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Adverse Childhood Experiences (ACEs), Psychological Distress, and Well-Being among Adolescents: Testing Measurement Invariance and Structural Relationships across Gender in Gauteng, South Africa

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ABSTRACT

Background: Adolescence is characterised by important emotional and psychological development. Adverse childhood experiences (ACEs), psychological distress and well-being may differentially affect male and female adolescents. These experiences may also differentially influence emotional health and well-being across gender and age groups. However, limited research exists about whether these factors are assessed similarly among adolescents in South Africa.
Objective: This study examined whether adverse childhood experiences (ACEs), psychological distress, and well-being demonstrated measurement invariance across male and female adolescents, and whether the structural relationships among these constructs differed by gender in Gauteng, South Africa. Specifically, the study examined three structural pathways: ACEs → psychological distress, ACEs → well-being, and psychological distress → well-being across gender groups.
Methods: The study adopted a cross-sectional correlational design involving 2,653 adolescents aged 10–19 years, comprising 1,240 males and 1,413 females. Data were analysed using independent-samples *t*-tests, correlations, and multi-group structural equation modelling. Measurement invariance was assessed using multi-group confirmatory factor analysis, with configural, metric, and scalar invariance tested across gender groups
Results: Measurement invariance was supported across gender, indicating that ACEs, psychological distress, and well-being were measured comparably among male and female adolescents. Female adolescents reported significantly higher psychological distress than male adolescents, while males reported slightly higher ACE scores. No significant gender difference was found in well-being. All three structural pathways were significant in both groups, but their strengths differed significantly by gender, with stronger associations among female adolescents.
Conclusion: The findings indicate that ACEs, psychological distress, and well-being were measured equivalently across male and female adolescents, supporting meaningful gender comparisons. However, the strength of the relationships among these constructs differed by gender, with stronger associations observed among females. These findings underscore the importance of gender-sensitive approaches to adolescent psychosocial assessment and intervention in South Africa.
Unique contribution: This study advances adolescent mental health research in South Africa by demonstrating that ACEs, psychological distress, and well-being are measured equivalently across gender while revealing gender-specific differences in their structural relationships. Schools and adolescent support services should implement gender-sensitive psychosocial screening and intervention programmes addressing ACEs and psychological distress among adolescents.

Keywords: Adverse childhood experiences, well-being, adolescents, gender, measurement invariance.

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INTRODUCTION

Adolescence refers to a developmental period characterized by significant psychological, emotional, social, and physical changes, during which young people undergo changes in well-being, emotional state, and behaviour (Reinhardt et al, 2020; Thakur et al, 2024). Research on adolescent psychological functioning has increasingly examined well-being, emotional difficulties, and behavioural problems as interconnected aspects of development. During this developmental period, adolescents may also experience adverse childhood experiences (ACEs), which include exposure to abuse, neglect, family dysfunction, and other forms of adversity that may affect psychological functioning. ACEs have been associated with psychological distress and reduced well-being during adolescence, making them important factors to consider when examining adolescent mental health outcomes. The psychological functioning of male and female adolescents cannot always be assumed to be the same. Internalising difficulties, such as anxiety, depression, and stress, have generally been reported at higher levels among female adolescents, whereas male adolescents tend to report or display higher levels of externalising difficulties (Matud et al., 2023; Yoon et al., 2022). During early adolescence, the differences become more pronounced, as the emergence of mental health difficulties can vary in rate for the gender groups (Yoon et al., 2022). Therefore, potential differences between male and female adolescents need to be considered when assessing psychological functioning. ACEs, psychological distress and well-being could be theoretically related, and we anticipate ACEs could be related to psychological distress and psychological distress related to well-being. The purpose of the current study was to test the relations between the three structural paths: ACEs → psychological distress, ACEs → well-being, and psychological distress → well-being. Understanding the differences between gender group regarding these associations could be useful.

Before gender differences can be interpreted, it is necessary to establish whether the measures assess the same constructs in male and female adolescents. Measurement invariance is an approach for examining whether an instrument functions similarly across groups and whether latent score comparisons can be meaningfully interpreted (Keller et al., 2020; Thakur et al., 2024). Scholarly works have documented configural, metric, and scalar invariance across genders for mental health, depression, executive functioning, and psychological well-being measures (Reinhardt et al., 2020; Jelínek et al., 2021). For example, among Hungarian adolescents, the Mental Health Continuum–Short Form has been found to have gender invariance, as has the Children's Depression Inventory among Czech adolescents (Reinhardt et al., 2020; Jelínek et al., 2021). According to Kristensen and Vestad (2025), previous studies have reported differential item functioning or incomplete scalar invariance, which suggests researchers should not assume measurement equivalence with gender. A crucial first step is to establish measurement invariance before investigating gender differences in psychological functioning.

Even when a measure functions equivalently for male and female adolescents, the relationships among psychological constructs may still differ between the two groups. Recent structural modelling research suggests that some psychological relationships may differ between male and female adolescents. However, this finding is often not replicated in other studies. For example,

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Locati et al. (2023) explored gender differences in associations between mentalisation, epistemic trust and psychopathology among adolescents, while Li et al. (2025) observed stronger associations between peer support and exercise adherence among male adolescents than female adolescents. In contrast, a network analysis of secondary-school students found no gender difference in the overall structure of psychosocial symptoms and school well-being (Zdoupas, 2026). Research using latent profiles suggests males and females have similar overall psychological adjustment levels, while differing in the types of adjustment profiles they are more likely to show, according to recently published results (Álvarez-Voces et al., 2025). Together, these findings indicate that comparisons of mean scores alone may not fully explain gender differences because the relationships among psychological constructs may also vary between male and female adolescents.

Evidence on psychological outcomes further suggests that gender differences are particularly evident in internalising and externalising difficulties. Gender differences have also been reported across internalising and externalising difficulties. Female adolescents may report higher levels of internalising difficulties, whereas male adolescents may show higher levels of conduct-related and other externalising problems (Matud et al., 2023; Wiedermann et al., 2026). Longitudinal research has also shown that mental health difficulties change during adolescence, with differences in trajectories observed between male and female adolescents (Yoon et al., 2022) However, gender differences are not evident across every aspect of psychological functioning. For example, research on adolescent psychological well-being found no significant gender difference in latent mean levels of well-being, while other work suggests that differences in subjective well-being emerge more clearly from around the age of 12 (Thakur et al., 2024; Esteban-Gonzalo et al., 2020). The mixed nature of these findings suggests that gender differences may depend on the particular dimension of psychological functioning being examined.

Although research on gender and adolescent psychological functioning has expanded internationally, evidence from South Africa remains limited in the literature identified for this study. Cross-cultural studies have shown that psychological measures can demonstrate comparable structures across culturally diverse adolescent groups, but such findings cannot necessarily be assumed to apply to South African children and adolescents (Nilles et al., 2023; Baroi & Himi, 2024). Gender norms may also shape adolescents' experiences of mental health differently across cultural settings, including expectations surrounding emotional expression, social behaviour, and exposure to gender-related pressures (Fine et al., 2025). However, previous South African research has not sufficiently established whether measures of ACEs, psychological distress, and well-being demonstrate gender measurement invariance, nor whether the structural relationships among these constructs differ between male and female adolescents. The limited South African evidence on whether psychological functioning is measured equivalently across gender, and whether the relationships among its dimensions differ between male and female adolescents, therefore represents an important gap. Examining these issues among children and adolescents in Gauteng can provide evidence on both the measurement and structural aspects of psychological functioning and clarify whether observed gender differences reflect differences in the underlying constructs or differences in the relationships among these constructs across male and female adolescents.

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Therefore, this study aimed to examine whether ACEs, psychological distress, and well-being demonstrate measurement invariance across male and female adolescents and whether the structural relationships among these constructs differ by gender in Gauteng, South Africa. Specifically, the study examined measurement equivalence across gender and tested whether the pathways between ACEs, psychological distress, and well-being differed between male and female adolescents

OBJECTIVES OF THE STUDY

1. To determine whether the measurement models of adverse childhood experiences (ACEs), psychological distress, and well-being demonstrate measurement invariance across male and female adolescents.
2. To examine whether male and female adolescents differ significantly in their levels of ACEs, psychological distress, and well-being after establishing measurement invariance across gender.
3. To examine the structural relationships among ACEs, psychological distress, and well-being separately for male and female adolescents.
4. To determine whether the structural relationships among ACEs, psychological distress, and well-being differ significantly between male and female adolescents and to identify the specific pathways accounting for these differences.

THEORETICAL FRAMEWORK

Gender Schema Theory explains how young people come to assess and develop expectations in a way that relates to their cultural environment. Bem (1981) states that children develop gender schemes through their interaction with the environment which may influence the way they see themselves, interpret experiences and respond to society. During their teenage years, these schemas may impact how young people interpret and express emotional and psychological matters. In the present study, Gender Schema Theory provides a conceptual basis for considering gender as a relevant context when examining adverse childhood experiences (ACEs), psychological distress, and well-being. The theory is used in this study as a gender-difference framework to explain how gender-related social experiences and expectations may shape the interpretation and expression of psychological experiences among adolescents.

Although Gender Schema Theory provides insight into possible gender differences in psychological functioning, it does not directly explain the relationships among adverse childhood experiences (ACEs), psychological distress, and well-being. Therefore, the theory does not assume that these constructs or their relationships differ between male and female adolescents; rather, it provides a framework within which such differences can be empirically examined.

Measurement invariance is a psychometric property that must be established through empirical testing and is not assumed from theoretical perspectives. Therefore, in the present study, measurement invariance analysis was conducted to determine whether ACEs, psychological distress, and well-being were measured equivalently across male and female adolescents before examining gender differences in structural relationships. It therefore provides a theoretical basis for considering gender differences in psychological functioning, while the statistical analyses determine whether these constructs are measured equivalently across gender and whether their structural relationships differ between male and female adolescents (Bem, 1981).

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METHODS

The study assessed three main constructs: adverse childhood experiences, psychological distress, and well-being. ACEs were measured using an adapted Adverse Childhood Experiences measure based on the framework developed by Felitti et al. (1998). The measure assessed adolescents' exposure to adverse experiences during childhood, including experiences related to abuse, neglect, and household challenges. The adapted version used in this study employed a five-point Likert response format to capture the extent of participants' exposure to these experiences. Responses across the items were combined to produce an overall ACE score, with higher scores representing greater exposure to childhood adversity. The scoring direction of the three measures was checked before the structural analyses. Higher ACE scores represented greater exposure to adverse childhood experiences, higher psychological distress scores represented greater psychological distress, and higher well-being scores represented greater well-being. Psychological distress was assessed using the DSM-5 Self-Rated Level 1 Cross-Cutting Symptom Measure developed by the American Psychiatric Association (2013). This instrument assesses a range of psychological symptoms, including emotional, cognitive, and behavioural difficulties. Well-being was assessed using the Child and Youth Resilience Measure (CYRM) developed by Ungar and Liebenberg (2011), which examines individual, relational, and contextual resources associated with adolescent resilience and positive functioning. The reliability of the measures was assessed using Cronbach's alpha coefficients. The DSM-5 Self-Rated Level 1 Cross-Cutting Symptom Measure demonstrated good internal consistency (α = .894), while the CYRM (α = .86) and ACE measure (α = .87) also showed satisfactory reliability. The Strengths and Difficulties Questionnaire (SDQ), developed by Goodman (1997), was initially considered as part of the assessment battery. However, the SDQ was excluded from further analysis because all 28 indicators showed no variation across participants. As a result, the measure could not contribute meaningful information to the factor and structural analyses and was not included in the final analytical model.

Data analysis was conducted using SPSS and AMOS. The dataset was first examined for completeness, missing information, and indicators with no variation. Demographic characteristics of participants were summarised using descriptive statistics. Independent-samples t-tests were conducted to examine whether male and female adolescents differed in their levels of ACEs, psychological distress, and well-being. Given the large sample size, interpretation of statistical differences was supported by consideration of effect sizes and confidence intervals to determine the practical importance of the findings. Before examining gender differences, measurement invariance testing was conducted using multi-group confirmatory factor analysis (CFA). This analysis determined whether ACEs, psychological distress, and well-being were assessed in an equivalent manner among male and female adolescents. Configural, metric, and scalar invariance were tested sequentially. The evaluation of model fit considered multiple indices, including chi-square, comparative fit index (CFI), Tucker–Lewis index (TLI), root mean square error of approximation (RMSEA), and standardised root mean square residual (SRMR). Changes in relevant fit indices were examined across increasingly constrained models to determine whether measurement equivalence was supported. Where full invariance was not established, partial invariance procedures would have been considered. After establishing scalar

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invariance, multi-group structural equation modelling (SEM) was conducted to examine whether the relationships among ACEs, psychological distress, and well-being differed between male and female adolescents. The analysis examined the relationships between ACEs and psychological distress, ACEs and well-being, and psychological distress and well-being. Since the study adopted a cross-sectional design, these relationships were interpreted as associations and not as evidence of causal effects. The adequacy of the measurement and structural models was evaluated using relevant model-fit indicators, factor loadings, reliability estimates, and explained variance. Standardised coefficients, standard errors, confidence intervals, significance levels, and variance explained were reported. Equality constraint tests were conducted to determine whether the strength of the structural relationships differed significantly between male and female adolescents. Statistical significance was determined at $p < .05$.

RESULTS

Demographic Characteristics of the Participants

A total of 2,653 adolescents aged 10–19 years participated in the study. Table 1 presents the demographic characteristics of the sample by age group and gender.

Table 1: Demographic Characteristics of the Study Participants

Characteristic	Category	*N*	%
Age group (years)	10–12	258	9.7
	13–15	1,168	44.0
	16–19	1,227	46.3
Gender	Male	1,240	46.7
	Female	1,413	53.3
Total		**2,653**	**100.0**

Participants aged 16–19 years comprised the largest age group (46.3%, *n* = 1,227), followed by those aged 13–15 years (44.0%, *n* = 1,168) and 10–12 years (9.7%, *n* = 258). Female adolescents constituted 53.3% (*n* = 1,413) of the sample, while male adolescents constituted 46.7% (*n* = 1,240).

Objective 1: Measurement Invariance Across Gender

The first objective examined whether ACEs, psychological distress, and well-being were measured equivalently across male and female participants. A multi-group confirmatory factor analysis (CFA) was conducted sequentially to evaluate configural, metric, and scalar invariance. Measurement invariance was assessed using changes in model fit indices, with $\Delta CFI \leq .01$ and $\Delta RMSEA \leq .015$ considered evidence that model constraints did not substantially affect model fit. The invariance analysis was conducted using a combined measurement model including

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ACEs, psychological distress, and well-being to determine whether the constructs were measured comparably across male and female adolescents.

Table 2: Measurement invariance of ACEs, psychological distress, and well-being across gender

Model	χ^2	df	CFI	TLI	RMSEA	SRMR	ΔCFI	ΔRMSEA
Configural invariance	2,184.37	1,146	.946	.938	.018	.041	—	—
Metric invariance	2,237.91	1,172	.945	.938	.018	.043	−.001	.000
Scalar invariance	2,318.64	1,198	.943	.936	.018	.045	−.002	.000

The configural invariance model demonstrated good fit to the data, with CFI = .946, TLI = .938, RMSEA = .018, and SRMR = .041. This finding indicated that the same general factor structure was supported across male and female participants. Factor loadings were constrained to equality to test metric invariance. The resulting model showed only a negligible change in fit relative to the configural model (ΔCFI = −.001; ΔRMSEA = .000). These results provided evidence supporting metric invariance, indicating that the relationships between the observed indicators and their respective latent constructs were sufficiently similar across gender. Scalar invariance was subsequently tested by additionally constraining the item intercepts to equality. The change in model fit remained negligible (ΔCFI = −.002; ΔRMSEA = .000), providing evidence supporting scalar invariance across male and female participants. Establishing scalar invariance indicated that comparisons of latent construct mean across gender could be interpreted meaningfully.

Objective 2: Gender Differences in ACEs, Psychological Distress, and Well-Being

Following the establishment of scalar invariance, observed-score differences between male and female adolescents were examined using independent-samples *t*-tests. Although scalar invariance permits latent mean comparisons, observed-score comparisons were retained to provide a direct interpretation of differences based on the measured scale scores of ACEs, psychological distress, and well-being. These comparisons were conducted after establishing measurement equivalence across gender groups.

Descriptive statistics and inferential results are presented in Table 3. Effect sizes (Cohen's *d*) and 95% confidence intervals were also reported alongside *p*-values to determine the practical importance and precision of observed gender differences.

Table 3: Descriptive Statistics and Gender Differences in ACEs, Psychological Distress, and Well-Being

Variable	Male *n*	Male *M*	Male *SD*	Female *n*	Female *M*	Female *SD*	*t*	*p*	Cohen's *d*	95% CI
ACEs	1,240	2.278	0.183	1,413	2.257	0.162	3.133	.002	0.12	0.008 to 0.034
Psychol-gical distress	1,240	1.933	0.600	1,413	2.180	0.652	−10.152	<.001	−0.39	−0.295 to −0.199
Well-being	1,240	4.411	0.538	1,413	4.387	0.558	1.137	.256	0.04	−0.018 to 0.066

Note. *M* = mean; *SD* = standard deviation; ACEs = adverse childhood experiences; **Cohen's *d* represents the standardised mean difference between male and female adolescents, and 95% confidence intervals indicate the precision of the estimated mean differences.**

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A statistically significant gender difference was observed in ACE scores (t = 3.133, p = .002). Male adolescents reported a slightly higher mean ACE score (M = 2.278, SD = 0.183) than female adolescents (M = 2.257, SD = 0.162). However, the mean difference was extremely small (mean difference = 0.021), with a small effect size (Cohen's d = 0.12) and a narrow confidence interval (95% CI [0.008, 0.034]), indicating limited practical significance despite statistical significance. A significant difference was noted in psychological distress between genders with a t-value of −10.152 and a p-value of less than .001. Female adolescents reported a higher mean level of psychological distress (M = 2.180, SD = 0.652) than male adolescents (M = 1.933, SD = 0.600). The difference was statistically significant, t = −10.152, p < .001. The effect size was small to moderate (Cohen's d = −0.39), with a 95% confidence interval of −0.295 to −0.199, indicating a meaningful difference in psychological distress between male and female adolescents. The *t*-value (1.137) and *p*-value (.256) suggest that well-being did not differ significantly by gender in the study sample. Male adolescents had a mean well-being score of 4.411 (SD = 0.538), compared with 4.387 (SD = 0.558) among female adolescents. The difference was not statistically significant, t = 1.137, p = .256. The effect size was negligible (Cohen's d = 0.04), with a 95% confidence interval ranging from −0.018 to 0.066, suggesting comparable levels of well-being across male and female adolescents.

Objective 3: Structural Model and Gender-Specific Associations

The third objective examined the structural relationships among ACEs, psychological distress, and well-being across male and female adolescents. A multi-group structural equation model was used to estimate the three specified pathways separately for each gender group. The results are presented in Table 4.

Table 4. Gender-Specific Structural Relationships Among Adverse Childhood Experiences, Psychological Distress, and Well-Being

Structural pathway	Male β	SE	95% CI	*P*	Female β	SE	95% CI	*p*
ACEs → Psychological distress	−.200	.041	−0.280 to −0.120	<.001	−.340	.036	−0.411 to −0.269	<.001
ACEs → Well-being	.107	.035	0.038 to 0.176	.002	.261	.032	0.198 to 0.324	<.001
Psychological distress → Well-being	−.110	.034	−0.177 to −0.043	.001	−.190	.031	−0.251 to −0.129	<.001

Explained Variance

Outcome variable	Male R^2	Female R^2
Psychological distress	.040	.116
Well-being	.023	.088

Note. β = standardised path coefficient; SE = standard error; CI = confidence interval; R^2 = proportion of variance explained; ACEs = adverse childhood experiences.

It can be seen from Table 4 that all three structural paths are significant for the male and female adolescents. Among male adolescents, ACEs showed a significant negative association with

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psychological distress (β = −.200, SE = .041, p < .001), indicating that higher ACE scores were associated with lower psychological distress scores based on the scoring direction of the measure. ACEs also showed a significant positive association with well-being (β = .107, SE = .035, p = .002). Psychological distress was negatively and significantly associated with well-being (β = −.110, SE = .034, p = .001). Among female adolescents, ACEs demonstrated a significant negative association with psychological distress (β = −.340, SE = .036, p < .001), indicating that higher ACE scores were associated with lower psychological distress scores according to the scoring direction of the measure. ACEs also demonstrated a significant positive association with well-being (β = .261, SE = .032, p < .001). Psychological distress was negatively and significantly associated with well-being (β=−.190, SE=.031, p <.001). The confidence intervals presented in Table 4 further demonstrate the precision of the reported structural associations. The structural model explained 4.0% of the variance in psychological distress and 2.3% of the variance in well-being among male adolescents, compared with 11.6% and 8.8%, respectively, among female adolescents.

Objective 4: Gender Differences in Structural Relationships and Pathways

The fourth objective examined whether the structural relationships among ACEs, psychological distress, and well-being differed significantly between male and female adolescents. Equality-constraint tests were conducted by comparing an unconstrained multi-group model with models in which each structural pathway was constrained to be equal across gender. The three structural pathways tested were theoretically specified based on the study objectives, and equality-constraint tests were interpreted within the overall multi-group SEM framework. No multiple-comparison adjustment was applied because the pathways were specified a priori and examined as components of the overall structural model rather than as independent exploratory analyses. The difference in standardised path coefficients (Δβ) was calculated consistently as male β − female β across all pathways. The results are presented in Table 5.

Table 5: Tests of Gender Differences in Structural Pathways

Structural pathway	Male β	Female β	Δβ	Δχ²	Δdf	*p*
ACEs → Psychological distress	−.200	−.340	.140	15.07	1	<.001
ACEs → Well-being	.107	.261	−.154	24.83	1	<.001
Psychological distress → Well-being	−.110	−.190	.080	8.91	1	.003

Note. β = standardised path coefficient; Δβ = difference between male and female standardised path coefficients (male β − female β); Δχ² = change in chi-square between unconstrained and constrained models; Δdf = change in degrees of freedom; ACEs = adverse childhood experiences.

The tests conducted assess equality constraints showed significant differences for males and females across the three structural pathways. The ACEs–psychological distress pathway was significantly different across gender, $\Delta\chi^2(1) = 15.07$, $p < .001$, and the coefficient was larger in magnitude among female adolescents (β = −.340) compared with male adolescents (β = −.200), indicating a stronger association among females. In the same vein, the pathway from adverse childhood experiences to wellbeing differed substantially between the two groups, Δχ² (1) =

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24.83, p < .001. The coefficient observed was larger for female adolescents (β = .261) compared with male adolescents (β = .107), indicating a stronger association among females. Significant gender differences were also found in the psychological distress–well-being pathway**,** $\Delta\chi^2(1) = 8.91$, $p = .003$, indicating that the association was more negative among female adolescents (β = −.190) compared with male adolescents (β = −.110). Based on overall results, the structural relationships among ACEs, psychological distress and well-being were significantly different by gender with higher absolute value path coefficients observed among female adolescents compared with male adolescents. The structural model explained 4.0% of the variance in psychological distress and 2.3% of the variance in well-being among male adolescents, compared with 11.6% and 8.8%, respectively, among female adolescents. Although the relationships among the constructs were statistically significant, the explained variance was modest, particularly among male adolescents, suggesting that other factors not included in the current model may contribute to psychological distress and well-being.

DISCUSSION

The finding of measurement invariance is important because ACEs, psychological distress, and well-being are broad psychological constructs that can be experienced by both male and female adolescents, even though their social experiences may differ. The results indicate that the measurement models demonstrated configural, metric, and scalar invariance across male and female adolescents, supporting the comparability of the constructs across gender. These results are relevant for interpretation of observed gender differences since the measurements evaluated underlying constructs in both groups**.** Gender Schema Theory is appropriate in this regard as, according to Bem (1981), gender schemas are formed by the social environment and influence the way adolescents perceive themselves and their experiences. In this study, the theory provides a context for considering gender as an important context of the psychological functioning, but does not propose that the constructs themselves or their measurement should differ between male and female adolescents. The finding is consistent with previous research showing measurement invariance across gender for adolescent psychological measures. For example, Jelínek et al. (2021) found measurement invariance for the Children's Depression Inventory, while Baroi and Himi (2024) reported measurement invariance for the Teenage Executive Functioning Inventory. Thakur et al. (2024) also found evidence of measurement invariance for adolescent psychological well-being. These studies support the view that psychological constructs can be measured comparably across gender, allowing meaningful comparisons between groups.

The structural model indicated significant associations among ACEs, psychological distress, and well-being in both male and female adolescents, although the cross-sectional design does not permit causal interpretations. The model explained a greater proportion of variance in psychological distress and well-being among female adolescents than among male adolescents, although the overall explained variance was modest. The findings should not be interpreted as indicating that the model provides a complete explanation of adolescent psychological functioning, since variables other than those included in the current model may explain psychological distress and wellbeing. The ACEs–psychological distress pathway was negative in both male and female adolescents, whereas the ACEs–well-being pathway was positive in both

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groups. Before interpreting these unexpected directions, the scoring procedures and coding of the ACEs, psychological distress, and well-being measures were examined. The interpretation of these pathways was therefore based on the scoring direction of the measures used in the study. The observed associations should still be interpreted cautiously because the study design does not establish causality and the analysis did not test alternative explanations for these relationships. The positive association between ACEs and well-being should not be interpreted as suggesting that adverse experiences improve adolescents' well-being, and the negative association between ACEs and psychological distress should not be interpreted as indicating that ACE exposure reduces psychological distress. The findings may reflect characteristics of the measures, sample-specific factors, or other unmeasured influences that were not examined in this study**.**

Gender Schema Theory provides a theoretical framework for considering why gender may be relevant when examining these relationships. Bem (1981) suggests that adolescents develop gender-related schemas through their social and cultural environments, which may influence how they interpret experiences and express psychological difficulties. However, the theory does not predict that particular structural pathways will be stronger among one gender or determine the direction of associations among ACEs, psychological distress, and well-being. Therefore, the gender differences identified in this study should be understood as empirical findings rather than direct predictions of the theory. The findings are supported by Locati et al. (2023), who identified gender-related differences in relationships between psychological factors and psychopathology among adolescents. Li et al. (2025) also reported differences in some structural relationships between male and female adolescents. However, Zdoupas (2026) found no overall gender difference in the structure of psychosocial symptoms and school well-being. These differences across studies may relate to variations in the psychological constructs examined, participant characteristics, cultural settings, measurement instruments, and analytical approaches.

The stronger structural associations observed among female adolescents, together with the greater proportion of explained variance for both psychological distress and well-being, may suggest that gender-related factors could influence how psychological experiences are connected during adolescence. However, this interpretation remains tentative because the present study did not directly examine social experiences, coping processes, or other mechanisms that may account for these differences. Although male and female adolescents may experience similar types of psychological difficulties, the relationships between these experiences may not always be the same. Gender Schema Theory provides a possible explanation for considering gender in these relationships because Bem (1981) proposes that young people develop gender-related schemas through their social and cultural environments. These schemas may influence how adolescents interpret experiences, understand emotional difficulties, and express psychological experiences. Nevertheless, the stronger female pathways observed in this study cannot be attributed directly to gender schemas because the theory does not specify the strength or direction of these associations. Similar evidence has been reported by Locati et al. (2023), who found gender differences in some structural relationships involving mentalisation, epistemic trust, and psychopathology. In contrast, Zdoupas (2026) found no gender difference in the overall structure

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of psychosocial symptoms and school well-being. Álvarez-Voces et al. (2025) discovered comparable average levels of psychological adjustment although distinct adjustment profiles across gender groups. The discrepancy among studies may imply that gender difference in structural relations varies across distinct psychological variables, developmental age, cultural context, and operational procedures.

CONCLUSION

The findings indicated that ACEs, psychological distress, and well-being were measured in a similar way among male and female adolescents. This was supported by the presence of configural, metric, and scalar measurement invariance across gender. Female adolescents reported higher levels of psychological distress, whereas male adolescents had a slightly higher mean ACE score. However, there was no statistically significant difference in well-being between the two groups. The structural model further showed significant associations among ACEs, psychological distress, and well-being for both male and female adolescents. The strength of these associations differed between the two groups, with stronger relationships generally observed among female adolescents across the three structural pathways. The directions of the ACEs–psychological distress and ACEs–well-being associations were contrary to what would normally be expected based on previous understanding of childhood adversity and should therefore be interpreted with caution. These findings should not be interpreted as evidence that adverse childhood experiences reduce psychological distress or improve well-being. Rather, the unexpected directions may reflect characteristics of the adapted measures, scoring procedures, or other factors that were not examined in the present study**.** In contrast, the negative association between psychological distress and well-being was consistent among both male and female adolescents.

The study adds evidence from South African adolescents in Gauteng and shows why it is important to consider gender when examining psychological constructs. The findings indicate that establishing measurement invariance is important, but it is also necessary to examine whether the structural relationships among constructs are similar across gender. In this study, measurement invariance across gender was established, while the strength of the structural relationships differed between male and female adolescents. The findings should be interpreted cautiously because the cross-sectional design does not allow conclusions about cause and effect. In addition, the structural model explained only a modest proportion of the variance in psychological distress and well-being, indicating that other factors may contribute substantially to adolescent psychological functioning. The study did not include other factors that may influence adolescent psychological functioning, including social support, coping resources, and protective influences. These factors may help explain some of the relationships observed in the present study. Future longitudinal research among South African adolescents would therefore be useful for examining how ACEs, psychological distress, and well-being are related over time and whether the strength and direction of these relationships change during adolescence

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RECOMMENDATIONS

Based on the findings, the following recommendations are made:

1. Gender-sensitive psychosocial intervention programmes are needed for adolescents who experience psychological distress and adverse childhood experiences. The findings suggest that male and female adolescents may not experience or respond to these difficulties in exactly the same way. For this reason, interventions should allow for differences in psychological functioning instead of treating all adolescents as having the same needs.
2. Schools and other children's support services need better ways of identifying adolescents who are experiencing psychological and social distress. When such difficulties are noticed, there should also be a clear referral process so that the adolescent can receive suitable help. Schools, healthcare providers, counsellors, child-protection services, and social-service agencies all have a role to play in this process.
3. More attention should be given to programmes that help adolescents develop social support and coping skills**.** Schools and relevant government departments can provide or support such programmes as part of the support available to adolescents. However, the needs of adolescents should not be determined by gender alone. Male and female adolescents may show different patterns of psychological functioning, but individual circumstances also need to be considered when providing support.
4. There is also a need for longitudinal and culturally sensitive research among South African adolescents. Such research can help explain how adverse childhood experiences, psychological distress, and well-being are related as adolescents grow and develop. Future studies should also look at social support, coping resources, and other contextual influences that may affect these relationships. This may give a better picture of why some adolescents experience poorer psychological outcomes than others.

Ethical Approval

The researchers obtained ethical approval from the Ethics Committee of the Faculty of Education (Ethical Clearance Number: Sem 1 2019-033) prior to data collection. Permission to conduct the study was also received from concerned school authorities. The participation was voluntary, with parents and legal guardians giving as well as the assent of the adolescents. To protect the anonymity of participants, all the information gathered was treated as confidential.

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Conflict of Interest

The authors of this study have no conflict of interest to declare. The study was conducted in the absence of any commercial or financial relationships that may influence it.

Authors' Contributions

All authors contributed to the study conception, data analysis, interpretation of findings, and preparation and approval of the final manuscript.

Data Availability

The data are not publicly available due to the age of the participants and related ethical and privacy considerations but may be obtained from the corresponding author upon reasonable request.

Artificial Intelligence (AI) Use Disclosure:

AI-assisted technology (ChatGPT) was used for language editing purposes only and was not used for data analysis, interpretation, or the generation of scientific content. The authors take full responsibility for the accuracy, originality, and integrity of the manuscript content.

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