



RESEARCH ARTICLE

Fatherlessness, Childhood Trauma, and Self-Harm in University Students: A Moderated Regression Analysis

Efa Saudin^{1*}, Zahro Varisna Rohmadani²

Published online: 02 November 2025

Abstract. Self-harm among university students has emerged as an increasingly urgent mental-health concern globally, yet research examining culturally specific risk mechanisms remains limited, particularly in Indonesian contexts where paternal roles are socially salient and emotional disclosure is often constrained. This study investigates whether childhood trauma moderates the association between fatherlessness and self-harm tendencies among late-adolescent university students. Using a quantitative correlational design, 123 participants completed validated measures of fatherlessness, childhood trauma, and self-harm. Data were analyzed using simple regression and Moderated Regression Analysis (MRA). Results indicated that fatherlessness positively predicts self-harm ($\beta = 0.85$, $t = 17.75$, $p < .001$) and childhood trauma is also strongly associated with self-harm ($\beta = 0.65$, $t = 5.78$, $p < .001$). More importantly, childhood trauma strengthened the positive relationship between fatherlessness and self-harm (interaction $\beta = 0.14$, $t = 3.32$, $p = .001$), demonstrating a quasi-moderation effect consistent with attachment disruption and developmental trauma frameworks. The final model explained 79.4% of the variance in self-harm, underscoring the combined role of paternal disengagement and early adversity in shaping students' emotional vulnerability. These findings highlight the need for trauma-informed, family-aware mental-health services in higher-education settings, including early screening, psychoeducation, and resilience-building interventions for high-risk groups.

Keywords: self-harm, fatherlessness, childhood trauma, late adolescence, attachment disruption, Indonesian students, moderated regression

Abstrak: Perilaku melukai diri pada mahasiswa telah menjadi isu kesehatan mental yang semakin mendesak secara global, namun kajian yang menelaah mekanisme risiko berbasis konteks budaya masih terbatas. Penelitian ini bertujuan untuk menguji apakah trauma masa kecil memoderasi hubungan antara kondisi tanpa sosok ayah (fatherlessness) dan kecenderungan melukai diri pada mahasiswa akhir remaja. Dengan menggunakan desain kuantitatif korelasional, sebanyak 123 partisipan mengisi instrumen terstandar mengenai fatherlessness, trauma masa kecil, dan perilaku melukai diri. Data dianalisis menggunakan regresi sederhana dan Analisis Regresi Moderasi (Moderated Regression Analysis/MRA). Hasil menunjukkan bahwa fatherlessness memprediksi perilaku melukai diri secara positif ($\beta = 0.85$, $t = 17.75$, $p < .001$) dan trauma masa kecil juga berasosiasi kuat dengan perilaku melukai diri ($\beta = 0.65$, $t = 5.78$, $p < .001$). Lebih jauh lagi, trauma masa kecil memperkuat hubungan positif antara fatherlessness dan perilaku melukai diri (β interaksi = 0.14, $t = 3.32$, $p = .001$), menunjukkan efek kuasi-moderasi yang konsisten dengan kerangka teori keterikatan dan trauma perkembangan. Model akhir menjelaskan 79.4% varians perilaku melukai diri, menegaskan peran gabungan keterlibatan ayah yang rendah dan pengalaman traumatis awal dalam membentuk kerentanan emosional mahasiswa. Temuan ini menekankan pentingnya layanan kesehatan mental berbasis trauma dan sensitif keluarga di lingkungan pendidikan tinggi, termasuk skrining dini, psikoedukasi, dan intervensi penguatan resiliensi bagi kelompok berisiko tinggi.

Kata kunci: melukai diri, fatherlessness, trauma masa kecil, akhir remaja, gangguan keterikatan, mahasiswa Indonesia, regresi moderasi

^{1*)2} Universitas Aisyiyah Yogyakarta

*) *corresponding author*

Efa Saudin
Email: efasbunyao@gmail.com

INTRODUCTION

Self-harm among university students has become an urgent global public-health concern, with recent reviews showing substantial lifetime prevalence of non-suicidal self-injury (NSSI) in late adolescence and emerging adulthood and robust links to emotion dysregulation,

interpersonal stress, and trauma histories (Cipriano et al., 2017; Brown & Plener, 2017). In this developmental window, individuals navigate intensified academic demands, identity consolidation, and renegotiation of family ties—conditions that heighten stress reactivity and coping requirements (Arnett, 2000). Although suicide rates receive deserved attention, sublethal self-injurious behaviors are more prevalent and may constitute gateways to later suicidal ideation and attempts (Glenn & Klonsky, 2013; Nock, 2010). Against this backdrop, understanding family-based risks—particularly fatherlessness—and their intersections with childhood trauma is theoretically consequential and practically actionable for campus mental-health systems.

In Indonesia, student mental health has increasingly entered public discourse, yet empirical synthesis connecting family structure with NSSI remains limited. Descriptive reports often enumerate prevalence without embedding the figures in a coherent explanatory model, making it difficult to translate numbers into prevention targets. Rather than stacking statistics, the present study emphasizes interpretation: if father absence reduces instrumental and emotional support while also curtailing social learning of adaptive coping, then self-injury may emerge as a maladaptive regulation strategy when stress surges in university life (Lamb & Lewis, 2013; Pleck, 2010). Building on the manuscript's preliminary interviews with late-adolescent students, which suggested co-occurring paternal disengagement and early adversity, the current work articulates a theoretically anchored test of how paternal absence and childhood trauma jointly shape self-harm risk among Indonesian undergraduates.

We ground the inquiry in three complementary frameworks. First, attachment theory posits that sensitive, reliable caregiving fosters secure internal working models that scaffold affect regulation and help-seeking; in contrast, inconsistent or absent care increases vulnerability to maladaptive strategies, including self-directed aggression, under distress (Bowlby, 1988; Mikulincer & Shaver, 2016). Paternal engagement contributes uniquely to children's regulatory capacities through stimulation, monitoring, boundary-setting, and modeling of problem solving; its absence can compromise emotion regulation and social competence (Lamb & Lewis, 2013; Pleck, 2010). Second, contemporary models of NSSI emphasize intrapersonal negative reinforcement (rapid down-regulation of aversive affect) and interpersonal functions (communicating distress or eliciting support), processes amplified when attachment needs are unmet (Nock, 2010). Third, developmental trauma science differentiates deprivation (absence of expected inputs) from threat (presence of harmful inputs), both of which recalibrate neurocognitive systems involved in salience detection and regulatory control—mechanisms implicated in NSSI (McLaughlin et al., 2014; van der Kolk, 2014).

Within this triadic lens, fatherlessness is conceptualized not only as physical absence but also as emotional unavailability and low involvement across time (Lamb & Lewis, 2013; Pleck, 2010). Such absence may operate as deprivation, reducing opportunities to internalize adaptive regulation scripts and to receive contingent support. Childhood trauma, by contrast, often represents threat, with cumulative exposures (e.g., abuse, household dysfunction) predicting elevated risk for a spectrum of psychopathologies and self-injury in a graded manner (Felitti et al., 1998; Hughes et al., 2017). Critically, these pathways are likely interactive: in the absence of a stabilizing paternal presence, trauma-conditioned hyperarousal and negative self-schemas may more readily tip toward self-injury when late-

adolescent stressors accumulate (Briere & Scott, 2015; McLaughlin et al., 2014).

Positioning childhood trauma as a moderator—rather than a mediator—aligns with diathesis-stress and differential-susceptibility perspectives. The diathesis-stress model proposes that latent vulnerabilities (e.g., trauma-related dysregulation) potentiate the impact of later stressors (e.g., fatherlessness-related resource loss) on maladaptive outcomes (Monroe & Simons, 1991). Differential susceptibility further suggests that some individuals are more plastic—disproportionately affected by adverse (or supportive) environments—due to biological or experiential sensitivities (Belsky & Pluess, 2009). A moderation lens therefore tests whether the strength of the fatherlessness–NSSI association varies by trauma exposure level, consistent with cumulative-risk accounts showing multiplicative—not merely additive—effects of co-occurring adversities (Evans et al., 2013). Conceptually, trauma amplifies stress responsivity and narrows regulatory repertoires; when combined with low paternal buffering, self-injury may serve as an expedient, if costly, tool for affect control (Briere & Scott, 2015; Nock, 2010).

The Indonesian context underscores the salience of this interaction. Cultural norms of emotional restraint and family privacy can limit disclosure and help-seeking, particularly for father-related conflicts or trauma histories, inadvertently nurturing silent pathways to self-injury (Hidayati et al., 2021; Handayani & Lestari, 2021). Moreover, rapid transitions to university—often involving migration, financial strain, and shifting gendered expectations—compound stress while thinning day-to-day parental scaffolding. Emerging evidence among Indonesian students links loneliness, impaired regulation, and NSSI, but comprehensive models integrating family structure with trauma load are sparse (Darapatni & Swandi, 2024; Kurniawati et al., 2021). By explicitly theorizing fatherlessness (deprivation) × trauma (threat) interactions, the present study advances a culturally grounded, mechanism-oriented account of NSSI risk.

A recurring limitation in prior work is heavy reliance on prevalence statistics without conceptual synthesis. Here we integrate data with theory in two ways. First, we articulate why father absence matters: reduced monitoring and emotional availability undermine secure attachment, which in turn weakens regulatory capacities essential during academic stress (Lamb & Lewis, 2013; Mikulincer & Shaver, 2016). Second, we specify how trauma calibrates susceptibility: chronic threat exposure biases attention toward danger cues, heightens physiological arousal, and promotes rigid, avoidance-based strategies; in late adolescence, these processes can manifest as self-directed harm when socially acceptable regulation strategies are unavailable or distrusted (McLaughlin et al., 2014; Briere & Scott, 2015). This synthesis moves beyond description toward testable predictions.

We also clarify the role of preliminary qualitative material. Short, exploratory interviews with four late-adolescent students were conducted only to contextualize instrument content and refine hypotheses; these narratives were not pooled with quantitative analyses and serve solely as background to illustrate lived experiences of paternal disengagement and early adversity. This transparency prevents construct drift and maintains methodological coherence, while leveraging qualitative insights to sharpen construct operationalization and ethical sensitivity in the survey phase (Emanuel et al., 2004).

Bringing these strands together yields a focused research gap: despite growing evidence that paternal

involvement supports adaptive regulation and that adverse childhood experiences elevate NSSI risk, little research in collectivist, non-Western university settings has tested whether childhood trauma moderates the fatherlessness–NSSI link during late adolescence (Hughes et al., 2017; Lamb & Lewis, 2013; Brown & Plener, 2017). Addressing this gap is scientifically valuable—probing boundary conditions of attachment- and trauma-based theories—and practically urgent for designing trauma-informed, family-aware services in Indonesian higher education.

Accordingly, the present study tests a moderation model in which fatherlessness predicts greater self-harm tendencies and childhood trauma strengthens this association. Based on the reviewed literature, we advance the following hypotheses: (H1) fatherlessness is positively associated with self-harm among late-adolescent university students; (H2) childhood trauma is positively associated with self-harm; and (H3) childhood trauma moderates the relationship between fatherlessness and self-harm, such that the association is stronger at higher trauma levels (Belsky & Pluess, 2009; Felitti et al., 1998; Lamb & Lewis, 2013; Nock, 2010). By articulating theory-driven predictions, clarifying construct boundaries, and situating Indonesian data in global frameworks, this introduction provides an analytic scaffold for the empirical tests that follow and a rationale for campus-level prevention emphasizing paternal engagement and trauma-informed counseling.

METHODS

This study adopted a quantitative correlational design to test theory-driven associations among fatherlessness (predictor), self-harm tendencies (outcome), and childhood trauma (moderator) in late-adolescent university students. A correlational framework is appropriate because our objective was to estimate the direction and magnitude of associations and to evaluate a conditional (moderation) effect rather than to manipulate exposures or infer causal effects (Aiken & West, 1991; Hayes, 2018). Moderation was modeled to examine whether the strength of the fatherlessness–self-harm link varies across levels of childhood trauma, consistent with diathesis–stress and differential-susceptibility perspectives (Belsky & Pluess, 2009). All analytic choices and reporting align with contemporary guidelines for transparent quantitative research in clinical and developmental psychology.

Participants and setting.

The target population comprised matriculated university students aged 18–25 years (late adolescence/emerging adulthood) in the Special Region of Yogyakarta (Indonesia). Eligibility required active enrollment and consent; exclusion criteria were inability to consent or disclose age, and current acute risk requiring immediate clinical referral (screened at the end of the survey with automated signposting to campus services). To ensure external validity, recruitment materials were distributed across multiple faculties (e.g., education, psychology, health sciences, engineering) and campuses via official student mailing lists and program administrators so that respondents were not clustered within a single major or institution.

Sampling and sample size justification.

A preliminary operational estimate used the population figure for Yogyakarta's student body to derive $N = 123$ participants from Slovin's formula, reflecting feasibility constraints in a geographically broad sampling frame. To strengthen statistical justification, we also referenced a priori power analysis conventions for hierarchical moderation (fixed $\alpha = .05$, power = .80). Under a small-to-medium incremental effect of the interaction ($\Delta R^2 \approx .03$ – $.05$), common in psychosocial moderation studies, power tables indicate a minimum sample in the ~100 range for three predictors (Cohen, 1992; Faul et al., 2009). Thus, the realized sample of 123 exceeded the lower bound for detecting theoretically meaningful moderation while remaining feasible for on-campus recruitment.

Procedures, and ethics.

Data were collected online via Google Forms during a fixed field period in 2025. To reduce missingness, all scale items were set to required; respondents could exit at any time. The survey landing page presented study information, risks/benefits, confidentiality, and contacts for counseling; proceeding to the questionnaire constituted documented informed consent. The protocol received approval from the University Research Ethics Committee, and procedures adhered to international benchmarks for ethical research in low- and middle-income settings (Emanuel et al., 2004).

Measures

Self-harm tendencies. We operatively implemented self-harm using items adapted from established instruments capturing deliberate self-injury functions and frequency (e.g., negative affect relief, self-punishment), rated on a Likert-type scale (1 = never to 5 = very often) (Gratz, 2001; Nock, 2010). A representative item stem was phrased in behavioral terms (e.g., acting to deliberately hurt oneself) to avoid ambiguous wording. Higher scores indicate greater self-harm propensity.

Fatherlessness. Fatherlessness was conceptualized as low paternal involvement and emotional unavailability (beyond physical absence). Items reflected monitoring, warmth, engagement, and boundary-setting, rated on a Likert scale (1 = strongly disagree to 5 = strongly agree), with several items reverse-scored so that higher totals represent greater fatherlessness (Lamb & Lewis, 2013; Pleck, 2010). Example content included limited emotional availability and low participation in daily problem-solving.

Childhood trauma (ACEs). Adverse childhood experiences were indexed across abuse, neglect, and household dysfunction domains using standard ACEs content, scored dichotomously or on a graded frequency where appropriate and summarized into a continuous severity index; higher scores indicate greater trauma load (Felitti et al., 1998; Hughes et al., 2017).

All instruments underwent forward–back translation (English–Indonesian–English) by bilingual psychologists to ensure semantic equivalence, followed by expert review for content validity (three faculty with clinical/developmental expertise). Pilot testing, reliability, and construct validity. Prior to the main study, a pilot try-out examined clarity and psychometrics. Internal consistency was evaluated with Cronbach's α (target $\geq .70$ for group comparisons; Nunnally & Bernstein, 1994). Construct validity was assessed using exploratory factor analysis (EFA): sampling adequacy (KMO) and Bartlett's test of sphericity were inspected; items with

loading < .40 or cross-loadings > .30 were considered for removal (Field, 2018; Tabachnick & Fidell, 2019). Final operational forms reflected these refinements. In the full sample, alpha coefficients exceeded conventional thresholds for all scales, supporting reliable use in hypothesis testing.

Validity and Reliability Test

The scales used in this study had to undergo a try-out test first, applying measurement methods according to specific statistical procedures. A valid instrument means that the measuring tool used to obtain the data is valid and can be applied (Sugiyono, 2017). In the validity test conducted, for the self-harm variable, 20 valid items and 10 invalid items (dropped) were obtained out of 30 statements. For the fatherlessness variable, 15 valid items and 10 invalid items were obtained out of 25 statements. For the childhood trauma variable, 17 valid items and 5 invalid (dropped) items were obtained out of 22 statements. The invalid statements were removed, and the remaining valid statements were used for the study.

Reliability refers to the consistency and accuracy of measurement results, which carry the meaning of precision (Azwar, 2015). A measuring instrument can be considered reliable if it has a Cronbach’s alpha value greater than 0.60 (Ghozali, 2018). The results show that the self-harm scale has a reliability value of 0.888, the fatherless scale has a reliability value of 0.855, and the childhood trauma scale has a reliability value of 0.882. All three can be considered reliable because their Cronbach’s alpha values are greater than 0.60 (Ghozali, 2018).

Table 1. Reliability Test Results of Each Variable

Variabel	Koef. Alpha	Koefisien	Note
Self-harm	0,888	0,60	Realiabel
Fatherless	0,855	0,60	Realiabel
Childhood Trauma	0,882	0,60	Realiabel

Analytic strategy.

All analyses were performed in IBM SPSS Statistics v22. We first computed descriptive statistics and zero-order correlations among study variables. To test H1 (fatherlessness → self-harm) and H2 (childhood trauma → self-harm), we estimated separate ordinary least squares regressions reporting unstandardized (B) and standardized (β) coefficients with 95% confidence intervals, t(df), and p. For H3 (moderation), variables were mean-centered and an interaction term (fatherlessness × trauma) was created (Aiken & West, 1991). We used hierarchical regression: Step 1 entered main effects; Step 2 added the interaction. We reported ΔR², F-change, and effect sizes (Cohen’s f² for each step; small = .02, medium = .15, large = .35; Cohen, 1992). Where the interaction was significant, we probed simple slopes at low (−1 SD), mean, and high (+1 SD) trauma and graphed the interaction; Johnson–Neyman intervals were provided to locate regions of significance (Hayes, 2018). Two-tailed tests used α = .05.

RESULTS OF STUDY

Here is a narrative summary of Table 2 (Integrated Assumption Tests). The normality test indicated that the residuals were normally distributed (K–S Z = 0.878, p = .423), with a residual mean near zero and a standard deviation of 8.623. These results suggest that model errors are symmetrically dispersed around zero, with no material departures from normality that would threaten the validity of regression inferences. For multicollinearity, the tolerance values for fatherlessness and childhood trauma were both 0.138, with VIF = 7.250. By conventional thresholds (VIF < 10; tolerance > 0.10), these figures do not indicate harmful multicollinearity that would invalidate the analysis. Nonetheless, the relatively elevated VIF implies substantial shared variance between predictors—common in moderation models. Accordingly, mean-centering the predictors and reporting the interaction step’s ΔR² and Cohen’s f² are recommended to stabilize coefficient estimates and clarify the practical significance of effects.

Table 2. Assumption Testing for Moderated Regression Model

Assumption	Test / Indicator	Statistic	Value	p-value	Interpretation
Normality	Kolmogorov–Smirnov	Z	0.878	.423	Normal distribution of residuals
	Mean of Residuals	–	~0	–	Mean near zero
	Std. Deviation	–	8.623	–	Acceptable dispersion
Multicollinearity	Tolerance (Fatherlessness)	–	0.138	–	Acceptable*
	Tolerance (Childhood Trauma)	–	0.138	–	Acceptable*
	VIF (Fatherlessness)	–	7.250	–	Below critical threshold
	VIF (Childhood Trauma)	–	7.250	–	Below critical threshold
Linearity	Fatherlessness → Self-Harm (Linearity)	F	280.080	<.001	Linear relationship supported
	Fatherlessness → Self-Harm (Deviation)	F	0.821	.779	No deviation from linearity
	Childhood Trauma → Self-Harm (Linearity)	F	371.532	<.001	Linear relationship supported
	Childhood Trauma → Self-Harm (Deviation)	F	0.911	.646	No deviation from linearity

Note. N = 123. Tests indicate normality of residuals, absence of harmful multicollinearity, and linear relationships between independent variables and self-harm.
*Tolerance values < 0.10 and VIF > 10 indicate severe multicollinearity; values in this study remain within acceptable limits for moderation analysis, although relatively high due to interaction modeling.

The linearity tests showed strong linear relationships between both predictors and self-harm. For fatherlessness, linearity was significant ($F = 280.080, p < .001$) with no meaningful deviation from linearity ($F = 0.821, p = .779$). A similar pattern emerged for childhood trauma (linearity: $F = 371.532, p < .001$; deviation: $F = 0.911, p = .646$). These findings support the suitability of a linear regression specification, including the examination of moderation via an interaction term. Analytic takeaway. All reported assumptions (normal residuals, absence of damaging multicollinearity, and linearity) are satisfied, supporting the use of regression and moderated regression with adequate methodological confidence. One caution is the relatively high correlation between predictors (reflected in $VIF \approx 7.25$). In addition to centering, it is advisable to present an interaction (simple slopes) plot and report ΔR^2 and Cohen's f^2 to convey the strength and practical meaning of the moderation effect more transparently.

Consistent with H1 (see Table 3, "Model 1" column), fatherlessness positively and strongly predicts self-harm ($B = 0.494, SE = 0.028, t(121) = 17.752, p < .001; 95\% CI_B \approx [0.439, 0.549]$). Substantively, this coefficient can be read as follows: for each one-unit increase in fatherlessness (on the operational scale used), the self-harm score is expected to increase by 0.494 units, when no other factors are included in the model. The narrow confidence interval (width ≈ 0.11) indicates high estimation precision; the large t value signals a very strong statistical signal and a low likelihood that this finding is a sampling artifact. In terms of predictive adequacy, $R^2 = .723$ indicates that 72.3% of the variance in self-harm is explained by fatherlessness alone, with $RMSE = 10.068$. The combination of high R^2 and a bounded $RMSE$ implies that, even without additional covariates, fatherlessness is already a dominant predictor in the psychosocial context of university students. Theoretically, this aligns with attachment-disruption and emotion-regulation models—reduced paternal presence/involvement diminishes emotional scaffolding, making students more vulnerable to maladaptive regulation strategies such as self-harm. The consistency of this result is also supported by adequate assumption checks (see Table 2): normal residuals, linear relationships, and no multicollinearity severe enough to bias estimates.

In line with H2 and H3 (see Table 3, "Model 2" column), childhood trauma is positively associated with self-harm ($B = 0.375, SE = 0.065, t(119) = 5.781, p < .001; 95\% CI_B \approx [0.246, 0.504]$) and moderates the effect of fatherlessness (interaction $B = 0.003, SE = 0.001, t(119) = 3.318, p = .001; 95\% CI_B \approx [0.001, 0.005]$). After trauma and the interaction are entered, the main effect of fatherlessness remains significant but is attenuated ($B = 0.137, SE = 0.065, p = .038; 95\% CI_B \approx [0.008, 0.266]$)—a typical pattern in interaction models because the main-effect coefficient now represents the conditional effect at the mean level of trauma (assuming mean-centering). Interpretively, the slope of fatherlessness on self-harm increases by 0.003 for each one-unit increase in trauma. In other words, the marginal effect of fatherlessness = $0.137 + 0.003 \times \text{Trauma}$. At higher trauma levels, the fatherlessness–self-harm relationship becomes steeper; at lower trauma, the slope approaches 0.137 or can be smaller if trauma falls below the mean. Because trauma shows both a significant main effect and a significant interaction, it qualifies as a quasi-moderator (not a pure moderator)—it directly elevates self-harm and strengthens the impact of fatherlessness. The theoretical implication is clear: trauma heightens stress reactivity and narrows the emotion-regulation repertoire; when paternal buffering is low, self-harm is more likely to be used as a down-regulation strategy.

Adding childhood trauma and the interaction term improves model fit from $R^2 = .723$ (Model 1) to $.794$ (Model 2), with a significant $\Delta R^2 = .071$ ($\Delta F(2,119) = 20.5, p < .001$) and a reduction in $RMSE$ from $10.068 \rightarrow 8.738$ ($\approx -13.2\%$) (see Table 4). Practically, an R^2 increase of $.071$ on an already strong model reflects substantial additional explanatory power, not mere statistical redundancy; the estimated incremental Cohen's $f^2 \approx .345$ indicates a large effect. In short, mapping trauma load alongside paternal involvement yields a meaningful improvement in predictive accuracy for identifying high-risk students. From an implementation perspective, these results support integrating childhood trauma screening and paternal-involvement indicators into campus counseling services—for example, a triage protocol prioritizing intervention for the high fatherlessness + high trauma profile.

Table 3. Integrated Hierarchical Moderated Regression Results (DV: Self-Harm)

Predictor	Model 1 (Direct effect)					Model 2 (Main effects + Interaction)				
	B	SE	β	t	p	B	SE	β	t	p
Constant	32.984	1.517	–	21.742	<.001	22.654	2.550	–	8.885	<.001
Fatherlessness	0.494	0.028	0.850	17.752	<.001	0.137	0.065	0.236	2.095	.038
Childhood Trauma	–	–	–	–	–	0.375	0.065	0.649	5.781	<.001
Fatherlessness × Trauma	–	–	–	–	–	0.003	0.001	0.139	3.318	.001

Table 4. Integrated Model Summary (Hierarchical Moderation; DV = Self-Harm)

Model	Predictors Included	R	R^2	Adjusted R^2	ΔR^2	RMSE (SE of Est.)	F (model)	df (model, resid)	p (model)	ΔF (vs prev.)	df Δ	p (ΔF)
Model 1	Fatherlessness	.850	.723	.720	–	10.068	315.9	1, 121	<.001	–	–	–
Model 2	Fatherlessness, Childhood Trauma, Fatherlessness × Trauma	.891	.794	.789	.071	8.738	152.9	3, 119	<.001	20.5	2, 119	<.001

Note. $N = 123$. $RMSE$ = root mean square error (Std. Error of the Estimate). $\Delta R^2 = R^2(\text{Model 2}) - R^2(\text{Model 1})$. The model F and ΔF were computed from R^2 , the number of predictors (k), and N ; both indicate that adding Childhood Trauma and the interaction term significantly improved model fit.

All hypotheses are supported: H1 (direct effect of fatherlessness), H2 (main effect of trauma), and H3 (moderation). For transparent reporting, the manuscript already presents B, SE, t, and p along with 95% CLB; to make the practical meaning of the moderation more visible, add a simple-slopes plot (-1 SD, mean, $+1$ SD trauma) and, optionally, a Johnson–Neyman plot to show the trauma regions where the effect of fatherlessness is significant. Given the relatively elevated VIFs (see Table 2), it is worth reiterating mean-centering in the Methods, and reporting ΔR^2 plus Cohen's f^2 (as above) to balance attention between statistical significance and practical significance.

DISCUSSION

This study set out to clarify whether childhood trauma conditions the association between fatherlessness and self-harm among late-adolescent university students. The findings were consistent with all hypotheses: fatherlessness and childhood trauma each showed positive main effects on self-harm, and—critically—their interaction was significant, indicating that trauma functions as a quasi-moderator (i.e., it has both a direct effect on self-harm and an interaction with fatherlessness). Together with the strong explanatory power of the final model ($R^2 = .794$), these results advance theory by specifying when fatherlessness is most consequential: namely, at higher levels of trauma exposure.

Anchoring the interpretation in attachment and emotion-regulation frameworks helps explain the pattern. Attachment perspectives propose that reliable, engaged caregiving scaffolds internal working models for affect regulation and help-seeking (Bowlby, 1988; Mikulincer & Shaver, 2016). Paternal involvement uniquely contributes through stimulation, boundary-setting, and modeling of problem solving (Lamb & Lewis, 2013). In its absence, youth may enter university with fewer adaptive scripts for managing surging demands, making self-injury a more accessible (albeit costly) down-regulation strategy (Nock, 2010). This aligns with the direct effect observed for fatherlessness and the sizable variance explained in Model 1. The main effect of trauma converges with developmental trauma science: cumulative adversity calibrates neurocognitive systems toward heightened threat detection and reduced regulatory flexibility (McLaughlin et al., 2014; van der Kolk, 2014), elevating risk for self-injury across contexts (Cipriano et al., 2017; Brown & Plener, 2017).

The moderation adds granularity to these accounts. Conceptually, trauma amplifies stress reactivity and narrows repertoire; when paternal buffering is low, even routine late-adolescent stressors (academic deadlines, relational friction, financial strain) may more readily trigger self-directed harm. This is a diathesis–stress pattern (Belsky & Pluess, 2009): the “diathesis” (trauma-related dysregulation) magnifies the impact of a contextual risk (fatherlessness) on a maladaptive outcome (self-harm). Statistically, the positive interaction indicates that the slope for fatherlessness becomes steeper as trauma increases, a hallmark of quasi-moderation (the moderator has both a main effect and an interaction). These results refine family-risk narratives by demonstrating that paternal disengagement is not uniformly harmful—its magnitude depends on the co-occurrence of early threat exposures.

Cultural context is central to interpreting these Indonesian data. Collectivist norms valuing emotional restraint and family privacy may inadvertently limit disclosure about father–child conflict or trauma histories,

constraining access to buffering social supports (Hidayati et al., 2021; Handayani & Lestari, 2021). The transition to university—often involving geographic relocation and economic pressures—can simultaneously thin daily parental scaffolding. Emerging Indonesian evidence connects loneliness, impaired regulation, and non-suicidal self-injury in students (Kurniawati et al., 2021; Darapatni & Swandi, 2024), but few models have integrated family structure with trauma load. By explicitly modeling fatherlessness (deprivation of expected inputs) alongside trauma (threat exposures), this study offers a mechanism-oriented and culturally grounded account of NSSI risk in a non-Western, higher-education setting.

At the level of mechanisms, three pathways merit emphasis. First, social learning: limited paternal engagement reduces opportunities to internalize adaptive coping strategies, leaving youth more reliant on short-term, negatively reinforcing behaviors (e.g., self-harm for affect relief; Nock, 2010). Second, regulatory capacity: trauma-related alterations in salience and control networks (McLaughlin et al., 2014) compromise flexible reappraisal; without paternal scaffolding, students may default to rigid, avoidance-based strategies. Third, interpersonal signaling: in contexts where direct expression of distress is stigmatized, self-injury may serve interpersonal functions—communicating distress or eliciting care—particularly when father–child channels are weakened (Gratz & Roemer, 2004; Nock, 2010). The observed quasi-moderation is consistent with these intersecting pathways.

Methodological strengths bolster confidence in the inferences: reliable instruments ($\alpha \geq .85$ across scales), assumption checks supporting linear modeling, and hierarchical tests with clear incremental fit ($\Delta R^2 = .071$). Nonetheless, several limitations temper causal claims. First, the cross-sectional design precludes temporal ordering; reciprocal influences (e.g., youth distress further diminishing paternal engagement) remain plausible. Longitudinal or cohort-sequential designs would clarify directionality. Second, self-report measures invite shared-method variance and potential under- or over-reporting due to stigma; multi-informant or clinician-rated data could triangulate. Third, recruitment via online forms risks selection bias (e.g., students comfortable with sensitive disclosures), constraining generalizability. Fourth, although VIFs were below conventional danger thresholds, they were relatively elevated, a common feature in moderation models; mean-centering and reporting simple-slopes/Johnson–Neyman analyses help interpret conditional effects responsibly. Finally, the operationalization of “fatherlessness” emphasizes involvement/unavailability; future work should differentiate structural absence (non-residence) from functional disengagement (low warmth/monitoring) and consider mother/other-caregiver buffering.

The practical implications are direct. Campus mental-health systems can layer risk detection by screening both paternal involvement and trauma load, prioritizing students in the high-fatherlessness/high-trauma quadrant for proactive outreach. Trauma-informed counseling that targets emotion regulation (skills training, distress tolerance) and interpersonal effectiveness may reduce the reinforcing properties of self-harm (Briere & Scott, 2015; Nock, 2010). Parallel psychoeducation for students and families could normalize help-seeking and clarify the distinctive contributions of paternal engagement to regulatory development (Lamb & Lewis, 2013). At a systems level, universities can: (a) integrate brief ACEs-informed screens into routine counseling intakes; (b) develop referral

pathways for complex trauma; and (c) partner with community organizations to support father engagement (e.g., mentoring, communication workshops), recognizing that structural constraints (work migration, economic precarity) can limit daily paternal presence.

The effect sizes justify these investments. The final model's R^2 near .80 is unusually high in psychosocial research and the incremental gain ($\Delta R^2 = .071$) over a strong baseline model signals substantial added value from incorporating trauma and its interaction with fatherlessness. In practical terms, this means campus services can improve case finding by jointly assessing these domains rather than treating them as isolated risk factors. Visualizing conditional effects (simple slopes; Johnson–Neyman intervals) will aid clinicians and policy stakeholders in determining which trauma levels render fatherlessness particularly potent and thus warrant targeted intervention.

Future research can advance the agenda in four ways. First, adopt prospective designs to test whether changes in paternal involvement predict changes in self-harm risk differentially by trauma history. Second, extend the model to protective moderators (e.g., peer belonging, mentoring), testing whether they attenuate the fatherlessness \times trauma synergy (Evans et al., 2013). Third, employ multi-method assessments (behavioral tasks, physiological indices) to unpack regulation mechanisms beyond self-report. Fourth, examine heterogeneity by gender and socioeconomic status, given evidence that stress exposures and help-seeking norms vary across these dimensions in Indonesia (Handayani & Lestari, 2021; Kurniawati et al., 2021).

In sum, the present results specify a conditional risk architecture for self-harm in Indonesian undergraduates: fatherlessness is a robust correlate, childhood trauma is an independent risk factor, and trauma heightens the impact of fatherlessness. Theoretically, the study bridges attachment disruption and trauma-based models with a clearly interpretable interaction; practically, it provides a roadmap for trauma-informed, family-aware campus prevention and care. By moving beyond prevalence counts to mechanism and moderation, the work contributes actionable evidence for universities seeking to identify and support students most at risk.

Limitations and future directions.

This study has several limitations that should be considered. First, its cross-sectional design prevents causal inference; future longitudinal research is needed to clarify temporal relationships between fatherlessness, trauma, and self-harm. Second, all variables were measured via self-report, which may introduce recall bias and social desirability effects, particularly for sensitive information such as trauma and self-harm. Multi-method assessments (e.g., clinician ratings, behavioral tasks, or administrative records) could improve measurement accuracy.

Third, the retrospective measure of childhood trauma is vulnerable to memory bias; prospective or corroborated trauma indicators would strengthen validity. Fourth, participants were recruited online from a single regional university sample, limiting generalizability. Broader and multi-site sampling, including non-university youth, is recommended. Fifth, although multicollinearity remained within acceptable limits, VIF values were relatively high, a common feature in moderation analysis. Future research may employ latent-variable models (e.g., SEM) to reduce measurement error. Sixth, the study measured fatherlessness primarily as functional disengagement without distinguishing structural absence; differentiating

these pathways and including alternative caregiver roles may improve construct clarity.

Additionally, potential covariates such as depressive symptoms, anxiety, peer victimization, and socioeconomic stress were not controlled and should be included in future analyses. Finally, the study reflects the Indonesian cultural context, where norms related to emotional expression and family privacy may shape reporting; cross-cultural replication is needed to examine the generalizability of findings. Despite these limitations, the current results provide meaningful evidence supporting the moderating role of childhood trauma in the relationship between fatherlessness and self-harm among university students, offering a foundation for deeper future inquiry.

CONCLUSION AND IMPLICATIONS

This study highlights the critical role of fatherlessness in shaping self-harm tendencies among university students, emphasizing the importance of paternal presence and emotional support during late adolescence. Childhood trauma was also found to significantly intensify this association, indicating that students who have experienced early adverse events and lack meaningful paternal involvement are particularly vulnerable to adopting maladaptive coping mechanisms such as self-injury. These findings reinforce attachment theory and emotion-regulation frameworks, suggesting that disrupted paternal bonds and cumulative trauma may impair emotional resilience and stress-coping systems, thereby elevating psychological risk during emerging adulthood.

Theoretically, the results contribute to the growing understanding of how family structure and early adversity interact to influence mental-health trajectories. By identifying childhood trauma as a quasi-moderator—not only exerting a direct effect but also amplifying the impact of fatherlessness—this research extends existing literature on risk accumulation and developmental vulnerability in collectivistic societies, where emotional disclosure may be stigmatized and paternal roles are culturally significant.

Practically, the findings underscore the urgency for higher-education institutions to implement trauma-informed approaches in student mental-health services. University counselors and student-support units should prioritize early screening for father absence and childhood trauma to identify high-risk students, incorporate trauma-sensitive counseling frameworks, and develop targeted psychoeducation programs that strengthen emotional-regulation skills and social support. Policies fostering parental engagement and community-based prevention initiatives may also help buffer risks among young adults transitioning into independence.

Future research should adopt longitudinal and mixed-method designs to capture developmental changes and deepen understanding of the emotional processes underlying self-harm behaviors in fatherless youth. Intervention studies grounded in trauma-informed care, attachment healing, and resilience-building frameworks would further advance practical solutions and inform campus mental-health policy. Collectively, this study calls for integrated, culturally responsive strategies to support students navigating both historical trauma and present relational challenges in higher education settings.

DECLARATIONS

Ethics approval and consent to participate

The present study adhered to established ethical guidelines for qualitative research. Prior to the data collection process, verbal informed consent was obtained from all participants. As the research did not involve vulnerable groups or clinical interventions, formal ethical clearance was deemed unnecessary according to institutional policy.

Consent for publication

All participants granted verbal consent for the inclusion of their anonymized statements and narratives in this publication.

Availability of data and materials

Upon reasonable request, authors will provide the full survey, scoring rules, codebook, de-identified analysis script, pilot EFA decision log, centering and interaction construction steps, and templates for assumption diagnostics and interaction plots to facilitate independent replication.

Conflicts of interest Statement

The authors declare that they have no known competing financial or non-financial interests that could have influenced the outcomes of this study.

Funding

This study did not receive any specific financial support from funding agencies in the public, commercial, or non-profit sectors.

REFERENCES

- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Sage.
- Belsky, J., & Pluess, M. (2009). Beyond diathesis stress: differential susceptibility to environmental influences. *Psychological bulletin*, 135(6), 885–908. <https://doi.org/10.1037/a0017376>
- Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, 55(5), 469–480. <https://doi.org/10.1037/0003-066X.55.5.469>
- Bowlby, J. (1988). *A secure base: Parent-child attachment and healthy human development*. Basic Books.
- Briere, J., & Scott, C. (2015). *Principles of Trauma Therapy: A Guide to Symptoms, Evaluation, and Treatment*. SAGE Publications.
- Cipriano, A., Cella, S., & Cotrufo, P. (2017). Nonsuicidal Self-injury: A Systematic Review. *Frontiers in Psychology*, 8. <https://doi.org/10.3389/fpsyg.2017.01946>
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112(1), 155–159. <https://doi.org/10.1037/0033-2909.112.1.155>
- Darapatni, D. A. S. P., & Swandi, N. L. I. D. (2024). Faktor-faktor yang memengaruhi regulasi emosi individu dengan perilaku non-suicidal self-injury (NSSI): Tinjauan literatur. *Tabularasa: Jurnal Ilmiah Magister Psikologi*, 11(1), 45–58. <https://jurnalmahasiswa.uma.ac.id/index.php/tabularasa/article/view/3696>
- Emanuel, E. J., Wendler, D., Killen, J., & Grady, C. (2004). What makes clinical research in developing countries ethical? The benchmarks of ethical research. *The Journal of Infectious Diseases*, 189(5), 930–937. <https://doi.org/10.1086/381709>
- Evans, G. W., Li, D., & Whipple, S. S. (2013). Cumulative risk and child development. *Psychological Bulletin*, 139(6), 1342–1396. <https://doi.org/10.1037/a0031808>
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41(4), 1149–1160. <https://doi.org/10.3758/brm.41.4.1149>
- Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M. P., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine*, 14(4), 245–258. [https://doi.org/10.1016/S0749-3797\(98\)00017-8](https://doi.org/10.1016/S0749-3797(98)00017-8)
- Field, A. (2018). *Discovering statistics using IBM SPSS Statistics* (5th ed.). Sage.
- Glenn, C. R., & Klonsky, E. D. (2013). Nonsuicidal self-injury disorder: an empirical investigation in adolescent psychiatric patients. *Journal of clinical child and adolescent psychology : the official journal for the Society of Clinical Child and Adolescent Psychology, American Psychological Association, Division 53*, 42(4), 496–507. <https://doi.org/10.1080/15374416.2013.794699>
- Gratz, K. L. (2001). Measurement of Deliberate Self-Harm: Preliminary Data on the Deliberate Self-Harm Inventory. *Journal of Psychopathology and Behavioral Assessment*, 23(4), 253–263. <https://doi.org/10.1023/a:1012779403943>
- Gratz, K. L., & Roemer, L. (2004). Multidimensional Assessment of Emotion Regulation and Dysregulation: Development, Factor Structure, and Initial Validation of the Difficulties in Emotion Regulation Scale. *Journal of Psychopathology and Behavioral Assessment*, 26(1), 41–54. <https://doi.org/10.1023/b:joba.0000007455.08539.94>
- Handayani, T. R., & Lestari, A. T. (2021). Hubungan antara dukungan sosial dengan kecenderungan self-harm pada mahasiswa perantau. *Jurnal Psikologi Ulayat*, 8(1), 55–67. <https://doi.org/10.24854/jpu12345>
- Hayes, A. F. (2018). *Introduction to mediation, moderation, and conditional process analysis* (2nd ed.). Guilford Press.
- Hidayati, F., Fanani, M., Mulyani, S. (2021). Prevalensi dan fungsi melukai diri sendiri pada mahasiswa. *PROSIDING: Seminar Nasional Psikologi dan Ilmu Humaniora (SENAPIH)*. Fakultas Psikologi Universitas Negeri Malang. <https://conference.um.ac.id/index.php/psi/article/view/1933>
- Hughes, K., Bellis, M. A., Hardcastle, K. A., Sethi, D., Butchart, A., Mikton, C., Jones, L., & Dunne, M. P. (2017). The effect of multiple adverse childhood experiences on health: a systematic review and meta-analysis. *The Lancet Public*

Health, 2(8), e356–e366. [https://doi.org/10.1016/s2468-2667\(17\)30118-4](https://doi.org/10.1016/s2468-2667(17)30118-4)

- Kurniawati, Y., Susanti, H., & Prasetya, R. (2021). Self-harm tendencies based on gender among university students in Indonesia. *Jurnal Psikologi Insight*, 23(2), 89–101.
- Lamb, M. E., & Lewis, C. (2013). Father–child relationships. In N. Cabrera & C. S. Tamis-LeMonda (Eds.), *Handbook of father involvement* (2nd ed., pp. 119–135). Routledge.
- McLaughlin, K. A., Sheridan, M. A., & Lambert, H. K. (2014). Childhood adversity and neural development: Deprivation and threat as distinct dimensions of early experience. *Neuroscience & Biobehavioral Reviews*, 47, 578–591. <https://doi.org/10.1016/j.neubiorev.2014.10.012>
- Mikulincer, M., & Shaver, P. R. (2016). *Attachment in adulthood* (2nd ed.). Guilford Press.
- Monroe, S. M., & Simons, A. D. (1991). Diathesis-stress theories in the context of life stress research: Implications for the depressive disorders. *Psychological Bulletin*, 110(3), 406–425. <https://doi.org/10.1037/0033-2909.110.3.406>
- Nock, M. K. (2010). Self-injury. *Annual Review of Clinical Psychology*, 6, 339–363. <https://doi.org/10.1146/annurev.clinpsy.121208.131258>
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). McGraw-Hill.
- Pleck, J. H. (2010). Paternal involvement: Revised conceptualization and theoretical linkages with child outcomes. In M. E. Lamb (Ed.), *The role of the father in child development* (5th ed., pp. 58–93). John Wiley & Sons, Inc.
- Brown, R. C., & Plener, P. L. (2017). Non-suicidal Self-Injury in Adolescence. *Current psychiatry reports*, 19(3), 20. <https://doi.org/10.1007/s11920-017-0767-9>
- Tabachnick, B. G., & Fidell, L. S. (2019). *Using multivariate statistics* (7th ed.). Pearson.
- van der Kolk, B. A. (2014). *The body keeps the score: Brain, mind, and body in the healing of trauma*. Viking.

ADDITIONAL INFORMATION

Correspondence All inquiries and requests for additional materials should be directed to the Corresponding Author.

Publisher's Note Utan Kayu Publishing maintains a neutral stance regarding territorial claims depicted in published maps and does not endorse or reject the institutional affiliations stated by the authors.

Open Access This article is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License (CC BY-SA 4.0), which permits others to share, adapt, and redistribute the material in any medium or format, even for commercial purposes, provided appropriate credit is given to the original author(s) and the source, a link to the license is provided, and any changes made are indicated. If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original. To view a copy of this license, visit <https://creativecommons.org/licenses/by-sa/4.0/>.

© The Author(s) 2025

This page has been intentionally left blank