Research Article

The Social Patterning of Adolescent Depression: A Multi-Group Path Analysis of Social Stress, Support, and Context in Addis Ababa, Ethiopia

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Background: Early adolescence (ages 10–14) is a period of heightened vulnerability to depressive symptoms. While adolescent depression is socially patterned, evidence from low- and middle-income countries, especially for early adolescents, remains limited.

Methods: This quantitative phase identified tendencies linking social stressors to depressive symptoms as part of a broader explanatory mixed-methods study integrating Pearlin's Stress Process Theory with Archer's Morphogenetic Approach under a critical realist meta-theory. Data were collected from 830 adolescents in a highly deprived area of Addis Ababa using validated measures of social stressors, social support, and depressive symptoms. Structural equation modeling examined context–mechanism–outcome tendencies.

Results: 77.7% screened positive for risk of depressive symptoms. Neighborhood disorder showed the strongest total association with depressive symptoms (β = 0.506), operating through both direct and support-mediated pathways. Family and school stressors displayed distinct direct and indirect associations. Multi-group analysis showed these tendencies varied significantly by gender, family structure, and socioeconomic position.

Conclusions: The findings identify key socially patterned tendencies linking stressors and depressive outcomes and provide a structured basis for the qualitative phase, which will investigate the underlying social processes and forms of reflexive response.

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1. Background

1.1. Adolescent Depression as a Global and Local Public Issue

Depression in adolescence is a significant global public health concern, understood sociologically not as an isolated personal trouble but as a socially patterned public issue rooted in social structures[1][2]. Meta-analyses estimate a global prevalence of 21–34% among adolescents[3][4], with the highest burden in low- and middle-income countries (LMICs), where 90% of the world's 1.2 billion adolescents live[5]. In sub-Saharan Africa, for instance, it has been estimated that around 26.9 per cent of adolescents report depressive symptoms[6]. The situation is particularly concerning in Addis Ababa, the capital of Ethiopia, where more than one-third of the population is under 18 years of age[7]. Although city-wide studies are limited, available research suggests that the prevalence of adolescent depression is around 36%, consistent with the national prevalence reported in a recent systematic review[8].

1.2. Why early adolescence matters

Early adolescence (10-14 years) is a critical developmental period marked by swift biological, psychological and social changes[9][10][11][12]. These changes are associated with increased vulnerability[13], uncertainty[10] and social challenges[14], which can trigger the onset of depressive symptoms during this developmental stage[15][16][17][18]. UNICEF[19] reports that nearly half of all depressive symptoms first emerge during early adolescence. The early-onset of depressive symptoms have long-term consequences, including impaired educational attainment, poorer social adjustment, and elevated risks of suicide and self-harm[20][12][21][22]. These factors make early adolescence a decisive window for understanding the social origins of depression.

1.3. A Sociological Lens: From individual pathology to social processes

Adolescent depression is often understood through the lenses of bio-psychological theories; however, a sociological approach highlights the socio-structural factors that make individuals susceptible to depression[23]. This does not mean that sociology explains all of depression, but rather that sociology has specific analytical tools for studying the social mechanisms and structure that contribute to patterned distributions of depression. In particular, Pearlin's Stress Process Theory emphasizes how socially stratified positions expose individuals to unequal stressors and unequal access to coping resources,

thereby producing patterned mental health outcomes[24][25]. From this perspective, the statuses individuals occupy within gender, socioeconomic, and familial stratifications create unequal distributions of power, resources, and adversity, which in turn generate differential vulnerability to depression[26][27][28]. These macro-level systems do not directly impact mental health, but they influence adolescent's proximal social contexts, such as family, school, and neighborhood, where stress is experienced and resources for social support are accessed[29][30][28][31].. Structurally patterned vulnerabilities are activated and manifest in the day-to-day lives of people in these near social settings. A recent scoping review by Isayas et al.[32] reveals that family, school, and community stressors as well as social support in the family, school, and community are linked to depressive symptoms in LMICs, in line with Pearlin's Stress Process Theory.

In line with Pearlin's Stress Process Theory, a recent scoping review by Isayas et al.[32] shows that family, school, and neighborhood stressors and the availability of social support within these contexts are associated with depressive symptoms in LMICs. Such effects also differ depending on the social positions of adolescents. To take an example, when exposed to the same stressors as boys, girls are more likely to be depressed due to gender norms, expectations, and social sanctions[33][34][35][36][37][38] (Chandra-Mouli et al., 2018). Socioeconomic status also predisposes risks by impacting resource allocation, opportunities and stresses within the families, thus impacting adolescents home settings, school choices, and residential arrangements[39][31]. There is also the impact of family structure: married-couple households might be able to afford more financial stability, but single-parent households often face economic pressures that create uncertainty and stress, thus increasing the risk of adolescents to develop depressive outcomes[38][31].

1.4. Identifying the Empirical and Theoretical Gap

Although there is a growing research on adolescent depression in LMICs, much of current studies remains atomistic, focusing on individual or single domain stressors without exploring how these sources of risks interact within social contexts like family, school, and neighborhood[32]. This limitation is further enhanced by a major emphasis on adults or older adolescents in Ethiopia and particularly in Addis Ababa, leaving early-adolescence almost uncharted, with some notable exceptions, such as Mulat[40] and Mekonnen et al.[41]. Sociologically, this is a theoretical as well as an empirical gap, highlighting the need to conduct research beyond mere risk-factor lists to examine how structural

conditions pattern the exposure of adolescents to stress and their resources and how these processes lead to unequal mental-health outcomes.

1.5. An Integrated Theoretical Framework: Toward a Generative Explanation

This study is grounded in Critical Realism which assumes a stratified social reality in which observable outcomes are generated by underlying mechanisms, identified through retroductive reasoning[42]. Within this philosophy, the study integrates Pearlin's Stress Process Theory (SPT) and Archer's Morphogenetic Approach (MA).

SPT illustrated how social positions pattern xposure to stressors in the family, school, and neighborhood context and how resources such as social support could mitigate their impact[24][25]. The MA by Archer prefigures the concept of a reflexive agency whereby in the intermediate of the structured incorporation and the social outcome is a space, (here termed) 'internal conversation' where people interpret their situation and act on it[43].

Combining these perspectives, the analysis proceeds as a process where adolescents are confronted with structurally conditioned stressors, make a reflexive deliberation, and try to mobilize coping strategies, including social support. The responses are influenced by the availability of resources and context constraints, and over time the different responses lead to divergent mental health outcomes. Outcomes are therefore recognized as the result of the interplay between reflective agency, coping capacities and structural conditions, rather than of exposure to them alone.

1.6. The Present Study: A Quantitative Phase within a Critical Realist Explanatory Strategy

CR's stratified ontology distinguishes between the empirical (observed experiences), the actual (events that occur), and the real (underlying structures and generative mechanisms)[42][43]. Within this stratified ontology, adolescent depressive symptoms are treated as empirically observable outcomes generated through the interaction of underlying social mechanisms and the structural and relational contexts in which adolescents are embedded. Although these mechanisms are not directly observable, they may be inferred through recurring patterns of association under specific contextual conditions. This quantitative study is designed to identify patterned associations and conditional pathways that signal where generative mechanisms are likely to be activated or constrained, rather than explaining mechanisms directly. It determines the "what" by examining the strength, direction, and variation of the associations with context hence illustrated how the structural and cultural conditions influence exposures of

adolescents to stressors which they perceive reflexively. Activation of the available existing protective resources, social, psychological and coping, depends on both access to support and the ability to activate agentic reflexivity, where latent mechanisms can give rise to depressive symptoms, but their activation allows adaptation. The mapping of these empirical tendencies gives the study a basis to the next qualitative stage, which will examine the how and why of the tendencies based on the lived experiences of adolescents, their meaning-making patterns, and agentive strategies.

1.7. Purpose of the Research

This quantitative study, as the first phase of a broader CR explanatory strategy, aims to identify empirical tendencies in the distribution and co-variation of stress exposures, perceived social support, and depressive symptoms among early adolescents. It examines the extent to which observed empirical patterns are compatible with the stress-process component of our framework and whether the covariance structure among stress, perceived support, and depressive symptoms aligns with theorized stress-buffering and erosion pathways. Crucially, the study seeks to identify the role of protective social resources as supportive mechanisms already active in the context, evaluating how their availability varies across different social groups. These tendencies are mapped to provide a foundation for a qualitative investigation into the reflexive and intrapersonal processes that adolescents engage in to try to trigger these resources.

2. Research Method

2.1. Research Design

This cross-sectional study is the quantitative portion of a mixed methods design which involved a school-based survey of early adolescents in Addis Ababa.

2.2. Study Setting

The locality of Merkato is located in the Addis Ketema and Lideta sub-city administrations of Addis Ababa, Ethiopia. It is a socio-economically deprived area where the poorest households in the city are concentrated[44], and where the largest number of social welfare recipients is found[45].. More recent disaggregated poverty rates are limited, but poverty is currently over 53 percent in Lideta sub-city, where the study school is located, which is the highest poverty rate in Addis Ababa[46].

This material deprivation is exacerbated by infrastructural lack, overcrowding and often poor quality housing, restricted access to clean water and sanitation, and exposure to community violence. These conditions constitute established social determinants of adolescent depression[32]. The macro-structural realities of Merkato thus configure the proximate environments of family, school, and neighborhood life in ways that systematically expose adolescents to multiple, intersecting stressors[47][48][49][50][51]. In this context, the risk for mental health problems among adolescents is high, because stressors are not isolated occurrences, but layers of life.

2.3. Sampling and Participants

The school under study was a government primary school (Grades 1 -8) purposely chosen as a critical case due to its geographical location in the high-poverty area of Merkato. It is located between a big informal market and neighborhoods with high levels of crime thus, displaying the contextual risks being studied

A school-based census approach was used for the target population. Out of 1,256 enrolled students, 339 students that were not between the 10-14 years of age were excluded. Following the refusal of the parents (n=81) and adolescents (n=6), the final sample involved 830 respondents, which is a response rate of 90.5% in the target group

2.4. Survey Instruments and Measures

The data were collected using a structured and self-administered questionnaire. The tool has four parts: (1) socio-demographic variables; (2) family, school, and neighborhood stressors; (3) perceived social support; and (4) depressive symptoms. Items were chosen based on tested instruments that are widely used in mental-health studies of adolescents, and then customized to the local environment to ensure compatibility with age and locality.

2.4.1. Depressive Symptoms

This is the outcome variable measured by the Center for Epidemiologic Studies Depression Scale for Children (CES-DC). It is a 20-item rated scale on a 4-point scale (0 = "not at all" to 3 = "a lot"), with 16 negative and 4 positive items. It captures mood, self-esteem, helplessness, thought problems, appetite, and sleeping experienced over the last seven days. The range of the scores is between 0 and 60 with a cut-off score of ≥16. CES-DC has been previously tested in Ethiopia and has demonstrated good internal

consistency with adolescent samples[52][53]. Internal consistency (Cronbach α) in the current sample was .864.

2.4.2. Social Stressors

The social stressors were measured in the context of family, school and neighborhood.

Family Stressors-

Family stressors were measured using the home-based items of the International Child Abuse Screening Tool – Child Version (ICAST-C). The study used 34 items that focused on exposure to violence, emotional abuse, neglect, physical abuse, and sexual abuse. The respondents were asked how frequently they have experienced each item on a 4-point scale from Never to Many times, with a high score represents an increased abuse. The ICAST -C has proved to be highly reliable in previous studies conducted in Ethiopia[54][55]. In this sample, Cronbach's α was .941.

School Stressors-

School-related stress was measured with the 16-item Perceived School-Related Stress Scale (PSRSS). The measure has 4 domains, including peer-related stressors, school-achievement-related stressors, school-work pressure and parent and/or teacher-related stressors. The items were rated using a 6-point scale, ranging between 0 (no stress) and 5 (severe stress), with higher scores indicating greater perceived stress. The scale has been proven to be reliable in local contexts[56], and in the present research, the internal consistency was.921. Its internal consistency in this study was .921.

Neighborhood Stressors

Perceived neighborhood disorder was assessed via a 10-item scale adapted from Kim and Mueller[57], with items rated on a 4-point Likert scale (1 = strongly disagree to 4 = strongly agree). Higher scores indicate greater perceived neighborhood disorder. This scale was previously utilized and found reliable among students in Addis Ababa[58]. Cronbach's α for this scale was .900.

2.4.3. Social Support

The mediator, perceived social support, was assessed using the 12-item Multidimensional Scale of Perceived Social Support (MSPSS), with support from family, friends, and significant others. Items are

rated on a 7-point Likert scale from very strongly disagree to very strongly agree. Higher scores indicate greater perceived social support. It has a good reliability among adolescents in Ethiopia[59]. In this study, internal consistency was .929.

2.5. Translation, Cultural Adaptation, and Pilot Testing

The questionnaire has gone through a translation and adaptation process that involved forward and back translation as well as its semantic equivalence and its relevance and clarity by experts. Validity was tested in a similar school with a pilot study of 50 students. This included a think-aloud procedure with 10 students, leading to minor wording clarifications but no structural changes. The internal consistency of all scales in the pilot was also good (0.702–0.941), indicating reliability in the local context.

2.6. Data Collection Procedures

Data were collected in April 2025 using paper-based self-administered questionnaires administered in students' classrooms after regular school hours to avoid disruption of teaching activities. After obtaining ethical approval from the Institutional Review Board of the Ethiopian Society of Sociologists, Social Workers, and Anthropologists (ESSSWA/L/AA/05903/2025), informed parental consent and adolescent assent were secured before participation in the study. Data collection took place from Monday to Friday from 3:00 PM to 4:00 PM and on Saturdays after tutorial classes between 1:00 PM to 2:30 PM. Twelve trained enumerators and two coordinators supervised the process, with one enumerator assigned to a maximum of 15–20 students. Questions were read aloud for Grade 4 and 5 students, and Grade 6 to 8 students filled out the questionnaire independently and enumerators clarified and checked for incomplete responses. The school leader of the unit and assigned school staff helped with classroom arrangements, questionnaire distribution and coordination of students in data collection. Each questionnaire took around 30-45 minutes to complete, and the participating students were given small school supplies (notebooks and pens/pencils) as appreciation for their participation.

2.7. Data Management and Quality Assurance

2.7.1. Data Entry and Cleaning

Enumerators in the field would check completed questionnaires against instant omissions. These data were then entered in the IBM SPSS Statistics (V.31). Data entry was systematically checked for quality, with 11 values identified as 'out of range' and 8 as 'extreme outliers' found via sorting, missing-values

reporting and box-plots. Any difference was checked and confirmed as entry errors and was fixed prior to analysis.

2.7.2. Preparation for Analysis

Reverse coding was applied where required, and scale scores were calculated according to standard guidelines. Immediate onsite checks by enumerators ensured that no items were left blank when submitted, yielding a final dataset with no missing values.

2.8. Data Analysis Method

Quantitative data analysis was conducted using IBM SPSS Statistics (V.31) for preliminary, descriptive, and other statistical analyses, and IBM AMOS (V.29) for structural equation modeling (SEM). In line with the study's CR orientation, SEM was used to examine the empirical plausibility of theoretically derived relationships and patterned tendencies and to establish empirical regularities, rather than to identify predictive causal laws (Brown et al., 2022; Ford et al., 2018).

2.8.1. Preliminary Analyses and Assumption Checks

Mean and standard deviations (SD) were used as descriptive statistics to summarize the sample. Pearson and Spearman correlations were used to measure bivariate relationships, t -tests and one-way ANOVA were used to measure group differences.

Prior to model estimation, data were screened for statistical assumptions: outliers ($|z| > 3.29$), multicollinearity (VIF < 2.0; tolerance > 0.20), linearity, homoscedasticity, and normality (Stevens, 2009; Field, 2009Tabachnick et al., 2013). Substantively valid observations with extreme z-scores (> ±3.29) were retained to preserve population heterogeneity. No multicollinearity was observed as the predictors were significantly correlated (r = 0.45- 0.63), the VIF was low (1.30 -1.59) and high tolerance (0.63- 0.77). The univariate distributions were approximately normal with skewness of 0.79 to 2.03 and kurtosis of -0.57 to 4.74.

As a result, bias-corrected bootstrapping was used in all SEM analyses in order to produce strong standard errors and confidence intervals, which is advised when maximum-likelihood estimation is done on non-normally distributed data[60]. SEM based on covariance was kept in order to test the theory, and bootstrapping was done to guarantee sound inference of the parameters[61][62].

2.8.2. Structural Equation Modeling

SEM is employed not for predictive inference, but to examine theoretically specified configurations of tendencies among social stressors, perceived social support, and depressive symptoms across family, school, and neighborhood contexts. SEM enables the identification of demi-regularities including mediation pathways and group-specific variations by gender, family structure, and socioeconomic status. Using SEM, the theoretical relationships between social stressors, perceived social support, and depressive symptoms were analyzed in a two-step process (Anderson and Gerbing, 1988).

Measurement Model Validation

A Confirmatory Factor Analysis (CFA) validated the five latent constructs. Model fit was assessed using standard indices: $\chi^2/df < 3$, CFI > 0.90, TLI > 0.90, and RMSEA < 0.08 (Bentler, 1990; Hu & Bentler, 1999; Kline, 2011; Ullman, 2006). Convergent validity was confirmed via factor loadings ≥ 0.50, AVE ≥ 0.50, and CR ≥ 0.70 (Fornell & Larcker, 1981; Hair et al., 2010). Discriminant validity was evaluated using the Fornell-Larcker criterion (Fornell & Larcker, 1981).

All study constructs demonstrated acceptable reliability, convergent validity, and model fit. The depressive symptoms was best represented by a unidimensional model after removing low-loading items ($\chi^2/df = 3.62$, CFI = 0.982, TLI = 0.973, RMSEA = 0.056; AVE = 0.505, CR = 0.91). Family stressors retained a revised five-factor structure- witnessing violence, emotional abuse, physical abuse, neglect, and sexual abuse- with acceptable fit ($\chi^2/df = 5.18$, CFI = 0.903, TLI = 0.891, RMSEA = 0.071) and AVE/CR values supporting convergent validity. The PSRSS was optimally represented by its original four-factor model (peer-related stressors, school achievement-related stressors, school work pressure, and parent and/or teacher-related stressors) with good fit ($\chi^2/df = 3.98$, CFI = 0.960, TLI = 0.952, RMSEA = 0.060; AVE = 0.529–0.736, CR = 0.763–0.896). The neighborhood disorder was unidimensional with adequate fit ($\chi^2/df = 3.97$, CFI = 0.986, TLI = 0.975, RMSEA = 0.060; AVE = 0.518, CR = 0.902). The social support demonstrated a three-factor structure (family, friends and significant others) with strong fit ($\chi^2/df = 3.79$, CFI = 0.978, TLI = 0.972, RMSEA = 0.058; AVE = 0.568–0.704, CR = 0.860–0.918).

The overall measurement model, correlating all constructs, showed good fit ($\chi^2/df = 2.00$, CFI = 0.923, TLI = 0.920, RMSEA = 0.037) and confirmed both convergent and discriminant validity.

Structural Model Estimation and Pattern Identification

After confirming an adequate measurement model, the structural model was estimated to examine the patterned associations and conditional pathways among the study variables. Direct associations and mediated pathways from the three stressor domains to depressive symptoms through perceived social support were examined. Indirect pathways were assessed using bias-corrected bootstrapping (2,000 samples) to evaluate the stability of the mediated tendencies.

Contextual conditioning was tested using multi-group SEM across gender, family structure, and socioeconomic status, measured via perceived family income, to identify “for whom” and “under what conditions” the observed empirical patterns vary. To meet sample size recommendations (~100 per group) (Kline's, 2005), categories were consolidated. Perceived family income was grouped into low (n = 152), moderate (n = 488), and high (n = 190). Family structure was categorized as two-parent households (n = 525), single-parent households (n = 199; combining single mother and single father families), and other arrangements (n = 305; including step-parent families, institutional care, and living with relatives).

In the multi-group estimation, the construct of family stressors did not converge when modeled using its five detailed sub-dimensions. To address this issue, a theoretically informed parceling approach was applied. Specifically, the items within each sub-dimension were summed to form composite indicators, resulting in a reduced set of indicators for the latent construct (Little et al., 2002). This adjustment enabled successful model convergence for all multi-group analyses.

3. Findings of the study

3.1. Descriptive Statistics

On the CES-DC (cutoff ≥16), 77.7% of adolescents screened positive, indicating that elevated depressive symptoms are the norm rather than the exception in this population. Family stress (M = 49.34, SD = 16.05) was moderately high compared to the midpoint of the scale; school stress (M = 23.83, SD = 15.88) was low to moderate on average, but the high standard deviation indicates a subpopulation of high school stress. The average score for neighborhood disorder was below the midpoint (M = 17.90, SD = 6.71) indicating that there was relatively low perceived disorder overall, but there was some variation across the neighborhoods in Merkato. Perceived social support (M = 59.04, SD = 19.69) was moderate to high on average, but the large variation indicates that a significant minority report very low support, leaving them without protective resources when facing stressors.

3.2. Group Analysis

There were more depressive symptoms reported by girls than boys (M = 24.27 vs. 21.48) though the difference was not large, around 2.8 points. Similarly, girls reported higher mean scores for child maltreatment (M = 51.73, SD = 17.83) and neighborhood disorder (M = 19.27, SD = 6.87) compared with boys (CM: M = 46.91, SD = 13.56; ND: M = 16.47, SD = 6.23). There is a relatively small difference between the means and the overlapping variability suggests shift in distribution rather than group separation. In contrast, boys reported slightly higher perceived social support (M = 60.38, SD = 18.51 vs. 57.74, SD = 20.70), indicating only a marginal advantage in relational resources. There was a non-significant gender difference in school stress (p = .09). Overall, the patterns suggest a moderate gender gradient that suggests that girls are exposed to more cumulative adverse events and receive slightly less protective support.

Depressive symptoms tended to be higher by grade level, from a mean of 19.9 in Grade 4 to 27.5 in Grade 8 ($F(4,825)=11.8$, $p<.001$). Overall, Grade 4 students had slightly elevated average scores than the CES-DC cut-off of 16, with Grade 8 students more strongly elevated, suggesting an increase in symptoms as students move up in grade. There were also patterned family structure associations with symptoms: adolescents in stepfamily and single-father families reported higher symptoms ($M=28.0$) than those with both biological parents ($M=22.0$, $p<.001$). Double orphans reported significantly more symptoms ($M=32.9$) than having both parents alive ($M=22.1$, $p<.001$), which was about 11 points more on the CES-DC scale, indicating high vulnerability. A graded pattern emerged for maternal education: average depressive symptoms tended to be higher among adolescents whose mothers never attended school ($M=24.5$) and lower among those whose mothers held a degree ($M=15.9$, $p<.001$). Average symptoms were also found to be highest in the very low income group ($M=29.0$) and lowest in the high income group ($M=19.6$; $p<.001$). School stress was the exception, showing no consistent association with grade level, family structure, or parental education, only with family income ($p=.024$), suggesting that academic pressures tend to affect students across different backgrounds similarly, though economic precarity may amplify them.

3.3. Structural Model Assessment

The following table displays the direct, indirect, and overall patterned tendencies in the estimates of the structural model relating family, school, and neighborhood stressors and social support to the adolescent depressive symptoms. It presents standardized coefficients (β) and confidence intervals for all pathways.

Paths	Direct Tendency (β) [95% CI]	Indirect Tendency (β) [95% CI]	Total Tendency (β) [95% CI]	p-value
Family Stressors → Social Support	-0.267 [-0.392, -0.143]	—	-0.267 [-0.392, -0.143]	< .001
School Stressors → Social Support	-0.190 [-0.282, -0.097]	—	-0.190 [-0.282, -0.097]	< .001
Neighborhood Disorder→ Social Support	-0.358 [-0.438, -0.242]	—	-0.358 [-0.438, -0.242]	< .001
Family Stressors→ Depressive Symptoms	0.120 [0.035, 0.199]	0.056 [0.028, 0.098]	0.176 [0.094, 0.262]	<.001
School Stressors → Depressive Symptoms	0.189 [0.106, 0.284]	0.039 [0.018, 0.069]	0.228 [0.139, 0.323]	< .001
Neighborhood Disorder → Depressive Symptoms	0.431 [0.350, 0.506]	0.075 [0.040, 0.115]	0.506 [0.425, 0.572]	<.005
Social Support → Depressive Symptoms	-0.209 [-0.301, -0.122]	—	-0.209 [-0.301, -0.122]	< .001

The structural model results reveal patterned tendencies in how social stressors and social support relate to depressive symptoms among adolescents. Neighborhood disorder showed the strongest patterned tendency toward higher depressive symptoms (total β = 0.506, 95% CI [0.425, 0.572]). This tendency was primarily expressed through a direct pathway (β = 0.431), indicating that adolescents exposed to higher levels of neighborhood disorder tended to report higher depressive symptoms. A smaller indirect tendency was observed through reduced activation of social support (β = 0.075), suggesting that the protective role of social support is present but not fully engaged in these contexts.

Family stressors exhibited a moderate patterned tendency to influence depressive symptoms both directly (β = 0.120) and indirectly through non-activated social support (β = 0.056). The similar magnitude of direct and indirect tendencies indicates a partial buffering effect, where social support may

mitigate the influence of family stress, but only for some adolescents and to varying degrees depending on their access to or activation of supportive resources.

School stressors showed a moderate direct tendency toward depressive symptoms ($\beta = 0.189$) and a smaller indirect tendency via social support ($\beta = 0.039$). This pattern suggests that while school-related stress exerts a noticeable impact on depressive symptoms, the mitigating effect of social support is comparatively weaker in this domain.

Across all pathways, perceived social support tended to be protective, with higher levels associated with lower depressive symptoms ($\beta = -0.209$). This does not imply a causal law but indicates a tendency: adolescents who were able to engage and utilize available social support tended to experience fewer depressive symptoms under conditions of stress. Overall, the model accounted for approximately 60% of the variance in depressive symptoms ($R^2 = 0.60$).

3.4. Multi-group Analysis

Multi-group analysis was performed for gender, family structure, and perceived family income. The findings show patterns, indicating that the relationship between social stressors and depressive symptoms, and between social support and depressive symptoms, are dependent on structural and contextual factors. These findings provide empirical evidence of how different social positions shape the activation and expression of underlying generative mechanisms.

3.4.1. Gender

Among boys, neighborhood disorder showed a pronounced direct tendency in its association with depressive symptoms ($\beta = 0.492$, $p < .001$). Among girls, the pattern was more nuanced: school stressors exhibited both direct ($\beta = 0.242$, $p < .001$) and indirect tendencies (indirect $\beta = 0.100$, $p < .001$), while family stressors showed a notable direct tendency ($\beta = 0.210$, $p < .001$). School stressors tended to undermine social support only among girls ($\beta = -0.253$, $p < .001$). Variance explained was comparable across genders ($R^2 = 0.62$ boys, 0.585 girls).

3.4.2. Family Structure

The patterned tendencies of associations varied across family structures. In single-parent families, family stressors tended to reduce the activation of social support ($\beta = -0.642$, $p < .001$), with corresponding indirect tendencies toward higher depressive symptoms ($\beta = 0.245$, $p < .001$) and a strong

direct protective tendency from social support (β = -0.381, p < .001). In other family structures (step-parent families, institutional care, or living with relatives), family stressors exhibited a direct patterned tendency toward higher depressive symptoms (β = 0.365, p = .002). In two-parent households, neighborhood disorder exhibited the strongest patterned tendency toward depressive symptoms (β = 0.469, p < .001). School stressors tended to relate to depressive symptoms only in two-parent (β = −0.185, p < .001) and other family structures (β = -0.292, p = .007). The variance explained was highest in other family structures (R^2 = 0.823), suggesting that the measured variables capture empirical regularities most comprehensively in these contexts, while still allowing for unmeasured structural and agentic processes to operate

3.4.3. Perceived Family Income

The configuration of patterned tendencies varied across socioeconomic groups. Among low-income adolescents, family stressors tended toward higher depressive symptoms (β = 0.481, p < .001), with minimal mediation through social support. Among high-income adolescents, family stressors tended to relate indirectly to symptoms via reduced activation of social support (β = 0.061, p < .001), while neighborhood disorder tended directly toward higher symptoms (β = 0.392, p < .001). Among middle-income adolescents, school stressors exhibited the strongest direct patterned tendency toward depressive symptoms (β = 0.615, p < .001). Perceived social support consistently tended to protect against depressive symptoms across all income groups (β = -0.240 to -0.147, all p < .01), though the stressor most strongly associated with reduced support differed: neighborhood disorder in low-income adolescents (β = -0.425, p < .001) and school stressors in middle-income adolescents (β = -0.344, p < .001). Variance accounted for was highest among middle-income adolescents (R^2 = 0.635).

4. Discussion

In keeping with a CR epistemology, the findings are interpreted as identifying empirical tendencies that signal the likely activation of underlying generative mechanisms, rather than as direct demonstrations of those mechanisms themselves; accordingly, the statistical tendencies reported below are treated as explanatory clues situated within a broader causal ontology.

4.1. The Central Position of Social Stressors and the Mediating Process of Social Support

The findings of this research support the conclusion that adolescent depressive symptoms have a tendency to be associated with social stressors both directly and indirectly through the absence or non-activation of protective social support. These indirect pathways are not causal sequences, but are intended to indicate empirically observed tendencies, and serve as patterns for qualitative investigation in a CR framework. These tendencies are consistent with Pearlin[24][25] who argued that social stressors are linked to the reduction or lack of access to protective social resources, particularly social support which can be called upon by adolescents when structural and relational conditions are conducive. Various studies find that protective social networks are consistently associated with reduced depressive symptoms in LMIC contexts, but their context-specific form may differ[63][64][65][66][67][68][69].

Adolescents growing up in deprived neighborhoods, such as Merkato, are shaped by structural conditions including material deprivation, unstable or chaotic social relations, visible disorder, weak institutions, and cultural norms shaped by insecurity or survival strategies. These contextual conditions generate chronic stress, fear, anomie, and alienation, which create tendencies toward depressive symptoms. Adolescents' social and psychological outcomes are further influenced by how they and other actors, such as parents or community groups, engage with these conditions[48][51][70]. The operation of these underlying structural conditions is illustrated by the strong patterned relationship between neighborhood disorder and depressive symptoms, which occurs both directly and indirectly. While the current study does not directly measure the mechanisms themselves, the observed empirical regularities signal where they are likely to be active.

4.2. Structural Conditioning: The Divergent Tracks of Vulnerability and Resilience

A key contribution of this work is that the empirical patterns differ across social positions supporting claim that there exists no universal stress-support-depression rocess; rather, it shaped by social context. According to R logic these findings are not direct "evidence" of morphogenesis, but structurally conditioned empirical results.

4.2.1. Gendered Structures and Divergent Engagements

Depressive symptoms tended to be higher in girls exposed to relational and emotional family and school stressors, which were associated with lower activation of social support. In boys, neighborhood disorder tended to show the strongest direct link with depressive symptoms. These gendered patterns resonate

with established literature documenting girls' greater sensitivity to interpersonal stressors and boys' heightened reactivity to external environmental threats[71][72][73][74][75][76]. Within our CR framework, we interpret these patterns as demi-regularities consistent with the conditioning effects of patriarchal structures, theorized at the level of the real[43]. This conditioning is understood to probabilistically shape divergent social fields: orienting girls toward relational networks (increasing sensitivity to interpersonal disruptions) and boys toward independent environmental engagement (heightening exposure to external risks). These are not deterministic but contextually variable tendencies[77][78][79].

4.2.2. Agency and the Morphogenesis of Support in Non-Intact Families

The most salient result is that social support was more strongly associated with depression among adolescents in alternative family types, which are frequently environments with disrupted support systems. This pattern, observed in other sub-Saharan African studies[80][81][82][83][84] moves beyond a paradox when viewed through a CR lens. This finding is interpreted as suggestive of morphogenetic processes of agency.

SEM cannot observe the underlying generative mechanisms or the reflexive 'internal conversations' of adolescents. However, the heightened protective tendency of support in these contexts is consistent with adolescents experiencing and responding to external resources (e.g., from teachers, peers, or kin). This pattern suggests a potential compensatory response to parental limitations and structural constraints[85], which will be further explored in the subsequent qualitative phase to understand the processes behind these tendencies.

4.2.3. Socioeconomic Position and the Architecture of Adversity

In the case of low-income family adolescents, family stressors showed a direct and strong patterned tendency toward higher depressive symptoms, with little mediation by social support. In high-income adolescents, stressors tended to erode existing resource advantages, reflected in the non-activation of social support. For middle-income adolescents, school stress emerged as a stronger direct patterned tendency associated with depressive symptoms. These trends are consistent with theoretical predictions of the status-anxiety hypothesis[86] according to which youths in this stratum are faced with the enhanced academic strains as a perceived pathway to social mobility. The quantitative results, however, only indicate the empirical tendencies that emerged from the data collected; they do not fully describe the experience, the interpretation, and the process through which the tendencies emerged. The

qualitative step, which then follows, using open-ended inquiry, will allow exploring the lived experiences of adolescents and context-specific processes that were not foreseen by the survey, thus providing more comprehensive information about how these patterns are created and maintained.

5. Limitations and Future Research

This study has limitations that clarify its scope and point toward future research. To begin with, the cross-sectional design is restrictive to causal inference. Even though the models are based on theory, longitudinal research is required to track the intricate interaction between structure, stressors, agency and mental health over a period. Second, self-report measures carried out at a single point of time can overinflate the associations based on a shared method variance. Nevertheless, the use of subjective appraisals is theoretically central to stress processes, social support assessment, and depressive experience which make self-report a weakness, as well as, an epistemically practical methodological decision. Third, the key constructs were measured with specific limitations: socioeconomic status was assessed based on perceived family income, which is a subjective measure that could be complemented by objective measures in future research; the family stressors scale (ICAST -C) focused on abuse and maltreatment, which might not adequately represent other persistent familial stressors. Fourth, the use of a purposive sample from a single highly disadvantaged urban setting (Merkato) limits statistical generalizability but provides a powerful critical case for theory development, rendering latent structural processes empirically visible.

Future research should address these limitations through complementary designs. Longitudinal research is essential in determining the precedence over time and mapping the morphogenetic cycle over time. Most directly, the conditioned pathways identified here offer precise targets for qualitative inquiry to explore the reflexive 'internal conversations' and relational practices through which adolescents navigate stressors and cultivate support, thereby opening the 'black box' of agency inferred in this study. Lastly, the results underline the importance of multi-level interventions responding to the structural stressors like disorder in the neighborhood and economic inequality coupled with the promotion of supportive settings and resilience among teenagers.

6. Conclusion

In conclusion, using a CR-informed integration of Pearlin's SPT and Archer's MA, this study has mapped patterned tendencies linking social stressors to adolescent depressive symptoms. The SEM results

indicate that neighborhood disorder and other stressors tend to be associated with depressive symptoms, both directly and indirectly via the non-activation of social support.

Social support is treated as an empirical indicator of adolescents' capacity to engage supportive relational mechanisms. These significant paths represent tendencies rather than deterministic effects. Adolescents with higher levels of activated social support tend to report fewer depressive symptoms under high-stress conditions. Model fit indices suggest that this configuration of tendencies is empirically plausible, but they do not imply causal closure. Other unmeasured mechanisms, such as resilience or coping dispositions, may also be operative within this open-system ecology.

The quantitative findings identify where generative mechanisms are likely to be activated or constrained. They also highlight differences across social positions defined by gender, family structure, and socioeconomic status. But they don't provide an explanation of how the processes by which adolescents interpret, respond to, or mobilize resources in these contexts work. The subsequent qualitative phase will be critical to identify additional structural conditions with protective causal powers. It will also address adolescents' reflexive responses to these conditions. These dispositions are not fixed traits but contextually activated mechanisms that contribute to resilience.

Overall, the study highlights that adolescent depression is not only a personal condition but is a product of social stressors, social structures, and adolescents' ability to mobilize protective resources. Interventions need to be more than just tailored to the individual and focus on addressing structural factors, such as neighborhood and school conditions, and equip adolescents with psychological and relational resources.

Statements and Declarations

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Declarations

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