019; Liberto et al., 2020), which necessitates adjustment for sex and gender differences in developmental maturity (Riva, 2021). Greater household resources and education are associated with less childhood adversity (Suglia et al., 2022) and subsequently better physical health outcomes (Oh et al., 2018), an extra dose of optimism (Carver et al., 2010), and potentially less risk of loneliness (Buecker et al., 2021; Qualter et al., 2021). Moreover, several forms of childhood adversity, such as exposure to violence and the absence of the father in the

home, are themselves linked to gainful activity (defined as “engagement with work or school”¹) (McGuire et al., 2021), which further predicts psychological outcomes including optimism (Hocking, 2021; McGuire et al., 2021). Clearly, the biophysical and social mechanistic pathways impacting psychological outcomes are complex, highlighting the need to recognize profiles of early experiences in the design and application of clinical treatments.

Psychological Outcomes

Research in adolescent and adult samples point to a range of psychological outcomes associated with ACEs. Lee et al. (2020) found variable associations with depression, anxiety, and PTSD in the Add Health sample. In fact, across systematic reviews and meta-analyses, the results in both adolescent and adult samples show a positive association between ACEs and common mental disorders such as internalizing and anxiety disorders, depression, and suicidality (Sahle et al., 2021). The current study focuses on loneliness and optimism—which are consistently positively and negatively, respectively, associated with excess morbidity and mortality (Leigh-Hunt et al., 2017; Rozanski et al., 2019)—as understudied psychological processes. The few studies that have examined the potential for loneliness following greater childhood adversity suggest a positive association (Babad et al., 2020; Wen-Hsu & Chi, 2020; Wong et al., 2019). In a similar vein, among students at a single university, while the association between ACEs and loneliness was not significant, the relationship was in the expected direction (Doom et al., 2021). However, drawing on convenience samples at a few universities and volunteers on the Mechanical Turk website, as well as a Taiwanese cohort sample, none of these studies examining ACEs and loneliness is representative of a US population. As noted above, the research regarding early adversity points to a negative impact on communication skills, emotional regulation skills, constructive coping strategies, as well as mood disorders, all of which point to diminished resources for maintaining healthy relationships. These mechanisms would not suggest that exposure to social situations would necessarily address feelings of loneliness. Given that approaches to address loneliness often rely on the faulty premise that creating opportunities for more social engagement is the solution (Cacioppo et al., 2015), a closer look at potential origins of

loneliness, in the form of childhood adversity, may inform stronger clinical support.

The research regarding optimism following exposure to ACEs is even more limited. Optimism reflects a mindset of positive expectancies about the future (Carver et al., 2010), and diminished optimism is referenced as a component symptom of depression (Driessen & Hollon, 2010). More specifically, understanding risk factors for deficits in optimism is important because of the role that optimism plays in protective health behaviors, healthier relationships, effective coping strategies, and pursuit of other beneficial outcomes (Carver et al., 2010). Childhood experiences of adversity would be expected to undermine the development of an optimistic outlook. Indeed, a prospective cohort analysis found that adults in middle age were significantly more optimistic if they had experienced minimal early childhood adversity (assessed by five socioeconomic measures and five measures of residential stability, parents’ marital status, and the experience of a sibling death) (Non et al., 2020). Likewise, in a study of adults experiencing housing insecurity, ACEs were negatively correlated with optimism (Fitzpatrick & Bussey, 2011). Life course patterns in optimism show reductions over time (Chopik et al., 2020), and thus understanding the relevance of earlier possible intervention points may be constructive for lifetime well-being.

The Current Study

In sum, the field lacks representative studies of the role of childhood adversity in the development of optimism and loneliness as psychological outcomes in emerging adulthood. Research investigating childhood exposures may help address the need to develop effective interventions to mitigate loneliness and build optimism. To address these methodological and substantive gaps in the literature, we first conducted person-centered analyses of adverse childhood events reported by a nationally representative cohort and, second, estimated associations of the resulting latent classes with selected psychological outcomes a year later. Regarding our first study aim, we expected that a large plurality of respondents would fall into a profile of minimal ACEs exposure and that there would be more than one profile of respondents with at least moderate exposure to different adversities, reflecting results from prior research. Regarding our second study aim, regarding psychological outcomes following differential profiles of childhood adversity exposures, we hypothesized that any exposure to ACEs would be associated with reduced optimism and greater loneliness. Third, we expected that measures of emotional well-being would attenuate the associations between childhood adversity and respondents’ optimism and loneliness.

¹ While this definition of gainful activity is common in the literature, we appreciate that a broader definition inclusive of other forms of gainful activity (e.g., caregiving, volunteering) and consideration of capacity for different activities (e.g., physical and mental capacity, family circumstances, available opportunities and structural constraints) are important considerations; this measure is not intended to imply a value judgement.

Methods

Sample

Data were drawn from responses to waves 1, 5, and 6 of the Survey on Teen Relationships and Intimate Violence (STRiV), a nationally representative study launched in 2013 with a US cohort of youth ages of 10 to 18 years old. The STRiV cohort was recruited from an address-based, national probability sample of Spanish and English-speaking households (Knowledge Panel). The weighted baseline (wave 1) sample encompassed 2354 parent-youth dyads (Taylor & Mumford, 2016). Of the baseline youth respondents, a total of 1319 youth (56.0%) completed the wave 5 survey, roughly 5 years after wave 1 (October 2018 to September 2019). Of those same baseline respondents, 1447 youth (61.4%) completed the wave 6 survey, which was conducted from December 2019 to November 2020. All youth responses to the wave 5 and wave 6 surveys were included in analyses; however, those who provided no responses to any of the three loneliness items or to any of the four optimism items were excluded. After these exclusions, there were very few missing observations in the data (fewer than 2% of observations missing across all variables). All analyses were conducted with Stata 15.1. Missing data were imputed to create 20 imputed data sets. Results of analyses conducted on the original data and the 20 imputed data sets were substantively similar. We chose to present findings using the imputed data. The final analytical sample consisted of 1177 youth, including 575 and 602 young women and men, respectively.

Measures

Adverse Childhood Experiences

During the wave 5 survey, respondents were asked 10 items assessing exposure (yes/no) to adverse childhood experiences, referring to respondent experiences prior to age 18, consistent with measurement in the Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance System (BRFSS) ACE module (Wade Jr et al., 2017). These ten items appraised whether the youth had lived with anyone who was depressed, mentally ill, or suicidal; was a problem drinker or alcoholic; used illegal street drugs or who abused prescription medications; or was incarcerated. Additional measures captured whether respondents had parents who were ever separated or divorced, and if they had witnessed parents' intimate partner violence (IPV) within the home. Remaining items asked respondents whether they had ever experienced physical, sexual, or verbal abuse or sexual assault.

Gainful Activity

An indicator of *gainful activity*, also reported at wave 5, was computed (yes/no) and captured if a respondent indicated that they were either working for pay outside of the home or if they were currently attending school or college.

Distal Outcomes

Outcomes were measured at wave 6. To capture *loneliness*, respondents were asked how often they felt left out, isolated, or without companionship via the Three-Item Loneliness Scale validated in earlier research (Hughes et al., 2004). Response values on a three-point scale (hardly ever; some of the time; often) were summed to create a scale measure of *loneliness* (Cronbach's $\alpha=0.86$) ranging from 0 to 6, with higher scores indicating greater loneliness. Respondents' *optimism* was measured by four items on five-point response scales drawn from the validated EPOCH Measure of Adolescent Well-Being (Kern et al., 2016). One item reflected their optimism for their future (from almost never to almost always), and three items were measured on a scale of not at all like me to very much like me: belief that good things would happen to them, belief that things will work out despite their difficulty, and their expectations of good things even in uncertain times. The mean of these four items (Cronbach's $\alpha=0.88$) was taken to create a scale measure, where higher scores on the item average represented greater optimism.

Emotional Well-Being

Emotional well-being was assessed both in terms of a key input, emotional regulation (Rawana et al., 2014), and in terms of a mental health screener (Berwick et al., 1991). *Emotional regulation* was measured with 10 items collected at wave 5 on a five-point scale from strongly disagree to strongly agree. The Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA) was developed and validated in earlier research (Gullone & Taffe, 2012). Respondents were asked about their level of agreement with six items, including whether they think about something different if they want to feel happier or less bad; whether they change the way they think about something if they are wanting to feel happier, less bad, or less worried about it; and whether they control their feelings by changing the way they think about them. Four additional items gauged whether respondents kept feelings to themselves, were careful not show happiness or bad feelings, and had the tendency to control their feelings by not showing them. These four were reverse-coded, and a mean of all 10 items was computed to create a scale measure, where a higher mean score across all measures indicated better emotional regulation (Cronbach's

$\alpha = 0.77$). A *common mental disorder*, also measured at wave 5, was captured through responses to the five items of the Mental Health Index (MHI-5; from the SF-36 Health Survey), a validated screener for anxiety and depression (Berwick et al., 1991). Items assessed on a six-point response scale (from none of the time to all of the time) the extent to which respondents had felt nervous, happy, down in the dumps, calm, or downhearted over the past month. The continuous score ranged from 0 to 100. Following Kelly et al. (2008), respondent values were recoded as a binary variable, with scores ≤ 76 indicating that the respondent screened positive for a common mental disorder, where (1 = yes).

Sociodemographic Covariates

Additional measures controlled for in the analyses were drawn from the wave 1 survey response data, except for respondent *age* at the time of outcome measurement (wave 6). Sex was coded as a binary variable (female = 1, male = 0). Four categories of *race and ethnicity* were included as dichotomous measures (Black, Hispanic, Other, and White as the reference category). Additional covariates were informed by responses to the parent/caregiver survey at wave 1, including *household income* (a dichotomous variable indicating whether household earnings were above the 2013 median income (1 = yes)). *Parental educational attainment* (some college, college degree or more, and a high school education or less as the reference) was coded as the highest level of education attained based on the parent respondent's own education and an additional survey item asking "Which of the following best describes your *spouse or partner's* education."

Analysis Plan

We began by executing a series of latent class analyses using indicators of adverse childhood experiences identified in prior research. We examined model fit statistics, focusing in particular on the Bayesian Information Criterion (BIC) as the most reliable fit statistic for comparing latent class solutions; lower BIC values indicate better fit in terms of selecting the most parsimonious and correct model (Nylund et al., 2007). Based on our review of model fit, in addition to the meaning of the class distinctions, we selected the three-class model as the most appropriate for the respondents included in this investigation. Subsequently, we presented the sample descriptive characteristics and estimated the associations of all study covariates with class membership in regression models. Next, we drew on the posterior probabilities of latent class membership to assign respondents to classes and used latent class membership to predict loneliness and optimism in a series of multivariable OLS regression models. Model 1 examined the association of ACE classes with loneliness

Table 1 Model fit information for competing latent class models ($n = 1177$)

Number of classes	AIC	BIC
2	6610.76	6717.25
3 ^a	6533.63	6695.89
4	6506.85	6724.89

^aSelected as final model

Table 2 Conditional probabilities of adverse childhood experiences for three-class solution ($n = 1177$)

	Class 1	Class 2	Class 3
	81.5%	13.4%	5.1%
Household member mental illness	12.4%	59.9%	18.8%
Household member problem drinker	4.2%	66.5%	0.9%
Household member drug user	1.2%	40.1%	3.4%
Household member incarceration	1.8%	34.7%	7.9%
Parental separation/divorce	16.0%	55.6%	21.7%
Parental IPV	1.9%	32.8%	55.6%
Child physical abuse	0.1%	18.6%	78.4%
Child verbal abuse	18.5%	64.7%	80.4%
Child sexual abuse	0.4%	5.6%	25.8%
Child sexual coercion	0.1%	0.0%	23.9%

Class 1 represents low risk for ACEs. Class 2 represents higher levels of parental mental illness, problem behaviors, and family instability. Class 3 represents higher levels of abuse and neglect

and optimism as the respective outcomes, adjusting for sociodemographics. Model 2 repeated these analyses with the addition of measures of emotional well-being to assess attenuation of the Model 1 associations. The findings from these analyses are described below.

Results

Descriptive Statistics and Latent Classes

Model fit information for models with two through four classes is provided in Table 1. Results of our latent class analyses yielded three distinct subgroups in the data, as a function of respondents' exposure to different ACEs. Table 2 presents the item-response probabilities for each item conditional on latent class membership. The majority of respondents belonged to the low-risk group (81.5%; class 1), while the remainder were distributed across classes 2 (13.4%) and 3 (5.1%), respectively. As can be observed in Fig. 1, classes 2 and 3 were relatively clearly characterized by a set of ACEs. That is, members of class 2 reported higher levels of parental mental illness, problem behaviors, and family instability, including parental mental illness, alcoholism, substance use, incarceration, and divorce. In

Fig. 1 Conditional probabilities of ACEs, by latent class membership ($n = 1177$)

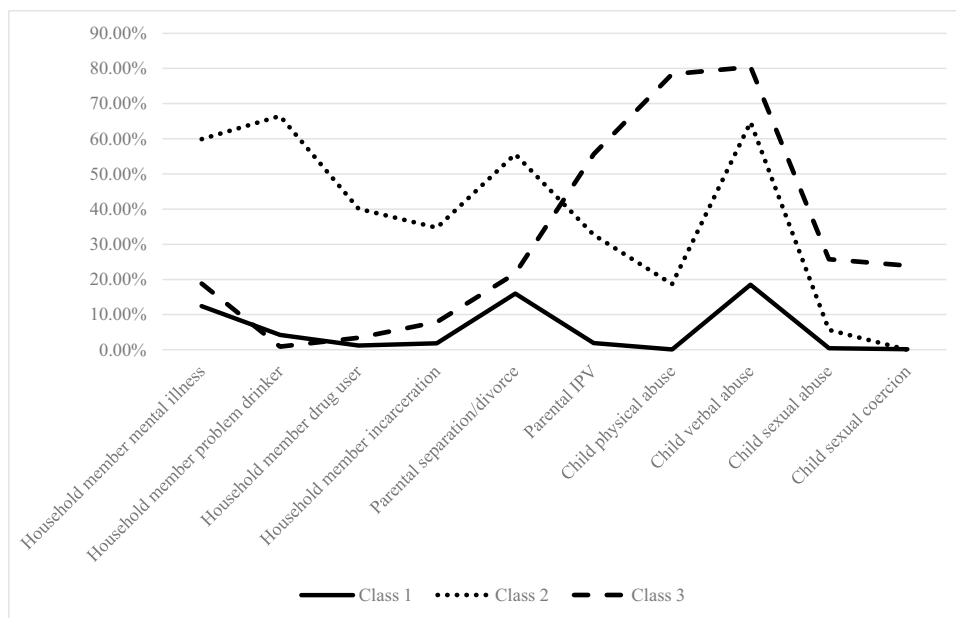


Table 3 Descriptive statistics for all study variables, by class membership ($n = 1177$)

	Mean/percentage	SD	Range	Class 1	Class 2	Class 3
Dependent variables						
Loneliness	1.90	1.83	0–6	1.79	2.41	2.49
Optimism	3.42	0.94	1–5	3.46	3.20	3.11
Independent variables						
Latent classes (class 1)	84.3%			–	–	–
Class 2	11.6%			–	–	–
Class 3	4.2%			–	–	–
Emotional well-being						
Emotional regulation	3.49	0.52	1–5	3.49	3.49	3.47
Common mental disorder	54.4%			50.5%	75.0%	75.5%
Sociodemographic characteristics						
Sex (male)	51.2%			53.1%	41.2%	38.8%
Female	48.8%			46.9%	58.8%	61.2%
Age	20.3	2.81	15–30	20.2	20.4	20.9
Race/ethnicity (White)	70.8%			71.6%	70.6%	55.1%
Black	9.8%			9.4%	10.3%	16.3%
Hispanic	12.7%			12.4%	14.0%	14.3%
Other	6.8%			6.6%	5.2%	14.3%
Household income (> 2013 median income)	57.8%			59.3%	45.6%	61.2%
Parental education (high school or less)	28.2%			27.9%	32.4%	22.4%
Some college	30.5%			29.1%	39.7%	32.6%
College or more	41.3%			42.9%	27.9%	44.9%
Respondent gainful activity	94.4%			94.7%	94.1%	87.8%

Reference categories indicated in parentheses

contrast, members of class 3 were exposed to higher levels of abuse and neglect.

Descriptive statistics are provided in Table 3 for the full sample, and by class membership. The average level of

loneliness was 1.9, suggesting that on average, respondents reported lack of companionship, feeling left out, or feeling isolated from others at least some of the time. Respondents reported an average level of optimism of 3.4 on a scale of 1

Table 4 OLS regression models predicting loneliness and optimism as a function of class membership, emotional well-being, and sociodemographic characteristics

	Loneliness			Optimism		
	Zero order	Model 1	Model 2	Zero order	Model 1	Model 2
Latent classes (class 1)						
Class 2	0.617***	0.636***	0.394*	−0.265**	−0.258**	−0.134
Class 3	0.695**	0.615*	0.385	−0.356*	−0.335*	−0.216
Emotional well-being						
Emotional regulation	−0.875***		−0.608***	0.606***		0.476***
Common mental disorder	1.299***		0.992***	−0.673***		−0.497***
Sociodemographic characteristics						
Sex (male)						
Female	0.386***	0.359**	0.231*	−0.143**	−0.138*	−0.082
Age	−0.012	−0.025	−0.017	−0.007	0.004	−0.001
Race/ethnicity (White)						
Black	−0.152	−0.189	−0.101	0.291**	0.314**	0.266**
Hispanic	−0.067	0.015	−0.029	0.173*	0.192*	0.224**
Other	−0.113	−0.248	−0.300	0.089	0.116	0.155
Household income (> 2013 median income)	0.145	0.012	0.032	−0.043	−0.015	−0.021
Parental education (high school or less)						
Some college	0.194	0.221	0.160	−0.008	−0.004	0.021
College or more	0.477***	0.568***	0.403**	−0.028	−0.037	0.048
Respondent gainful activity	−0.680**	−0.836***	−0.687**	0.506***	0.533***	0.441***
Constant		2.644***	4.083***		2.902***	1.628***
Model F		5.76***	18.89***		5.06***	24.55***

Reference categories indicated in parentheses. Model 1 examined the association of ACE class with loneliness and optimism as the respective outcomes, adjusting for sociodemographics. Model 2 repeated these analyses with the addition of the measure of emotional well-being

to 5, indicating that they often felt optimistic and identified somewhat with an optimistic outlook. These estimates varied somewhat across the different classes, such that members of class 1 (the low-risk group) reported lower levels of loneliness and higher levels of optimism than members of classes 2 and 3.

Across the full sample, average levels of emotional regulation were 3.5, and just over half of respondents demonstrated symptoms of a common mental disorder, based on their responses to the mental health inventory (MHI-5). Just under half of the sample was female, and the average age of respondents was 20.3. The majority of respondents were non-Hispanic White (70.8%), and the remainder were non-Hispanic Black (9.8%), Hispanic (12.7%), or identified as members of “other” racial/ethnic groups (6.8%). Nearly three-fifths (57.8%) of respondents reported household incomes above the 2013 median income. Roughly a quarter of respondents reported levels of parental education of high school or less, while 30.5% and 41.3% reported that their parents had attended some college or earned at least a bachelor’s degree, respectively. Finally, the vast majority (94.4%) of sample members

were gainfully active—that is, either working or attending school—at the time of the wave 5 interview.

Distal Outcomes

Results of a series of OLS regression models are presented in Table 4. Based on the results of the latent class analyses, we created a set of dummy variables to classify individuals based on their reports of ACEs. Using class 1 as our reference category (those with low levels of exposure to ACEs overall), we examine associations between latent class membership and young adult psychological outcomes of loneliness and optimism. At the zero order, classes 2 and 3 reported higher levels of loneliness than their counterparts in class 1. In addition, emotional regulation, common mental disorder, sex, parental education, and respondent gainful activity were all related to loneliness at the bivariate levels, such that those with greater levels of emotional regulation and engaged in gainful activity reported lower levels of loneliness. In contrast, those displaying symptoms of a common mental disorder, females, and those raised in households with higher levels of parental education reported

higher levels of loneliness. These associations largely persisted in Model 1, which included the indicators of latent class membership and the sociodemographic controls. More specifically, members of classes 2 and 3 continued to report higher levels of loneliness than their class 1 counterparts, net of the full roster of sociodemographic considerations. However, in Model 2, after controlling for the respondents' emotional well-being (i.e., emotional regulation and common mental disorder), the associations between class membership and loneliness were slightly attenuated such that differences in reports of loneliness between members of class 1 and 3 were no longer significant. Controlling for the full set of study variables, members of class 2 continued to report higher levels of loneliness than their peers in class 1, although the magnitude of this difference was reduced ($p < 0.05$). These findings suggest that much of the difference in loneliness across the latent classes may be attributable to differences in respondents' emotional well-being. Still, those exposed to higher levels of parental mental illness, problem behaviors, and family instability remain worse off in terms of reports of loneliness net of their own emotional well-being.

In models predicting respondent optimism, a somewhat similar pattern of findings emerges. That is, at the zero order, members of classes 2 and 3 report lower levels of optimism than do members of class 1. In addition, levels of respondent emotional well-being are linked to reports of optimism such that those with higher levels of emotional regulation report higher levels of optimism, while those displaying symptoms of a common mental disorder report lower levels of optimism. Of the sociodemographic controls, sex, race/ethnicity, and gainful activity were significantly associated with respondents' reports of optimism, such that female respondents reported lower levels of optimism, while Black and Hispanic respondents (relative to Whites) and respondents engaged in gainful activity reported higher levels of optimism. In model 1, which included the latent classes and the full range of sociodemographic characteristics, the linkages between class membership and optimism remained significant and negative. In particular, members of classes 2 and 3 continued to report lower levels of optimism than members of class 1 after controlling for sex, age, race/ethnicity, household income, parental education, and respondent gainful activity. However, in contrast to the models predicting loneliness, the associations between class membership and optimism were entirely attenuated following the addition of the indicators of respondent emotional well-being to the model (model 2). Taken together, the findings of these analyses suggest that youth's early exposure to adversity has important implications for feelings of loneliness and optimism; however, respondents' own levels of emotional well-being in later adolescence and early adulthood factor heavily into these observed associations.

Discussion

The current study adds to the body of literature regarding childhood adversity and subsequent loneliness and optimism in a nationally representative sample of adolescents and young adults. Although young adults experience optimism to a greater degree than their older counterparts (Chopik et al., 2020), they also face increased risk of loneliness (Larsgaard et al., 2016; Luhmann & Hawkey, 2016). Investigating childhood risk factors for these psychological outcomes may be constructive for tailoring effective interventions. Consistent with our first hypothesis, we found a large class of low childhood adversity with low probability of parental divorce, verbal abuse, and mental illness representing four out of five youth. The second class, representing about one in seven youth, reported indicators of family dysfunction with higher probability, but lower levels of interpersonal abuse. A third class of youth reporting higher parental discord and IPV, as well as child abuse, represented about five percent of this cohort, or one in twenty youth. While measurement and cohort characteristics vary across studies, the current findings are in line with prior research (Dobson et al., 2021; Lee et al., 2020; Lew & Xian, 2019), except for a higher proportion of the STRiV sample reporting low childhood adversity.

This study also presents the first representative results of the associations of childhood adversity, as self-reported, with subsequent self-perceptions of loneliness and optimism. Results were in line with our second hypothesis. The finding that respondents in class 2, with a higher risk of childhood exposure to verbal abuse, parental separation/divorce, mental illness, and problem drinking, were more likely to experience loneliness is consistent with past research regarding adult children of alcoholics (Haverfield & Theiss, 2014). Further, there is consistent evidence that relates parental neglect and emotional abuse to subsequent emotional expression, connectedness, and ability to trust, with correlations stronger than that of physical and sexual abuse (Pilkington et al., 2021). This underscores that childhood adversity need not rise to the level of parental criminal behavior to have long-term detrimental impacts. Returning to theoretical reasoning about the development of psychological states and processes, both the biosocial vulnerability model (Scarpa, 2015) and the neuroecosocial approach (Rose et al., 2021) provide conceptual space for bidirectional interplay between physiology, relationships, and environmental impacts on individual pathways. Repeatedly experienced emotions and psychological processes form conditioned emotional patterns in the brain (Costafreda et al., 2008). While optimism has a neurostructural basis (Lai et al., 2020), positive expectancies characterizing an optimistic outlook may also be impacted by early childhood

experiences. The experience of loneliness, impacted by both direct early experiences and subsequent social experiences shaped by stronger or weaker social skills, can itself alter neurostructures (Cacioppo et al., 2014).

Results supported our third hypothesis that measures of emotional well-being would attenuate the association between childhood adversity and our outcomes. These findings underscore the importance of addressing emotional well-being following childhood adversity, as well as informing further longitudinal research to understand potential mediation of subsequent reports of optimism and loneliness. However, there is likely a complexity in these associations to be investigated further. Loneliness may not just be associated with depression and other affective disorders, but also a cause of increased depression (Cacioppo et al., 2010; Richardson et al., 2017) and anxiety (Moeller & Seehuus, 2019). While the valence is different, there is also a potential directional impact of optimism on mental health. Optimism may facilitate engagement coping strategies and better health outcomes (Carver & Scheier, 2014), as suggested by the association between both gainful activity and emotional regulation with respondent optimism in the current sample. Taken together, this research underscores that both loneliness and optimism are important constructs—net of the significant associations of measures of emotional well-being with our study outcomes—to take seriously in all age groups. Late adolescent experiences of loneliness and optimism are markers for personal, familial/friend, and professional interventions to shift individual patterns.

Implications

The current results suggest that around 7 million youth in this age cohort in the USA (Howden & Meyer, 2011) are growing into adulthood with the challenge of learning to cope with early childhood adversity; however, the number of at-risk youth would be even higher based on ACE estimates from other representative cohorts (Barboza, 2018; Lee et al., 2020; Logan-Greene et al., 2014). Emotional regulation attenuates the impact of ACEs on psychological outcomes (Cloitre et al., 2019), and strategies to enhance emotional regulation can ameliorate the effect of ACEs on chronic stress and cognitive flexibility (Kalia & Knauft, 2020). The additional impact of ACEs on physical outcomes (Cloitre et al., 2019; Merians et al., 2019; Wade et al., 2016) add to the overall burden. Annually, the estimated costs of physical and mental health outcomes associated with ACEs experienced by individuals in North America is \$748 billion (Bellis et al., 2019). Thus, there are compelling human and fiscal benefits of community, familial, and individual

primary prevention and secondary interventions to disrupt patterns that create childhood adversity as well as tertiary interventions targeting mediators of ACEs. Trauma-informed counseling, mental health services, and school-based interventions are important evidence-based approaches to mitigating the impact of ACEs and building resilience (Soleimanpour et al., 2017) and to boosting optimism (Rincón Uribe et al., 2021).

These results offer insights to the psychological impact of childhood adversity, informing further research regarding social processes, neurophysiology, and, importantly, potential clinical supports for deleterious psychological outcomes related to anxiety and depression. Cognitive behavioral therapeutic approaches targeting hypervigilance for perceived social threats (potentially reinforced by attentional, confirmatory, and memory biases) show the most promise in addressing loneliness (Masi et al., 2011) and depression symptoms including pessimism (Driessen & Hollon, 2010). Research addressing psychosocial activation and hypervigilance also points to potential pharmaceutical treatment for loneliness similar to other symptoms of anxiety and depression (Cacioppo et al., 2015; Campagne, 2019). From a research perspective, investigations of treatment options may be stronger to the degree that they reflect the multiple neuroecosocial bases of origin of psychological outcomes such as optimism and loneliness.

Limitations

These analyses rely on self-reported data and may reflect recall or other reporting biases. The STRiV dataset relies on a household sampling frame; this design means that results are not necessarily representative of youth in foster care, unhoused, or incarcerated youth. Not all respondents in the current analytic sample had reached adulthood when surveyed at wave 5 about childhood adversity “before the age of 18.” Thus, these minors may have experienced subsequent adversities during childhood not captured in the current study. However, we examined ACEs reported at wave 5 and outcomes at wave 6 and thus maintained temporal order of the key predictors. Additionally, the measurement of ACEs in the current study does not reflect broader community and systematic adversities (Ortiz, 2021; Wade et al., 2016), including the differential geospatial and cultural impacts of the social upheaval of 2020, which have implications for health inequalities (Gibson et al., 2021; Nurius et al., 2016). Finally, adolescence is a period of developmental growth, and self-reports of psychological states may fluctuate daily (e.g., Arbel et al., 2018). Further research to assess the durability of the associations found in this study, taking into account broader measures of childhood adversity, is warranted.

Conclusion

While the negative outcomes associated with childhood adversity are many, there are also multiple potential psychological pathways for intervention. Acknowledging and addressing adolescent loneliness and supporting optimistic outlooks are two pathways with potential benefits to reduce mental and physical morbidities. These outcomes take on more significance in light of the social and economic disruption arising with the COVID-19 pandemic, which may impact the prevalence of ACEs as well as optimism and loneliness. There are evidence-based approaches to mitigating the impact of childhood adversity, and practitioners might find some success in focusing on optimism and loneliness among adolescents and young adults.

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Data Availability <https://www.icpsr.umich.edu/web/NACJD/studies/36499/summary>

Declarations

Conflict of Interest The authors declare no competing interests.

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