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College Students' Perceptions of Problematic Childhood Family Environments Change Across the COVID-19 Onset

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Abstract

While debate persists over the accuracy of retrospective self-reports of childhood family environments, empirical understanding of the stability of these assessments among young adults during stressful events remains limited. In response, this study examined whether college students' perceptions of problematic childhood family environments changed across the COVID-19 onset. We leveraged a longitudinal dataset of 355 college students (237 female, *M*age = 19.4 years, *SD* = 0.70; 118 male, *M*age = 19.6 years, *SD* = 0.70), oversampled for recent substance misuse. Participants completed assessments over five to seven timepoints; the pandemic onset (13 March 2020) occurred near the midpoint of data collection. We employed piecewise growth-curve modeling (PGCM) to evaluate pandemic-onset-related changes in participants' perceptions of problematic childhood family environments and the moderating effect of family co-residence during the acute pandemic onset. Results indicated that college students' perceptions of problematic childhood family environments significantly but modestly increased from pre- to post-pandemic onset. Living with family during the acute disruption period did not moderate this change. In conclusion, stressful events like the COVID-19 outbreak could serve as a pivotal event associated with increased problematic perceptions of childhood family environments among young adults. We reinforce the necessity of adopting rigorous longitudinal, repeated-measures designs for retrospective assessments in family sciences. Additional conceptual and theoretical, methodological, and practical implications were discussed.

Keywords: COVID-19; childhood family environments; young adults; college students; longitudinal retrospective study

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1. Introduction

A person's perception of their childhood family environments encompasses both feelings of being cared for and loved by family members, as well as recollections of unpleasant family experiences, such as conflicts or potential mistreatment during early life. Family science researchers have applied various concepts to conceptualize and measure childhood family perceptions, focusing on the degree to which the family environment was problematic, risky, or negative given its lasting health implications. For instance, the risky family environment measure assesses childhood stressors in the family environment, such as the frequency or levels of harsh parenting, abuse, and neglect, compared with affection and harmony (Taylor et al., 2006). Another commonly evaluated indicator of childhood family environment is adverse childhood experiences (ACEs), encompassing

various forms of child abuse and maltreatment (e.g., physical, sexual, and emotional), neglect, and household dysfunction (Hughes et al., 2017).

Social scientists recognize the vital role that childhood family relations play in adults' mental health, well-being, and relationship function across the lifespan (Thurston et al., 2025). Consequently, scientific understanding of how perceptions of childhood family environments are associated with both short- and long-term developmental outcomes has been well established (see the systematic review and meta-analysis by Petruccelli et al., 2019). One population of interest in this research topic is young adults. Young adulthood is marked by heightened autonomy and independence, self-focus, identity exploration, and the development of social relationships, especially romantic relationships (Arnett, 2000). Although young adults experience reduced direct familial supervision and changed family roles, their perceptions of problematic childhood family environments continue to influence their adjustment and pose challenges to a healthy transition to adulthood. Specifically, these perceptions can increase mental health symptoms and negatively impact self-worth, hindering their ability to fully embrace self-exploration (Roustit et al., 2011). Also, childhood family stressors may carry over to social relationships in young adulthood, raising the likelihood of young adults being sensitized by or becoming involved in risky intimate relationships filled with aggression and conflict (Maleck & Papp, 2015).

Indeed, the health and adjustment implications of problematic childhood family environments or ACEs on young adult development are well-documented. A recent systematic review of 23 empirical studies has highlighted the association between primarily retrospectively reported ACEs and young adults' antisocial and criminal behaviors, such as psychopathy, persistent criminal activity, and psychosocial issues (Silva et al., 2024). Additionally, individuals with a history of ACEs tended to become both the perpetrators and victims of intimate partner violence, as well as report a lower quality of life. Cross-sectional retrospective reports of negative family social environment, ACEs, and risky family environments have been linked to poor self-perceived health, cognitive functioning, and negative romantic relationship functioning (Hawkins et al., 2021; Maleck & Papp, 2015; Roustit et al., 2011)—all of which are important functions in young adulthood. Therefore, accurate and reliable assessments of young adults' childhood family environments are pivotal to informing targeted prevention and intervention efforts.

Currently, two approaches to measuring childhood family environments include prospective and retrospective reports. Prospective longitudinal studies were deemed ideal for developmental researchers interested in studying childhood family environments and their associations with family members' health and adjustment. However, methodological limitations in terms of resources and time may hinder the feasibility of a prospective design to examine childhood family environments over time (Bell & Bell, 2018). Moreover, additional drawbacks of prospective longitudinal studies that may raise concerns about the accuracy of reports include heterogeneity in reporting, overreliance on informant reports (e.g., parents, teachers, clinicians, and social service records) rather than children's self-reports, and missing data due to high attrition rates (Newbury et al., 2018; Thurston et al., 2025).

When prospective studies are unavailable or infeasible, retrospective studies are a convenient alternative. Indeed, it is a common practice in family sciences to assess perceptions of childhood family environments using cross-sectional, retrospective self-reports (Silva et al., 2024). Nevertheless, prior findings have called into question the validity and reliability of retrospective measures of family environment, with research comparing children's prospective and young adults' retrospective reports of childhood family environments showing mixed results for between-method agreement. For instance, Naicker et al. (2021) found greater concordance between caregivers' prospective reports

of ACEs and young adults' retrospective reports than between self-reported prospective and retrospective accounts. Henry et al. (1994) observed a poor correlation between mothers' prospective reports of childhood family conflict and children's retrospective accounts (mean r = 0.19). White et al. (2007) reported poor to fair agreement between adolescents' prospective and young adults' retrospective accounts of parental discipline and physical abuse (kappa ranged from 0.20 to 0.40). The between-method inconsistencies raised concerns about bias, particularly in retrospective reports. The time elapsed between the maltreatment and the retrospective self-reports, along with factors such as self-report bias (e.g., substantial false-negative reports), social desirability bias, mood-congruent memory bias, and inaccuracies in recollections (known as recall bias), can affect the accuracy of the assessment (see systematic review by Hardt & Rutter, 2004). These biases may arise from memory decay or forgetting, subsequent life events, developmental factors, the quality of the measurement tools, and discrepancies between self-reports and other reports (Bell & Bell, 2018).

Nevertheless, these mixed findings do not undermine the value of retrospective reports of childhood family environments, especially considering their convenience and availability (Kendall-Tackett & Becker-Blease, 2004). In addition, retrospective findings offer meaningful health implications and enable researchers to explore individuals' perceptions and appraisals of childhood family environment as associates of health symptoms. For instance, Brown et al. (2005) reported a strong relationship between retrospective reports of child abuse (but not prospective reports) and adult pain. Similarly, Reuben et al. (2016) suggested that retrospective ACEs showed a stronger association with subjective assessments of health outcomes than prospective ACEs, whereas prospective ACEs showed stronger associations with objectively assessed health outcomes. Another benefit of retrospective measures is their capacity to address potential biases found in prospective reports (Newbury et al., 2018).

Beyond the discussion around the benefits and drawbacks of prospective and retrospective measures, less attention has been given to single versus repeated assessments. Some researchers have questioned the accuracy of cross-sectional, retrospective reports of childhood family environments, raising concerns about static views of such memories and potential recall biases in existing studies (Colman et al., 2016; Hardt & Rutter, 2004). The memory reconsolidation theory challenges the traditional belief that memories are fixed and permanent (Nader & Hardt, 2009). Nader and Hardt (2009) argued that recollections, such as perceptions of childhood family environments, are inherently unstable and can be strengthened, weakened, or altered upon recall, as they undergo reconsolidation in response to new information or experiences. In other words, this theory suggests that memories are not static but subject to change over time. In line with this theory, longitudinal studies that track the same individuals over time may enable examination of within-individual changes in retrospective reports and effectively mitigate biases through repeated assessments (Hardt & Rutter, 2004).

Given the limited longitudinal evidence, it remains a critical and overlooked question whether young adults' perceptions of childhood family environments remain stable over time, especially in relation to significant events. Nevertheless, some insights can be drawn from theories and empirical findings. For instance, Fergusson et al. (2000) reported some consistency in 983 young adults' retrospective reports of ACEs across three years (kappa = 0.45), although substantial variation—largely false negative reports of child abuse—was identified in participants' recall. Similarly, in a 12-year longitudinal study following 7466 young adults, retrospective reports of ACEs at two time points were inconsistent, with participants failing to recall certain episodes of adversity they had previously reported (Colman et al., 2016). This finding was particularly true for participants who

reported less psychological distress during the second assessment, as those with greater psychological distress tended to "forget" the least.

Both the Fergusson et al. (2000) and Colman et al. (2016) studies indicated a possible change in the repeated, retrospective report of childhood family environment across young adulthood. However, these studies did not explore whether these inconsistencies in retrospective reports were related to significant life events. Supporting the memory reconsolidation theory, a recent longitudinal study following 2692 middle-aged and older adults for four years reported that significant life events, such as parental loss or marital dissolution, were associated with shifts in their perceptions of childhood parental care over time (Chopik et al., 2023). This research suggested that individuals' recollections of their childhood family environments may change over time in response to pivotal events.

One recent and virtually ubiquitous pivotal event was the COVID-19 pandemic, which profoundly affected many lives, particularly those of young adult college students. Following the outbreak of the pandemic in March 2020, widespread disruptions led to campus closures and a sudden shift to online education due to social distancing regulations and efforts to control the rapidly spreading virus (Li et al., 2021). Changes in college life, along with the need to adapt to a new environment and increased family closeness, may have prompted young adults to reflect on life transitions and their childhood family environments. Therefore, understanding the stability of young adult college students' perceptions of childhood family environments, especially whether there are changes in problematic perceptions, is critical, as these perceptions may be negatively associated with their concurrent and subsequent adjustment.

The Current Study

Guided by theory and empirical evidence, we leveraged longitudinal data collected before and after the COVID-19 onset to investigate whether the global pandemic was associated with changes in young adult college students' perceptions of problematic childhood family environments. These data span from September 2017 to September 2021. Participants' perceptions of problematic childhood family environments were assessed repeatedly at five time points (with some participants completing up to seven assessments), allowing for the examination of within-person change associated with the onset of COVID-19. To address the research limitation of a heavy focus on vulnerable samples (e.g., clinical or court control samples; Hardt & Rutter, 2004), we assessed a sample of young adults from the non-clinical population.

To measure growth trends associated with the onset of the pandemic, we employed piecewise growth-curve models (PGCMs; Willett et al., 1998)—a rigorous analytical approach well-suited to fully leveraging the depth and complexity of the data. PGCM is a flexible approach that accounts for a focal event (i.e., the hypothesized turning point) by coding time as pre- or post-event, allowing evaluation of differences around the pivotal event (Ning & Luo, 2017). Compared to basic mean-comparison analyses (e.g., *t*-tests or ANOVA), PGCM provides a more comprehensive assessment by capturing differences in the intercept (i.e., the average level) of the outcome variable while accounting for participants' repeated assessments and any potential linear change in the outcome.

Additionally, we were interested in whether living with family during the acute pandemic-onset period could moderate possible pandemic-onset-related changes in these perceptions. Against the backdrop of the COVID-19 pandemic, a record-high percentage of young adults from the United States (US) moved back home (i.e., 52% in July 2020; Pew Research Center, 2020), likely correlated with changing family dynamics, connectedness, and parent–child interactions (Prattley et al., 2023). While some research highlighted strengthened family connections and college students' genuine care for family members

during this time (e.g., Sharaievska et al., 2024), others reported family tensions and conflicts (e.g., Hall & Zygmunt, 2021). These family experiences, occurring at a life stage when autonomy is typically viewed as crucial, may have prompted young adults to revisit and potentially alter their perceptions of problematic childhood family environments.

We investigated the following questions:

RQ1: Did the intercept (i.e., average level) of young adult college students' perceptions of problematic childhood family environments change from before to after the onset of COVID-19? Given the mixed evidence in the field to guide hypotheses, we explored this research question.

RQ2: Did living with families during the acute COVID-19 outbreak moderate the intercept changes in the outcome variable? Due to the limited existing knowledge, we explored this research question.

2. Materials and Methods

2.1. Procedures and Participants

The current research leverages an existing dataset from a longitudinal project focused on college students' prescription drug misuse and related health (see Papp et al., 2020). The baseline study recruited freshmen and sophomores aged 18–21 from a large Midwestern US university through flyers, newspaper announcements, social media, and emails sent to enrolled students. Materials stated, "We are particularly interested in how people use prescription medications." Informed consent and all study procedures were approved by the Institutional Review Board. Further information regarding the original research design can be found in previous publications (Papp et al., 2020).

The baseline (i.e., Time 1) assessment occurred on a rolling basis from September 2017 to 2019, with 355 participants (237 female, *M*age = 19.4 years, *SD* = 0.70; 118 male, *M*age = 19.6 years, *SD* = 0.70) completing initial surveys on health, relationships, and overall functioning. At Time 1, participants predominantly self-identified as female (66.8%). Most participants self-reported as White (79.4%), with other racial identities including Asian (8.7%), African American (2.3%), and other racial backgrounds (9.3%), including American Indian/Alaska Native, Native Hawaiian or Pacific Islander, and multiple or other races. For ethnicity, 7.6% of participants reported a Hispanic or Latino/a background. Given the broader project's focus, individuals reporting recent prescription drug misuse of one or more medications were oversampled during recruitment and categorized as the risk group (*N* = 300). Fifty-five participants without recent misuse at study enrollment were classified as non-risk group participants.

Subsequent surveys were administered to all study participants every six months for two years after the baseline assessment, with excellent retention rates maintained (Time 2: 99.4%; Time 3: 98.3%; Time 4: 98.3%; Time 5: 97.5%). The COVID-19 outbreak occurred during the data collection process. In response to this event, all participants (*N* = 355) were invited to complete a one-time survey capturing experiences during the acute disruption phase. Most participants (83.1%) accepted the survey invitation, with 295 participants completing the COVID-19 survey between 27 March 2020 and 6 April 2020, after which the survey was closed. Following the pandemic onset, the study was extended for the earliest-enrolled participants to include Time 6 (i.e., 82/84; 97.6% response rate) between January and February 2021 and Time 7 (i.e., 60/63; 95.2% response rate) between July and August 2021. Details about the broader study can be found in other publications (e.g., Haas et al., 2024).

2.2. Measures

2.2.1. Outcome Variable

Problematic Childhood Family Environments. We assessed participants' retrospective reports of problematic childhood family environments with the Risky Families questionnaire (Taylor et al., 2006) at all time points. This measure contains 11 items that assess the degree of supportive/caring family dynamics as well as conflicts/harshness experienced during childhood. Example items include "I felt loved and cared for" and "I observed quarreling or shouting between parents." Participants responded on a scale ranging from 1 (none of the time) to 4 (most or all of the time). Although the construct includes both positive and negative items, we maintained its predominantly negative nature, consistent with the original measurement design. With the positively valenced items reverse-coded, higher average scores indicate a more problematic or challenging view of childhood family environments. The measurement demonstrated high internal consistency across the timepoints in the present study (i.e., Cronbach's α ranges from 0.82 to 0.87 across assessments).

2.2.2. Moderator

Family Co-Residence. As part of the COVID-19 survey, participants reported their primary residence by specifying whether they lived in their usual residence or had relocated, and by detailing their residence during the acute COVID-19 disruption. Based on these responses, we created a binary variable (0 = no, 1 = yes) to indicate whether there was evidence that participants co-resided with family members at that time. Responses that did not clearly indicate co-residing partners were coded as missing data. Of the 295 participants who completed the COVID-19 survey, 19 responses were treated as missing data, yielding a final sample of 276 for the moderation analysis.

2.3. Data Analysis

During preliminary analyses, we first conducted independent *t*-tests to examine whether mean-level differences in reports of problematic childhood family environments existed by participants' biological sex and risk group status from Time 1 to Time 7. Next, we explored the linear change in the outcome variable over the study period using a simple linear growth-curve model, without accounting for the effect of the COVID-19 onset. The linear analysis was conducted using the HLM2 module in HLM 8.2 software (Raudenbush et al., 2019). We created a *Time* variable and coded it so that the intercept reflects the average score at the first assessment (i.e., Time 1 coded as 0, Time 2 as 1, and so forth). We also explored whether family co-residence during the acute COVID-19 disruption phase served as a moderator of the linear model.

To address our first research question on the intercept change associated with the COVID-19 onset, we specified the PGCM using multilevel modeling (with restricted maximum likelihood estimation). Following Haas et al. (2024), we modeled COVID-19 onset as a pivotal event and assessed its association with participants' perceptions of problematic childhood family environments. We defined the onset of COVID-19 as 13 March 2020, corresponding with the university's major instructional and operational changes. Longitudinal study follow-ups conducted before this date were classified as pre-pandemic, and those on or after this date were classified as post-pandemic. We first created a *Time* variable for the PGCM, coding each participant's first follow-up assessment after the COVID-19 onset as 0. Assessments conducted before the pandemic onset were assigned negative values, while those conducted after were assigned positive values. Given the six-month interval between assessments, the preceding and subsequent assessments were coded as half-unit reductions and increments, respectively (e.g., *Time* = 0.5 for the second post-COVID-19 onset assessment, *Time* = 1.0 for the following one, and so on). We also created a time-

varying *COVID-19* variable, using effect coding to distinguish assessments collected during the pre-pandemic-onset (*COVID-19* = −0.50) and post-pandemic-onset (*COVID-19* = 0.50) periods. Compared with dummy coding (e.g., coding *COVID-19* as 0 and 1), effect-coding facilitates interpretation without designating either period as the reference category, as noted by Haas et al. (2024).

The Level 1 equation for the PGCM predicting the participant *i*'s problematic childhood family environment at *Time t* can be expressed as:

$$\text{Problematic Childhood Family Environment}_{ti} = \beta_{0i} + \beta_{1i}Time + \beta_{2i}COVID\text{-}19 + e_{ti}$$

where e_{ti} is normally distributed with a mean of 0 and variance of σ^2.

Level 2 equations are:

$$\beta_{0i} = \gamma_{00} + u_{0i} \quad (1)$$

$$\beta_{1i} = \gamma_{10} + u_{1i} \quad (2)$$

$$\beta_{2i} = \gamma_{20} + u_{2i} \quad (3)$$

Given the coding of *Time* and *COVID-19* in this study, the intercept (i.e., γ_{00}) represents the expected average levels of problematic childhood family environment perceptions at the point of COVID-19 onset (i.e., falling between the last assessment before the start of COVID-19 and the first assessment after the start of COVID-19). The first-order effect of *Time* (i.e., γ_{10}) represents the linear slope in the perceptions of problematic childhood family environments across the entire study period. We referred to γ_{20}—the estimate of fixed effects (with robust standard errors) for COVID-19 onset—as the change in the intercepts of participants' perceptions of problematic childhood family environment across the onset of the pandemic. The PGCM accounts for multiple assessments over time and provides statistics on the differences in predicted mean levels before and after the onset of COVID-19. A significant *p*-value (i.e., less than 0.05) indicates a reliable intercept change in the outcome variable. In addition, u_{0i}, u_{1i}, and u_{2i} represented the random effects for the intercept, linear slope, and pandemic-onset-associated changes in the intercepts of the outcome variable, respectively.

Following the baseline PGCM analysis, we addressed our second research question by testing whether family co-residence during the acute COVID-19 disruption moderated intercept changes in the outcome variable. To do so, we estimated an additional PGCM that included family co-residence as a Level 2 predictor, moderating each Level 1 coefficient.

In this study, we did not utilize generative artificial intelligence (GenAI) during the study process.

3. Results

3.1. Preliminary Findings

Preliminary analyses using independent *t*-tests examined biological sex (male/female) and risk group status (non-risk/risk) as possible covariates for the scores of problematic childhood family environments over time. Results revealed no significant differences in outcome scores between males and females over seven time points (*p*-values ranged from 0.236 to 0.948). Moreover, no significant differences were observed based on participants' risk-group status (*p*-values ranged from 0.057 to 0.969). As a result, neither variable was included as a covariate in the subsequent PGCM analyses.

We also examined the distribution of assessments collected before and after the onset of COVID-19 (Table 1). The number of days elapsed between each participant's pre- and post-pandemic-onset assessments ranged from 142 to 897 (M = 228.4, SD = 92.6). Table 1 presents

additional descriptive statistics (means and standard deviations [*SD*s]) for participants' reports of problematic childhood family environments across timepoints.

Table 1. Descriptive statistics for the outcome variable across the study.

	Number of Assessments						
	T1 (*N* = 355)	**T2 (*N* = 353)**	**T3 (*N* = 348)**	**T4 (*N* = 349)**	**T5 (*N* = 346)**	**T6 (*N* = 82)**	**T7 (*N* = 60)**
Before COVID-19 onset	355	347	256	141	67	--	--
After COVID-19 onset	--	6	92	208	279	82	60
	M (SD)						
Problematic childhood family environments	1.490 (0.43)	1.489 (0.46)	1.494 (0.45)	1.501 (0.48)	1.512 (0.48)	1.649 (0.47)	1.634 (0.51)

We modeled the outcome variable over time, independent of the effect of the pandemic onset. Results from the linear growth curve model indicated a small yet significant increase in participants' perceptions of problematic childhood family environments across the study period ($b = 0.01$, $SE = 0.01$, $p = 0.049$). In other words, participants viewed their childhood family environments as more problematic over time. Random-effects analyses revealed significant variability in slope change across participants ($\tau_{10} = 0.01$, $p < 0.001$). This finding indicates that participants differed significantly regarding their changing perceptions of problematic childhood family environments across the study period.

Family co-residence did not reliably moderate the linear slope change in the outcome variable over time ($b = -0.02$, $SE = 0.01$, $p = 0.187$). Put differently, there was no evidence that the changes in participants' perceptions of problematic childhood family environments across the study period differed by family co-residence status during the acute phase of the pandemic. Relatedly, the significant random effect for the linear slope change ($\tau_{11} = 0.01$, $p < 0.001$) indicated that family co-residence did not account for between-participant differences in the changing perceptions over the study period.

3.2. Main Findings

Table 2 presents the baseline PGCM results in response to the first research question. Although the preliminary model showed a significant positive slope of the perception of problematic childhood family environments across the study period, this slope became nonsignificant after the COVID-19 indicator was included in the baseline PGCM, with the direction of the coefficient changing from positive to negative ($b = -0.00$, $SE = 0.02$, $p = 0.920$). The differences in slope change in perceptions of problematic childhood family environments between the two models indicate that the significant longitudinal increase in the outcome variable observed in the preliminary model was primarily driven by the pandemic-onset effect, rather than by a continuous linear increase. Once the pandemic-onset effect was modeled, little evidence remained for the continued linear increase across the study period. Random-effects analyses showed significant variability in the slope change across participants ($\tau_{10} = 0.05$, $p < 0.001$), suggesting that participants differed significantly in their changes in perceptions across the study period.

In addition, findings revealed a significantly higher intercept of the problematic childhood family environment perceptions after the onset of COVID-19 than before ($b = 0.05$, $SE = 0.02$, $p = 0.010$), although the magnitude of this change was modest. The estimated 0.05-point shift corresponds to approximately one-tenth of the observed standard deviations of the outcome across assessments (*SD*s = 0.43–0.51). These comparisons suggest that, based on participants' repeated reports over time, the onset of the pandemic was associated with a detectable but small negative change in perceptions of childhood family

environments rather than a substantial change. The random effect for the intercept change was not significant (τ_{20} = 0.02, $p > 0.500$), indicating limited between-person variability in the onset-related intercept change. In other words, there is no reliable evidence that participants differed significantly in their changing perceptions of problematic childhood family environments before and after the COVID-19 onset.

Table 2. Problematic childhood family environments before and after the COVID-19 onset.

Fixed Effects	Coefficient	SE	*p*-Value
Baseline Piecewise Growth-Curve Model (PGCM)			
Intercept (average of expected levels at COVID-19 onset)	**1.50**	**0.03**	**<0.001** *
Slope across the study period	−0.00	0.02	0.920
Differences in intercept before and after the COVID-19 onset	**0.05**	**0.02**	**0.010**
Moderated Piecewise Growth-Curve Model (PGCM)			
Intercept (average of expected levels at COVID-19 onset)	**1.52**	**0.03**	**<0.001**
Moderated by living with family	**−0.17**	**0.06**	**0.004**
Slope across the study period	0.00	0.02	0.896
Moderated by living with family	−0.05	0.04	0.197
Differences in intercept before and after the COVID-19 onset	**0.05**	**0.02**	**0.016**
Moderated by living with family	0.02	0.04	0.661

* Note. **Bolded** estimates represent findings with significant *p*-values.

Findings from the moderated PGCM are also shown in Table 2. First, family co-residence at the acute pandemic-onset phase was significantly associated with the intercept ($b = -0.17$, $SE = 0.06$, $p = 0.004$). Specifically, college students who lived with family members during the acute COVID-19 outbreak reported significantly lower expected levels of problematic childhood family environment perceptions at the onset of COVID-19 than those who did not live with family. Based on the random effect, the intercept varied by participants (τ_{00} = 0.19, $p < 0.001$), indicating that participants differed significantly in their expected average levels of problematic childhood family environment perceptions at the onset of COVID-19, even after accounting for whether they lived with family.

Addressing the second research question, we found that the slope of the perceptions of problematic childhood family environments over the study period was nonsignificant, similar to the baseline PGCM ($b = 0.00$, $SE = 0.02$, $p = 0.896$). The direction of the coefficient was consistent with the preliminary model. Subsequently, family co-residence at the acute phase of the COVID-19 onset did not moderate the slope changes ($b = -0.05$, $SE = 0.04$, $p = 0.197$). As in the baseline PGCM, the random effect of the slope changes over time was significant across participants (τ_{10} = 0.05, $p < 0.001$), meaning that longitudinal changes in perceptions vary significantly by participant.

Also, participants' family co-residence status at the acute disruption phase did not reliably moderate the effect of COVID-19 onset on the intercept change in problematic childhood family environments ($b = 0.02$, $SE = 0.04$, $p = 0.661$). Consistent with the baseline PGCM, the random effect was not significant on this measure (τ_{02} = 0.02, $p > 0.500$), indicating that the increase in problematic perceptions following COVID-19 onset was relatively consistent across participants, regardless of the living arrangement.

4. Discussion

The current research examined changes in young adult college students' perceptions of their childhood family environments over time, particularly in relation to the onset of the COVID-19 pandemic. Our preliminary analysis demonstrated a reliable increase in the retrospectively reported perceptions of problematic childhood family environments across the study period, which became nonsignificant once the effect of the pandemic onset was added to the PGCM. Findings from the baseline and moderated PGCM revealed that college students perceived their childhood family environments as more problematic after the pandemic onset than before, although the magnitude of this difference was modest. No

evidence suggested that family co-residence—whether one lived with the family during the acute phase of the COVID-19 onset—moderated pandemic-onset-associated changes in the perceptions.

Our findings regarding the increase in young adults' perceived problematic childhood family environments over time and following the onset of the pandemic may be understood through prior empirical evidence and theoretical guidance. First, the results of this study have the potential to support memory reconsolidation theory (Nader & Hardt, 2009), which conceptualizes memory as a dynamic, time-sensitive process that can be reconsolidated in light of current contexts and environments. The underlying reasons, however, may not be the reinterpretation or modification of previously stored memories per se. Instead, stressful life events and circumstances, such as the global pandemic, may serve as perturbations that expose the instability of perceptions of childhood family environments, increasing the odds that individuals will accentuate the deficits or negative aspects of past experiences.

Furthermore, our findings are in line with the limited existing research on the fluidity of people's recollections of childhood family environments (Chopik et al., 2023; Colman et al., 2016; Fergusson et al., 2000). Specifically, our finding was consistent with those of Fergusson et al. (2000) and Colman et al. (2016), which showed increasingly negative perceptions of ACEs over time across young adulthood. We advanced the research understanding by conducting multiple repeated assessments of the same young adult participants' perceptions of problematic family environments in childhood and by considering the role of the broader sociohistorical context in evaluating changes in perceptions over time.

We also found evidence that experiencing significant stressful events, such as the COVID-19 pandemic, was associated with individuals' increased perceptions of problematic childhood family environments, supporting Chopik et al.'s (2023) findings. Our research further expanded Chopik et al.'s (2023) exploration of midlife and older adults and emphasis on individual-level life events (e.g., parental loss or marital dissolution) by focusing on young adulthood and assessing population-level life events. In the current study, young adults demonstrated a tendency to recall more unpleasant childhood family memories in the context of the pandemic's health-threatening and disruptive conditions. Substantial evidence from a systematic review suggests that the pandemic led to increased mental health challenges among young adults (Kauhanen et al., 2023), which likely heightened their psychological vulnerability and contributed to more negative reinterpretations of early family experiences.

Our findings also offered insights into the validity of estimating problematic childhood family environments from a single retrospective report (Fergusson et al., 2000), especially during stressful times such as the pandemic. The results of the present study resonated with previous scholars' critiques of one-time, cross-sectional, and retrospective reports of childhood family environments regarding their accuracy, reliability, and potential biases (Bell & Bell, 2018; Hardt & Rutter, 2004). The observed changes in perceptions over time could confound the association between childhood family environments and other health or adjustment outcomes in young adults, raising concerns about the validity of prior research findings (Newbury et al., 2018).

We found no evidence that living with family during the acute phase of the pandemic onset was associated with increased perceptions of problematic childhood family environments over time and after the onset of the pandemic compared to before. This finding can be explained by the lack of between-participant variability in changes in perceptions before and after the onset of COVID-19. The results indicated that more problematic perceptions of childhood family environments following the onset of COVID-19 were relatively consistent across participants, regardless of living arrangements, suggesting the relatively consistent

adverse effect of the global pandemic on young adult college students' family perceptions (e.g., Hall & Zygmunt, 2021). Notably, we found that college students who co-resided with family during the acute COVID-19 outbreak period reported significantly less problematic perceptions at the onset of COVID-19 than their peers who did not co-reside with family, suggesting that young adults with more favorable family relationships may be more likely to live with family during the acute disruption. Nevertheless, we recognize that such a co-residence decision may also be attributed to pre-pandemic living arrangements, geographical proximity, financial considerations, socioeconomic circumstances, and the typical residential status of U.S. young adults during the pandemic (Kajta et al., 2023; Prattley et al., 2023).

4.1. Strengths and Limitations

This study offers novel insights into the stability versus fluidity of perceived family relationships, contributing to the broader understanding of developmental processes and family sciences. Our research design enables us to view the recollection of childhood family environments as a time-variant construct, challenging common practices in the field that treat it as a person-variant variable and assume its static nature (Silva et al., 2024). Testing college students' family perceptions across multiple assessments and examining the longitudinal continuity of these perceptions while considering the effect of the COVID-19 outbreak advanced empirical understanding of retrospective reports of childhood family environments in non-clinical populations under stressful conditions.

In addition, the present study shifted the discussion from whether prospective or retrospective assessments of childhood family environments are superior to emphasizing the necessity of rigorous longitudinal studies for retrospective reports when prospective assessments are unavailable or infeasible. Hardt and Rutter (2004) suggested that longitudinal designs enable the investigation of within-individual changes in ACE reports and effectively address issues such as missing data, recall biases, and the confounding effect of assessment timing associated with single retrospective reports by using repeated assessments over time. Indeed, our longitudinal research design allowed us to capture changes in participants' perceptions of problematic childhood family environments from before to after the pandemic outbreak, leveraging repeated assessments of the same participants over time. This work contributes to the ongoing discussion about the limitations of retrospective measures regarding childhood experiences (Colman et al., 2016).

Beyond its theoretical and empirical contributions, this study also advances the methodology in family science by applying multilevel modeling (i.e., PGCM) to rich longitudinal data collected from the same college students over five to seven times. Our statistical analysis went beyond basic mean-comparison analyses (e.g., *t*-tests or ANOVA) and the evaluation of measure reliability over time, providing a comprehensive report of intercept differences in childhood family environments while controlling for repeated assessments and possible linear changes. In addition, PGCM was well-suited to address our interest in examining the onset of the COVID-19 pandemic as a pivotal event and its association with changes in young adult college students' self-reported childhood family environments. With this analytical approach, we were able to not only answer calls to reconsider the fluidity of perceptions and the changes that occur in response to stressful events (Chopik et al., 2023) but also to explore the implications of the population-level stressor for young adults' adjustment.

Despite these strengths, some limitations warrant caution in interpreting the study results. First, our study sample consisted primarily of female and White college students, which may limit the generalizability of the results to more diverse populations. Also, our study oversampled young adults with recent prescription drug misuse. As a result, our

findings may not generalize to the broader population of young adults. Future research aiming to replicate this study's design for other stressful events should prioritize recruiting participants from diverse demographic backgrounds and general populations to better capture the range of young adults' perceptions of childhood family environments during significant life events. Furthermore, we examined only the moderating effect of living with family during the acute phase of COVID-19 onset. It is beyond the scope of this study to examine other moderation factors, such as the quality of family relationships or individuals' emotional states. One important consideration is whether participants continued to live with their families or moved back in with them during the acute phase of the pandemic onset. This distinction could lead to different findings, as having the disruptive experience of moving back home may be more salient than uninterrupted co-residence with family. Based on the typical residential patterns of undergraduate students at the university where data were collected, we expect that most participants resided on campus or in off-campus housing near the university, rather than in their family homes, before the pandemic onset, with some returning home after the pandemic outbreak. Our data, however, do not allow us to precisely distinguish between the two groups, thus limiting our ability to explain the moderation findings. Therefore, we recommend that future scholars examine residential changes during periods of acute stress, such as co-residence quality and residential changes, to further explore the association between family co-residence and changes in family perceptions. Nevertheless, we did not find a reliable moderation effect, largely due to the limited variance in participants' reports. Future research on the stability of perceptions could investigate changes in family perceptions following pivotal events across diverse populations, possible explanatory mechanisms, and factors that may account for between-person differences in these changes.

4.2. Implications

The current study offers critical conceptual and theoretical, methodological, and practical implications for assessing retrospective childhood family environments through self-reports. First, this study has meaningful implications for the conceptualization of childhood family environments. Contemporary literature has assessed childhood family environments with both prospective and retrospective measures. Specifically, retrospective self-reports may reflect not only individuals' historical family experiences but also their appraisals of these experiences at the time of assessment (Bell & Bell, 2018; Hardt & Rutter, 2004). Consistent with this distinction, our findings suggested that retrospective family perceptions may exhibit temporal variability in association with salient contextual disruptions. The observed modest increase in problematic family perceptions following the pandemic onset also extends the potential application of memory reconsolidation theory (Nader & Hardt, 2009) to family sciences by considering it a plausible explanation and useful framework. Furthermore, significant between-person variability exists in the stability of the assessments over time, indicating that this stability may differ across individuals. Such variability in retrospective reports during stressful times may hold developmental significance for how individuals interpret and evaluate their earlier family experiences across contexts, and these changes can have lasting implications for young adults' health, functioning, and relationship development across the life course (Hawkins et al., 2021; Maleck & Papp, 2015; Roustit et al., 2011; Reuben et al., 2016).

Recognizing retrospective appraisals as potentially variable over time also has important methodological implications for how problematic family environments in childhood are measured in developmental and family research. Our findings provide some evidence for the possible inaccuracy of one-time, cross-sectional assessments, especially during stressful times, thus continuing to call for rigorous, repeated-measures longitudinal studies

of this construct in the field of family sciences. This practice, as demonstrated in our study, provides an effective means of identifying the potential for retrospective reports to be contaminated by respondents' current circumstances and the timing of significant life or societal events. These factors have often been overlooked in family sciences. Beyond childhood family environments, our findings offer broader implications for cross-sectional, retrospective assessment, reinforcing the importance of testing the stability of other retrospective reports of developmental experiences, such as age of substance use onset. Using three-wave longitudinal data tracking 5549 children aged 10 and older over six years, Shillington et al. (2012) found that most children had inconsistent reports over time, with the age of substance use onset commonly reported as older in a later wave than in the previous one. Such findings further underscore the need to reevaluate how we measure individual and family functioning in family research.

Practically, the present study provides evidence of the negative effects of population-level stressors, such as the COVID-19 outbreak, on young adults' perceptions of family relationships, as reflected in elevated problematic perceptions of childhood family environments. This finding is concerning because individuals' views of their family environments and childhood memories are closely tied to their current capacity to cope with stress. For example, Speer and Delgado (2017) found that recalling positive memories served as a protective factor for healthy adults, promoting resilience during stressful situations. Notably, though, our observed effect size was modest, suggesting that the shift toward problematic family perceptions in response to the pandemic outbreak was minimal. This minor change offers hope that, if addressed or intervened upon at the onset of stressful periods, negative family perceptions could be minimized or even eliminated. Therefore, our findings underscore important implications for practical efforts to support young adult development in the face of past and future stressors, especially before and after the onset of stressful events.

For parents and caregivers, our findings highlight that young adults' perceptions of their childhood family environments can shift in response to broader life events. Since the onset of the pandemic has heightened young adults' problematic perceptions, parents may play an essential role in supporting their children by facilitating the retrieval of positive childhood memories through evidence-based practices, especially in the post-pandemic era or during future stressful circumstances. For instance, prior work proposed that open discussion and reflection on family experiences can help emphasize favorable memories and facilitate positive memory reconsolidation (Shore, 2009). Likewise, ample family support and intentional efforts to promote young adults' well-being may buffer against memory biases and reduce the salience of unfavorable childhood family memories during stressful times.

For professionals, particularly mental health practitioners (e.g., therapists and counselors) working with young adults and their families, recognizing that college students' perceptions of their childhood family environments may shift in response to major population-level disruptions, such as the COVID-19 pandemic, is crucial for offering timely support and guidance. Our findings underscore the need for caution when relying on single-time, retrospective assessments of family environments, as major life events and disruptions may influence these perceptions. Practitioners should contextualize young adults' reflections on past family environments, especially when working with them during or after significant societal stressors. Furthermore, therapeutic settings that invite both students and parents to openly discuss their pandemic-related experiences and co-reflect on past family memories may help promote understanding, strengthen family relationships, and foster resilience in the aftermath of the pandemic.

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Abbreviations

The following abbreviations are used in this manuscript:

ACEs	Adverse childhood experiences
PGCM	Piecewise growth-curve model
US	United States
GenAI	Generative artificial intelligence
SD	Standard deviation

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