Are there gender and age differences in the effect of coping strategies on suicidal ideation among adolescents? The mediating role of emotional intelligence

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ABSTRACT

Studies suggest that coping strategies (CS) and emotional intelligence (EI) can reduce the impact of suicidal ideation (SI) and help prevent adolescent suicide. However, it remains unclear whether EI mediates the relationship between CS and SI, and whether these effects are consistent across gender and age. The objective of this research was to analyze the direct and indirect effects of CS and EI on SI, as well as their invariance across gender and age. An observational, cross-sectional, analytic study was conducted, involving 598 adolescents (M=14.17, SD=2.01). Participants completed the Inventory of Suicide Orientation (ISO)-30, the Trait Meta-Mood Scale (TMMS), and the Coping Strategies Inventory (CSI). Path analysis revealed that CS explained 48% of the variance in EI. CS of emotional expression, social support, and cognitive restructuring showed significant direct effects ($p<0.01$). Together, CS and EI explained 39% of the variance in SI. The indirect effects of CS on SI through EI were significant ($p<.01$) for social support, cognitive restructuring, and problem-solving strategies. EI and adaptive CS are relevant in reducing SI. These results have significant implications for the design of clinical and educational interventions aimed at improving emotional regulation and adaptive coping to reduce suicide risk in adolescents.

Key words: suicide risk, coping strategies, emotions, adolescent, mental health.

Introduction

Suicidal ideation in adolescence

Suicidal ideation (SI) is a psychological construct characterized by thoughts and considerations regarding suicide, which can range from vague, non-specific contemplations about death to the detailed planning of a suicide attempt (Klonsky *et al.*, 2016). These ideations are frequently associated with intense negative emotions, including hopelessness, profound sadness, loneliness, guilt, shame, frustration, worthlessness, anxiety, anger, and resentment. SI may be passive or active, but in either form, it is a source of significant psychological distress (Jobes & Joiner, 2019). Suicidal ideation may escalate when adolescents' subjective distress co-occurs with specific suicidal motivations, such as the intent to exert interpersonal influence (Casini *et al.*, 2024).

SI is a key element of suicidal behavior, with its presence markedly elevating the risk of both suicide attempts and comple-

tions. The strongest predictor of suicide death is a prior attempt, followed by hospitalization for mental health issues, and SI is the third most significant predictor (Franklin *et al.*, 2017). Notably, SI is also a major cause of hospitalization due to mental health concerns, highlighting its potentially underestimated impact (Bowers, 2005; Plemmons *et al.*, 2018). Although in many cases SI does not escalate to suicide attempts, the presence of such thoughts can be sufficiently severe and concerning to warrant urgent clinical intervention, including psychiatric hospitalization. Hospitalizations are frequently recorded under a primary psychiatric diagnosis (such as major depressive disorder), while SI is documented as an associated symptom rather than the central reason for admission. Additionally, a significant proportion of previous suicide attempts were likely preceded by either passive or active ideation, suggesting that SI may play a more crucial role in the progression to suicide than has been previously recognized (Jobes & Joiner, 2019).

SI during adolescence represents a significant mental health concern. This developmental period is fraught with personal, familial, academic, and social conflicts, and adolescents are often less prepared, both cognitively and emotionally, to manage these challenges and adversities. Suicidal behavior continues to be a critical clinical issue and is one of the leading causes of death among young people (Bursztein & Apter, 2009; Hink *et al.*, 2022). In this demographic, previous SI, the severity of suicidal thoughts, and past suicide attempts are the most powerful predictors of future suicide attempts (King *et al.*, 2019; Mars *et al.*, 2019).

Several factors have been associated with SI in adolescents (Boone *et al.*, 2024; Yotsidi *et al.*, 2024). Kwon *et al.* (2018) identified individual factors such as depression, school violence, stress, high-risk behaviors, internet addiction, and self-harm. In a five-year longitudinal study, Im *et al.* (2018) found that while SI does not always result in suicide, it remains the strongest predictor of it. They also identified specific factors associated with SI, including being female, aged 14 to 15, low socioeconomic status, symptoms of depression or stress, sleep dissatisfaction, alcohol use, smoking, and certain sexual behaviors. Similarly, Cheng *et al.* (2009), in a study of 9,000 Chinese adolescents, had previously reported that females and those within the 14 to 15 age range are at a higher risk for SI and suicide attempts. A large-scale study conducted in Korea with over 70,000 adolescents found that SI was more prevalent among females and in the 12 to 15 age group (Kim *et al.*, 2014).

Female adolescents are at a higher risk for SI (Canbaz & Terzi, 2018; Cheng *et al.*, 2009; Im *et al.*, 2018; Ivey-Stephenson *et al.*, 2020; Zubrick *et al.*, 2016), indicating significant gender differences in this issue (Luca *et al.*, 2024). This gender disparity, with females showing a greater risk for SI, has been consistently observed across various countries (Bračič *et al.*, 2019; Cheng *et al.*, 2009; Florez *et al.*, 2022; Undheim & Sund, 2013). Differences in neurobiological responses to environmental stressors may contribute to the increased susceptibility of adolescent girls to SI (Giletta *et al.*, 2015; Ho *et al.*, 2022). Recently, Bao *et al.* (2024) also noted the association between female sex and SI, recommending that intervention programs be tailored to address these gender differences effectively.

Suicidal ideation and coping strategies

While many studies on SI in adolescents have focused on risk factors, such as depression, which certainly require attention and intervention (Breton *et al.*, 2015), it is equally important to explore protective factors that can reduce the impact of SI and prevent suicide. Effective psychological interventions can harness these protective factors to mitigate or counterbalance the influence of risk factors. Understanding and identifying these protective factors, as well as how they interact within the complex framework of suicidal behavior, represents a critical area of both fundamental and applied research (Fonseca-Pedrero *et al.*, 2022).

Coping strategies (CS) for SI demonstrate marked developmental variation across the stages of adolescence. In early adolescence (approximately ages 10-13), limited cognitive flexibility and underdeveloped emotion regulation capacities constrain the use of adaptive CS. At this stage, adolescents predominantly engage in avoidant or emotion-oriented responses (such as behavioral withdrawal, emotional suppression, or somatic expressions of distress) (Compas *et al.*, 2014; Gullone *et al.*, 2010; Turner *et al.*, 2002). In middle adolescence (ages 14-17), although the capacity for abstract reasoning and future-oriented thinking begins to consolidate, emotional lability and impulsivity remain salient features. Adolescents in this phase display increased heterogeneity in their coping repertoires, combining both adaptive strategies (*e.g.*, distraction, peer support seeking) and maladaptive patterns (*e.g.*, non-suicidal self-injury, substance use, behavioral disengagement) (Kiekens *et al.*, 2019; Miller *et al.*, 2015; Somerville & Casey, 2010; Wyman *et al.*, 2010). By late adolescence (ages 18-21), neurocognitive maturation facilitates more effective self-regulatory processes and executive functioning, enabling the implementation of cognitively mediated CS such as problem-solving, cognitive restructuring, and autonomous help-seeking (Compas *et al.*, 2014; Costello *et al.*, 2011).

CS are thought or behavior patterns that individuals use to manage difficult or stressful situations. These strategies are employed, either consciously or unconsciously, to handle emotional distress and navigate daily conflicts or challenges. Coping strategies can be problem-focused or emotion-focused (Stephenson & DeLongis, 2021). These strategies are a type of problem-solving skill that develops with age and may exhibit gender differences (Mullis & Chapman, 2000). Research suggests that women tend to use more maladaptive or dysfunctional CS (Al-Bahrani *et al.*, 2013; Hampel & Petermann, 2005), such as rumination or self-criticism. Adolescent females exhibit increased emotional reactivity to personal criticism concerning physical appearance. When coupled with a pronounced inclination toward perfectionism and a more self-critical evaluative style, this heightened sensitivity contributes to a greater propensity for employing maladaptive CS, such as self-blame and social withdrawal (Gilbert *et al.*, 2009; Maciejewski *et al.*, 2017).

Positive self-esteem, adaptive CS, and adequate social support have been identified as protective factors against SI (Primananda & Keliat, 2019). Breton *et al.* (2015) observed that productive CS were nearly absent, while non-productive strategies were prevalent among adolescents with suicidal behavior. Productive CS included focusing on problem-solving or maintaining a positive perspective, whereas non-productive strategies involved excessive worry or avoidance of the issue. However, these CS were found to have a protective effect primarily against depression, rather than suicide attempts, with specific strategies like positive thinking and striving for achievement showing limited impact. The study also highlighted gender differences in the use and effectiveness of these CS. For example, among adolescent females, the use of the positive refocusing strategy was significantly more effective (OR=2.60, p<.001) compared to males (OR=1.50, p=.09).

During adolescence, adaptive CS have been identified as protective factors against SI and suicide, while maladaptive CS are associated with increased risk. Gómez-Tabares *et al.* (2022) reported that social isolation and self-criticism heightened the like-

lihood of high-risk suicidal ideation and behavior, whereas problem-solving was the only coping strategy that effectively reduced the risk of both moderate and severe SI. Additionally, a large-scale study conducted in Korea with over 70,000 adolescents found gender differences in how coping behaviors affect SI, with adaptive strategies helping to lower suicide risk (Kim *et al.*, 2014).

The Integrated Motivational-Volitional (IMV) model (O'Connor & Kirtley, 2018) delineates the progression from distal risk factors to suicidal ideation and, ultimately, to suicide attempt. The model conceptualizes SI as a maladaptive coping strategy that arises when other regulatory efforts fail or prove insufficient to mitigate severe distress. When adolescents perceive no viable means of addressing their difficulties and experience pervasive feelings of defeat or entrapment, thoughts of self-harm can offer transient relief and an illusory sense of control or escape.

Suicidal ideation and emotional intelligence

Emotional intelligence (EI) serves as a significant protective factor against SI during adolescence. EI encompasses the ability to perceive, understand, manage, and effectively use emotions to enhance decision-making and behavioral regulation. It enables individuals to process emotions constructively and improve cognitive functioning (Mayer & Salovey, 1997). EI can moderate the impact of environmental stressors on SI and suicide attempts, especially in adolescents with a history of childhood sexual abuse (Cha & Nock, 2009). Recent research by Galindo-Domínguez & Iglesias (2023) found that EI is highly effective in reducing SI when supported by peer social support, irrespective of gender. However, this protective effect was found to be less pronounced in early adolescence, suggesting a potential age-related variation. Peer social support denotes the perceived availability of emotional, informational, and instrumental assistance from age-matched peers, which bolsters adaptive emotion regulation and enhances coping efficacy.

Quintana-Orts *et al.* (2020) conducted both cross-sectional and longitudinal studies with a large sample of Spanish adolescents, revealing that higher levels of EI were associated with the use of more adaptive cognitive regulation strategies, which correlated with lower levels of SI. Their mediation analyses using bootstrap methods indicated that adaptive cognitive regulation strategies partially mediated the relationship between EI and SI, both cross-sectionally and prospectively. In contrast, maladaptive cognitive regulation strategies did not demonstrate a similar mediating effect. Furthermore, psychotherapeutic interventions designed to enhance EI have been found effective in reducing suicide risk among adolescents with a history of physical and psychological abuse (Bonet *et al.*, 2010). Collectively, research on EI and SI consistently underscores EI as a significant protective factor that mitigates the risk of SI in adolescents (Fonseca-Pedrero *et al.*, 2024; Kausar *et al.*, 2022).

The current study

The reviewed literature indicates a predominant focus on risk factors relative to protective factors in the study of SI among adolescents. It also highlights that coping strategies and emotional intelligence play significant roles in mitigating suicidal ideation and behaviors within this population. Additionally, the interactions among these variables appear to be influenced by the adolescents' sex and age. Based on these observations, our study aimed to achieve three objectives: i) to evaluate the overall direct effects between CS, EI, and SI; ii) to assess the mediating role of EI in the relationship between CS and SI; and iii) to examine whether the effects of these variables depend on sex and age. The hypotheses guiding this research were as follows: H1: CS have positive effects on EI, and EI and CS have a negative impact on SI, reducing it among adolescents; H2: EI mediates the relationship between CS and SI; and H3: the effects and mediation of these variables depend on the adolescents' sex and age.

Methods

Participants

This study employed a quantitative, observational, cross-sectional, analytical, and associative methodology. A total of 754 adolescents from sixth to eleventh grades of four public educational institutions in the cities of Manizales and Armenia (Colombia) were invited to participate in this study on a voluntary basis.

The selection of educational institutions was strategic, based on their public status, enrollment of students from different geographic areas within the two Colombian cities, and similar socioeconomic conditions. Since the central focus of this study was to analyze the interactions between the variables of interest, rather than the differences between institutions or geographic areas, it was methodologically appropriate to select institutions with similar characteristics.

In terms of participants, the sample was purposive and focused on adolescents between the ages of 11 and 18, as this age group is at high risk for suicide attempts in Colombia (INS, 2023; IMLCF, 2024). In 2023, the suicide rate per 100,000 population in Colombia was 2.62 in the 10-14 age group, 7.54 in the 15-17 age group, and 10.34 in the 18-19 age group, with higher rates among females aged 10-14 and males aged 15-19 (IMLCF, 2024).

Of the 754 adolescents invited to participate, 156 were excluded because parental consent was not obtained (n=140) or they did not complete all questionnaires (n=16). The final response rate was 79.3%, resulting in a sample of 598 adolescents aged 11 to 18 years (M=14.17, SD=2.01). This sample size was considered adequate given the counting rule of 10 observations per observable variable for SEM or path analysis (Wolf *et al.*, 2013).

Regarding the distribution of the sample of 598 adolescents, 55.7% were in the age range of 11-14 years, corresponding to early adolescence, and the remaining 44.3% were in the age range of 15-18 years, corresponding to middle and late adolescence. Of the adolescents, 39.5% were male and 60.5% were female. With regard to familial structure, 46.5% of adolescents were from nuclear families, 23.9% from single-parent families, 14.4% from extended families, 4.7% from stepfamilies or blended families, and 10.5% reported other family structures, including living with a partner, a friend, or alone. The adolescents reported that 44.6% came from a lower-middle socioeconomic status, 46% from the middle, and 9.4% from the upper-middle. Comparison of the samples from both cities revealed no significant differences in socioeconomic status ($z=-1.527$, $p=0.127$), family structure ($\chi^2=3.188$, $p=0.671$), or gender ($\chi^2=0.118$, $p=0.731$).

Measures

Sociodemographic information questionnaire

A self-administered questionnaire was developed to systematically collect sociodemographic data, including participants' gender, age, city of residence, educational level, socioeconomic status, and family typology.

Inventory of Suicide Orientation

The Inventory of Suicide Orientation (ISO)-30 is a psychometric tool utilizing a Likert-type scale to evaluate the presence of risk factors associated with suicidal ideation and behavior (Galarza *et al.*, 2018). The instrument comprises 30 items, with response options ranging from 0 (strongly disagree) to 3 (strongly agree). These items are categorized into five distinct dimensions: hopelessness, low self-esteem, emotional dysregulation, social withdrawal, and SI (Valdés & González, 2019). Suicide risk is quantified by aggregating the item scores to yield a composite score. The ISO-30 has demonstrated robust internal consistency, with reported Cronbach's α coefficients of α=.83 in adolescent populations (Paniagua *et al.*, 2016) and α=.932 and ω=.93 in Colombian youth samples (Núñez *et al.*, 2024).

Due to the significant risk of construct overlap between the self-esteem and hopelessness dimensions of the ISO-30 and the emotional intelligence measure (TMMS), as well as between the inability to cope with emotions and social isolation dimensions of the ISO-30 and the CS measure, only the suicidal ideation items from the ISO were retained for analysis in this study. The suicidal ideation dimension consists of six critical items assessing suicidal ideation ("I think about dying as a way to solve all my problems"). To validate the unidimensionality of the suicidal ideation construct, a confirmatory factor analysis (CFA) was performed using diagonally weighted least squares (DWLS). The analysis confirmed that the one-factor model for suicidal ideation exhibited an excellent fit, as demonstrated by the following goodness-of-fit indices: Comparative Fit Index (CFI)=.999, Tucker-Lewis Index (TLI)=.998, Normalized Fit Index (NFI)=.998, Incremental Fit Index (IFI)=.999, Standardized Root Mean Square Residual (SRMR)=.018, and Root Mean Square Error of Approximation (RMSEA)=.044 (90% CI: .018-.072). The internal consistency of the suicidal ideation items in this sample was robust, with a Cronbach's α of .826 and an Omega's α of .862.

Trait Meta-Mood Scale-24

The Trait Meta-Mood Scale-24 (TMMS-24) (Salovey *et al.*, 1995) is a Likert-type scale designed to assess perceived emotional intelligence. The abbreviated version, adapted into Spanish by Fernández-Berrocal *et al.* (2004), preserves the three original dimensions: attention to feelings, emotional clarity, and emotion repair, distributed across 24 items (Pérez *et al.*, 2011). The Likert scale response options are: 1 (strongly disagree), 2 (somewhat disagree), 3 (neither agree nor disagree), 4 (somewhat agree), and 5 (strongly agree). This scale allows for the calculation of a total emotional intelligence score, as well as independent scores for each of the three dimensions (Bonet *et al.*, 2020).

In the Spanish version of the abbreviated scale, the internal consistency for each subscale has been estimated to exceed .85, as measured by Cronbach's α. Additionally, test-retest reliability for the dimensions of attention, clarity, and repair was found to be acceptable (Fernández-Berrocal *et al.*, 2004). In Colombian adolescent populations, the scale has demonstrated strong internal consistency, with a Cronbach's α of .830 for the total scale (Pérez *et al.*, 2011). In the current study, the internal consistency analysis yielded a Cronbach's α of .913 and an Omega's α of .920 for the total scale.

Coping Strategies Inventory

The Coping Strategies Inventory (CSI) is a psychometric tool utilizing a Likert-type response format to assess coping strategies. Originally developed by Tobin *et al.* (1989) and later adapted into Spanish by Cano *et al.* (2007), the inventory comprises 40 items rated on a 5-point Likert scale (Loayza, 2021), with response options ranging from 0 (not at all) to 4 (completely). The CSI evaluates the utilization of eight coping strategies, encompassing both problem-focused and emotion-focused approaches, which include adaptive and maladaptive strategies (Loayza, 2021).

The eight strategies assessed are: problem solving, cognitive restructuring, social support, emotional expression, problem avoidance, wishful thinking, social withdrawal, and self-criticism (Cano *et al.*, 2007). Loayza (2021) reported satisfactory internal consistency for each strategy, with Cronbach's α and composite Omega values as follows: problem solving (α=.82; ω=.82), cognitive restructuring (α=.80; ω=.80), social support (α=.84; ω=.85), emotional expression (α=.83; ω=.83), problem avoidance (α=.69; ω=.70), wishful thinking (α=.79; ω=.79), social withdrawal (α=.74; ω=.75), and self-criticism (α=.87; ω=.87). Cano *et al.* (2007) reported an overall internal consistency for the full scale, with a Cronbach's α of .85. In the present study, the internal consistency analysis yielded a Cronbach's α of .877 and an Omega's α of .891 for the total scale, with factor-specific internal consistency ranging from .73 to .85.

Procedure and ethical considerations

After obtaining authorization from the relevant educational institutions in the two Colombian cities, the researchers contacted the principals and guidance counselors of the participating schools to inform them about the study and present the assessment scales. An informed consent form was provided, which needed to be completed by the parents or guardians of the adolescent participants. Only adolescents with signed consent were included in the study.

As part of the ethical criteria considered in the informed consent, parents were informed that if high indicators of suicidal ideation were found, based on the ISO-30 inventory score, the adolescent would be referred to the educational institution's psychology professional for support and follow-up. According to Law 1090 of 2006, psychology professionals in Colombia must guarantee confidentiality, respect, autonomy, and beneficence in their professional practice.

The instruments were administered virtually *via* Google Forms in groups of 20 adolescents, conducted in the computer labs of the participating schools. The administration process was overseen by researchers with the support of an educator, and each session lasted between 30 and 45 minutes. At the end of the administration of the instruments, a mental health awareness session was provided to give the adolescents an opportunity to ask questions or express their opinions about the activity.

This study adhered to ethical principles of respect, privacy, and dignity, ensuring the confidentiality and anonymity of the participants in line with Law 1090 of 2006 and Resolution 008430 of 1993. The study was funded under project number [05020299122] and received approval from the ethics committee [65446] of the Universidad Católica Luis Amigó. The date of approval by the ethics committee was April 4, 2022.

Data analysis

Data analysis was performed using SPSS version 25.0 and AMOS version 24. Descriptive and frequency analyses were conducted to characterize the participants. The psychometric properties of the instruments were evaluated through internal

consistency analysis, using Cronbach's α and composite Omega, as well as CFA for the suicidal ideation dimension of the ISO-30 (Byrne, 2016).

Spearman's rho coefficient was employed to analyze correlations between coping strategies, emotional intelligence, and suicidal ideation. Subsequently, path analysis was used to investigate the mediating role of emotional intelligence in the relationships among different coping strategies and suicidal ideation, as well as to estimate the total, direct, and indirect standardized effects among the variables. The generalized least squares method was utilized for path analysis (Byrne, 2016), and the bootstrap method with 10,000 resamples and a 95% confidence interval was used to compute the standardized effects (Hayes, 2018).

Model fit was assessed using several indices, including the chi-square probability level (χ^2) and the chi-square-to-degrees of freedom ratio (χ^2/df). A χ^2 value with a probability level of $p \geq 0.05$ indicates a good fit, and a χ^2/df ratio less than 3 is considered acceptable (Jöreskog & Sörbom, 1993; Schermelleh-Engel *et al.*, 2003). Additionally, comparative fit indices (IFI≥0.90 and CFI≥0.90), Goodness-of-Fit Index (GFI≥0.90) and its adjusted version (AGFI≥0.90), Normalized Fit Index (NFI≥0.90), Tucker-Lewis Index (TLI≥0.90), and Root Mean Square Error of Approximation (RMSEA≤0.08) were evaluated. Values for IFI, CFI, GFI, and AGFI of 0.90 or higher, and an RMSEA of 0.08 or lower, are considered indicative of an adequate fit (Byrne, 2016; Hu & Bentler, 1999; McArdle & Nesselroade, 2014). The Expectation Cross-Validation Index (ECVI) was also reported, with ECVI values less than or equal to 1 suggesting a higher likelihood of model replication (Byrne, 2013; Hu & Bentler, 1999).

A multigroup analysis was conducted to assess metric invariance by gender (male/female) and age (11 to 14 years and 15 to 18 years) on the proposed path model (Byrne, 2008). Given the chi-square statistic's sensitivity to sample size and non-normality (Hair *et al.*, 1999), Cheung and Rensvold (2002) recommend evaluating changes in the Comparative Fit Index (ΔCFI) to assess model equivalence. Invariance between groups is accepted if ΔCFI≤0.01.

Results

Table 1 presents the results of the correlation analysis among the study variables. The analysis reveals that SI is significantly and negatively correlated with total EI, as well as with the dimensions of emotional clarity and emotional repair. In contrast, SI shows a significant negative correlation with problem-solving, cognitive restructuring, and social support strategies, while exhibiting a significant positive correlation with wishful thinking, social withdrawal, and self-criticism strategies. Furthermore, the results indicate that CS are significantly correlated with EI. The detailed strength and significance of these correlations are summarized in Table 1.

A path analysis was conducted to evaluate both the direct and indirect effects of CS and EI on SI. The model exhibited satisfactory goodness-of-fit, as detailed by the indicators presented in Table 2.

The proposed model assessed both the direct effects of CS and the mediating role of EI in relation to SI (Figure 1). The analy-

Table 1. Spearman correlation coefficient among measures.

Measures	Suicidal ideation	TMMS total score	Attention	Clarity	Repair
Suicidal ideation		-0.447**	-0.024	-0.455**	-0.547**
CSI total score	-0.126**	0.545**	0.404**	0.422**	0.442**
Problem solving	-0.419**	0.623**	0.250**	0.566**	0.636**
Cognitive restructuring	-0.452**	0.611**	0.181**	0.558**	0.691**
Social support	-0.324**	0.526**	0.222**	0.480**	0.512**
Emotional expression	-0.178**	0.511**	0.356**	0.434**	0.408**
Problem avoidance	-0.157**	0.336**	0.134**	0.295**	0.359**
Wishful thinking	0.123**	0.109**	0.246**	00.012	-00.015
Social withdrawal	0.473**	-0.244**	0.150**	-0.330**	-0.378**
Self-criticism	0.408**	-0.084*	0.212**	-0.153**	-0.265**

**p<.001; TMMS, Trait Meta-Mood Scale; CSI, Coping Strategies Inventory.

Table 2. Goodness-of-fit indices for the model.

	χ^2/df	df	p	IFI	CFI	NFI	TLI	GFI	AGFI	ECVI	RMSEA
Proposed model	0.009	2	0.923	0.999	0.999	1.000	0.999	0.999	0.997	.181	0.000
Metric invariance by gender (men/women)											
Unrestricted	0.306	2	0.737	0.998	0.998	0.999	0.998	0.997	0.989	0.363	0.000
Structural weights	1.152	18	0.293	0.996	0.995	0.968	0.976	0.993	0.957	0.344	0.016
Structural covariances	1.624	53	0.053	0.955	0.952	0.879	0.911	0.981	0.950	0.336	0.032
Metric invariance by age (11 to 14 years/15 to 18 years)											
Unrestricted	0.052	2	0.949	0.999	0.999	1.000	1.000	1.000	0.998	0.363	0.000
Structural weights	0.717	18	0.797	0.999	0.999	0.979	1.000	0.996	0.974	0.330	0.000
Structural covariances	0.751	53	0.910	1.000	1.000	0.937	1.000	0.987	0.972	0.258	0.000

χ^2/df, chi-square-to-degrees of freedom ratio; IFI, Incremental Fit Index; CFI, Comparative Fit Index; NFI, Normalized Fit Index; TLI, Tucker-Lewis Index; GFI, Goodness-of-Fit Index; AGFI, adjusted Goodness-of-Fit Index; ECVI, Expectation Cross-Validation Index; RMSEA, Root Mean Square Error of Approximation.

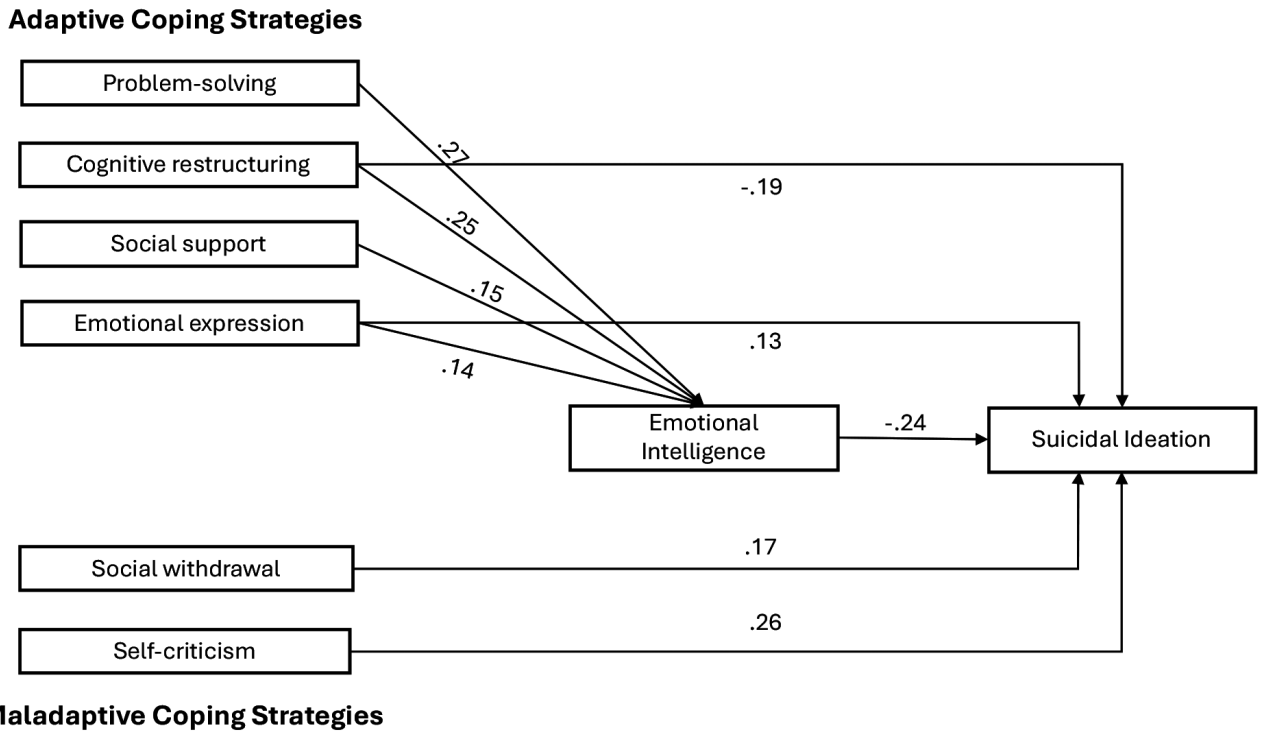

Figure 1. Path analysis.

sis indicated that CS explained 48% of the variance in EI (R^2=0.484, 95% CI: .407-.545, p=.001). Among the CS, emotional expression, social support, and cognitive restructuring were found to have statistically significant direct effects (p<.01). Furthermore, the combined influence of CS and EI accounted for 39% of the variance in SI (R^2=.393, 95% CI: .325-.445, p=.002).

Table 3 displays the total, direct, and indirect standardized effects of the independent, mediating, and dependent variables in the path analysis. The results reveal that self-criticism, social withdrawal, and emotional expression exerted positive and statistically significant effects on SI. In contrast, cognitive restructuring and emotional intelligence demonstrated negative and statistically significant effects. Additionally, emotional expression, social support, cognitive restructuring, and problem-solving had significant indirect effects (negative) on SI through EI.

To enhance the robustness of the proposed model, a metric invariance multigroup analysis was conducted to determine whether the model is equivalent across genders and between age groups (11 to 14 years and 15 to 18 years). Table 2 presents the goodness-of-fit indicators from this multigroup analysis, which were used to evaluate the differences in Comparative Fit Index (ΔCFI≤0.01) among the unrestricted model, structural weights, and structural covariances.

The results revealed that metric invariance by age was observed for both structural weights and structural covariances, with ΔCFI values below 0.01. However, metric invariance by gender was only found for structural weights, not for structural covariances. This suggests that the relationships between the latent variables vary between males and females. Given the lack of invariance by gender in the structural covariance model, the total, direct, and indirect effects of the proposed model were analyzed separately for males and females. Table 4 presents the total, direct, and indirect standardized effects of the independent, mediating, and dependent variables for both male and female groups.

Discussion

It is increasingly crucial to analyze protective factors against SI in adolescents to identify elements that may reduce the risk of suicidal behaviors. In this study, we aimed to evaluate whether CS and EI had negative effects (*i.e.*, reduced) on SI levels in a group of adolescents of both sexes and whether EI acted as a mediator of the effects of CS on SI. Additionally, we were interested in determining whether these interactions depended on the participants' sex and age. Regarding the proposed hypotheses, we confirmed H1 and H2, while H3 was only partially confirmed.

Overall direct effects between CS, EI, and SI

Path analyses revealed that CS have weak but positive effects on EI. However, only adaptive CS demonstrated these effects. This finding confirms previous reports and aligns with evidence highlighting the positive interactions between adaptive psychological mechanisms for coping with difficulties and cognitive skills for emotional control and behavioral regulation (Fteiha & Awwad, 2020; Moradi *et al.*, 2011). According to our findings, only emotional expression, social support, cognitive restructuring, and problem-solving had a positive impact on EI. All of these correspond to dimensions of CS.

Expressing emotions enhances individuals' understanding of their feelings. By discussing their emotions, people gain clearer insights into their emotional state, improving emotional awareness. This process helps manage reactions and prevents them from

becoming overwhelming, supporting emotional balance. The primary aim of this strategy is to reduce internal tension and promote the acquisition of social support. It differs from emotional processing, which focuses on internal reflection to understand one's affective response, and it also differs from aimless venting, which is a cathartic discharge lacking insight and regulatory intent (Tobin *et al.*, 1989). Social support provides validation and understanding, aiding in the identification and acceptance of emotions, which further enhances emotional awareness. It also reduces stress and emotional pressure, fostering more effective emotional regulation and a stable emotional equilibrium (Gross, 2014).

Additionally, social support contributes to emotional repair by offering comfort and strategies to overcome distress, thereby strengthening the ability to manage difficult emotions (Hidalgo-Fuentes *et al.*, 2014). Cognitive restructuring is a strategy that enhances the understanding of thoughts and emotions by addressing dysfunctional or biased interpretations. This process allows for the clarification of affective states and optimizes emotional awareness. Additionally, it corrects dysfunctional cognitive patterns, facilitating more efficient emotional regulation and promoting adaptive management of emotional responses (Ciarrochi & Mayer, 2007).

In relation to the effects of CS on SI, self-criticism, social withdrawal, and emotional expression increase the risk of SI, while cognitive restructuring reduces it. Self-criticism manifests as self-directed hatred and disgust. In adolescents, this pattern of thinking has been shown to heighten the likelihood of non-suicidal self-injury (NSSI) (Xavier *et al.*, 2016). NSSI may function as a maladaptive strategy to manage negative emotions directed toward the self. A strong correlation exists between NSSI and both suicidal ideation and suicide attempts in adolescents (Stewart *et al.*, 2017). Adolescents with elevated levels of self-criticism frequently perceive themselves as inadequate, flawed, or devoid of worth. Such self-perceptions can trigger social withdrawal, isolation, and the emergence of negative emotions like shame and guilt, potentially setting off a self-reinforcing cycle that may culminate in SI (Sadath *et al.*, 2024).

Table 3. Total, direct, and indirect standardized effects.

Effects	Emotional intelligence (mediator)				Suicidal ideation			
	β	CI 95%		p	β	CI 95%		p
		Lower	Upper			Lower	Upper	
Self-criticism								
Total	-0.047	-0.125	0.032	0.236	0.270	0.185	0.352	<0.001
Direct	-0.047	-0.125	0.032	0.236	0.259	0.178	0.340	<0.001
Indirect	---	---	---	---	0.011	-0.006	0.034	0.203
Social withdrawal								
Total	-0.027	-0.108	0.056	0.546	0.180	0.067	0.280	0.002
Direct	-0.027	-0.108	0.056	0.546	0.174	0.063	0.270	0.003
Indirect	---	---	---	---	0.006	-0.013	0.026	0.488
Wishful thinking								
Total	0.049	-0.026	0.131	0.192	-0.043	-0.120	0.030	0.260
Direct	---	---	---	---	-0.032	-0.104	0.037	0.371
Indirect	---	---	---	---	-0.012	-0.036	0.005	0.157
Problem avoidance								
Total	---	---	---	---	-0.020	-0.106	0.072	0.682
Direct	---	---	---	---	-0.020	-0.106	0.072	0.682
Indirect	---	---	---	---	---	---	---	---
Emotional expression								
Total	0.139	0.056	0.217	0.001	0.100	0.009	0.191	0.031
Direct	0.139	0.056	0.217	0.001	0.133	0.044	0.222	0.003
Indirect	---	---	---	---	-0.033	-0.059	-0.013	<0.001
Social support								
Total	0.147	0.053	0.239	0.003	-0.061	-0.157	0.038	0.205
Direct	0.147	0.053	0.239	0.003	-0.026	-0.112	0.065	0.555
Indirect	---	---	---	---	-0.035	-0.068	-0.012	0.001
Cognitive restructuring								
Total	0.252	0.138	0.362	<0.001	-0.245	-0.381	-0.102	0.001
Direct	0.252	0.138	0.362	<0.001	-0.185	-0.317	-0.054	0.006
Indirect	---	---	---	---	-0.059	-0.101	-0.029	0.000
Problem solving								
Total	0.272	0.172	0.369	<0.001	-0.153	-0.271	-0.033	0.013
Direct	0.272	0.172	0.369	<0.001	-0.089	-0.214	0.031	0.145
Indirect	---	---	---	---	-0.064	-0.105	-0.032	<0.001
Emotional intelligence								
Total	---	---	---	---	-0.236	-0.333	-0.136	<0.001
Direct	---	---	---	---	-0.236	-0.333	-0.136	<0.001
Indirect	---	---	---	---	---	---	---	---
R^2	0.484	0.407	0.545	0.001	0.393	0.325	0.445	0.002

CI 95%, confidence interval 95%.

Self-criticism represents a pattern of distorted self-referential cognitions. These cognitions are characterized by irrationality, bias, and inaccuracy, which negatively impact emotional states and foster maladaptive behaviors. In this framework, cognitive restructuring is emphasized as a crucial coping strategy for mitigating SI. As a protective mechanism, cognitive restructuring facilitates the identification, evaluation, and modification of erroneous thoughts, appraisals, and beliefs (Clark, 2014). Evidence supports the efficacy of cognitive-behavioral therapy programs that integrate cognitive restructuring in reducing SI among adolescents (Hetrick *et al*., 2014; Stanley *et al*., 2009).

EI was found to exert a significant negative effect on SI. This outcome aligns with prior research (Fonseca-Pedrero *et al.*, 2024; Galindo-Domínguez & Iglesias, 2023; Kausar *et al.*, 2022; Quintana-Orts *et al.*, 2020). EI is inversely correlated with depression and substance abuse, and it plays a crucial role in fostering positive emotions and resilience. Additionally, EI facilitates the development and maintenance of robust social support networks, optimizes the employment of adaptive coping strategies, bolsters self-esteem and self-efficacy, and enhances subjective well-being and life satisfaction (Domínguez-García & Fernández-Berrocal, 2018). Collectively, these positive impacts of EI significantly diminish the risk of SI in adolescents.

Mediating role of EI in the relationship between CS and SI

Analyzing the indirect effects of CS on IS revealed that IE is part of the explanatory mechanism. Autocriticism and social withdrawal had statistically significant direct effects on IS. However, the indirect effects on IS through IE were no longer statistically significant. Although the total effects remained unchanged, the

Table 4. Total, direct, and indirect standardized effects for both male and female groups.

Effects	Men								Women							
	Emotional intelligence (mediator)				Suicidal ideation				Emotional intelligence (mediator)				Suicidal ideation			
		CI 95%				CI 95%				CI 95%				CI 95%		
	β	Lower	Upper	p	β	Lower	Upper	p	β	Lower	Upper	p	β	Lower	Upper	p
Self-criticism																
Total	-0.073	-0.197	0.055	0.255	0.31	0.175	0.447	<0.001	-0.048	-0.159	0.058	0.358	0.266	0.154	0.382	<0.001
Direct	-0.073	-0.197	0.055	0.255	0.298	0.16	0.432	<0.001	-0.048	-0.159	0.058	0.358	0.254	0.147	0.362	<0.001
Indirect	—-	—-	—-	—-	0.012	-0.005	0.053	0.189	—-	—-	—-	—-	0.012	-0.012	0.047	0.299
Social withdrawal																
Total	-0.026	-0.16	0.104	0.683	0.189	0.038	0.338	0.014	-0.021	-0.13	0.087	0.72	0.18	0.034	0.314	0.012
Direct	-0.026	-0.16	0.104	0.683	0.185	0.035	0.33	0.015	-0.021	-0.13	0.087	0.72	0.174	0.036	0.304	0.013
Indirect	—-	—-	—-	—-	0.004	-0.018	0.032	0.543	—-	—-	—-	—-	0.005	-0.021	0.034	0.66
Wishful thinking																
Total	0.127	-0.005	0.256	0.055	-0.079	-0.206	0.053	0.254	0.021	-0.081	0.124	0.66	-0.032	-0.129	0.064	0.491
Direct	0.127	-0.005	0.256	0.055	-0.058	-0.183	0.075	0.419	0.021	-0.081	0.124	0.66	-0.027	-0.114	0.064	0.546
Indirect	—-	—-	—-	—-	-0.021	-0.061	-0.001	0.038	—-	—-	—-	—-	-0.005	-0.036	0.018	0.615
Problem avoidance																
Total	—-	—-	—-	—-	-0.068	-0.192	0.066	0.333	—-	—-	—-	—-	0.002	-0.11	0.117	0.961
Direct	—-	—-	—-	—-	-0.068	-0.192	0.066	0.333	—-	—-	—-	—-	0.002	-0.11	0.117	0.961
Indirect	—-	—-	—-	—-	—-	—-	—-	—-	—-	—-	—-	—-	—-	—-	—-	—-
Emotional expression																
Total	0.141	0.007	0.261	0.038	0.09	-0.063	0.239	0.262	0.141	0.036	0.246	0.009	0.097	-0.014	0.212	0.084
Direct	0.141	0.007	0.261	0.038	0.114	-0.046	0.265	0.17	0.141	0.036	0.246	0.009	0.132	0.026	0.245	0.018
Indirect	—-	—-	—-	—-	-0.033	-0.063	-0.012	0.001	—-	—-	—-	—-	-0.035	-0.072	-0.011	0.004
Social support																
Total	0.113	-0.026	0.24	0.111	-0.027	-0.169	0.128	0.758	0.147	0.022	0.272	0.022	-0.052	-0.168	0.068	0.391
Direct	0.113	-0.026	0.24	0.111	-0.008	-0.15	0.141	0.909	0.147	0.022	0.272	0.022	-0.016	-0.122	0.092	0.752
Indirect	—-	—-	—-	—-	-0.018	-0.064	0.002	0.081	—-	—-	—-	—-	-0.036	-0.083	-0.007	0.012
Cognitive restructuring																
Total	0.121	-0.058	0.312	0.18	-0.045	-0.233	0.151	0.667	0.318	0.18	0.457	<0.001	-0.328	-0.508	-0.14	<0.001
Direct	0.121	-0.058	0.312	0.18	-0.025	-0.212	0.17	0.846	0.318	0.18	0.457	<0.001	-0.249	-0.424	-0.072	0.007
Indirect	—-	—-	—-	—-	-0.02	-0.071	0.004	0.096	—-	—-	—-	—-	-0.079	-0.142	-0.035	<0.001
Problem solving																
Total	0.362	0.200	0.502	<0.001	-0.377	-0.536	-0.204	<0.001	0.215	0.085	0.338	0.001	-0.052	-0.193	0.096	0.501
Direct	0.362	0.200	0.502	<0.001	-0.317	-0.501	-0.133	0.001	0.215	0.085	0.338	0.001	0.002	-0.139	0.145	0.964
Indirect					-0.059	-0.136	-0.004	0.034					-0.053	-0.106	-0.02	0.001
Emotional intelligence																
Total					-0.164	-0.313	-0.006	0.041					-0.248	-0.368	-0.123	<0.001
Direct					-0.164	-0.313	-0.006	0.041					-0.248	-0.368	-0.123	<0.001
Indirect																
R^2	0.445	0.339	0.515	0.005	0.407	0.318	0.457	0.008	0.497	0.409	0.557	0.003	0.372	0.292	0.434	0.003

CI, confidence interval.

values of the indirect effects indicate that IE influences CS, modifying their impact on IS. This suggests that IE plays a role in the relationship between autocriticism, social withdrawal, social support, problem solving, emotional expression, and IS.

EI can help adolescents manage and control the negative emotions triggered by self-criticism. EI enhances emotional awareness, allowing adolescents to recognize their negative emotions and take steps to control them. Early identification of these emotions can be crucial in preventing them from escalating into SI. Moreover, the emotional regulation that EI fosters supports self-regulation, helping to ensure that negative emotions don't overwhelm an adolescent's coping mechanisms (Hatkevich *et al.*, 2019). Adolescents who socially withdraw often experience feelings of loneliness, rejection, or hopelessness. EI assists them in interpreting social isolation in a more functional and adaptive manner. An adolescent with low EI might view their desire to withdraw as evidence that they are unworthy of respect or value (low self-esteem), intensifying feelings of hopelessness and increasing the risk of SI (Primananda & Keliat, 2019).

Adolescents with high EI are better able to recognize and appreciate the social support they receive and to integrate it into their CS. This enhances their sense of being understood and supported, which in turn reduces feelings of hopelessness and isolation. EI also enhances the ability to express emotions functionally, which facilitates the effective utilization of social support. By better communicating their feelings and needs, individuals are more likely to receive the type and intensity of social support required to meet their needs. Additionally, EI aids individuals in managing their emotions during critical situations. By remaining calmer, adolescents can think more clearly and identify and apply effective strategies for problem-solving (Cha & Nock, 2009; Domínguez-García & Fernández-Berrocal, 2018).

To the best of our knowledge, no study has evaluated the mediating role of EI between CS and SI. As mentioned in the introduction, most research on SI in adolescents has focused on risk factors. While EI has been included in some studies, they have primarily centered on depression, anxiety, stress, bullying, anhedonia, or other risk factors related to suicidal behavior (Abdollahi *et al.*, 2020; Foster *et al.*, 2018; Mérida-López *et al.*, 2018; Rey *et al.*, 2019). Our model proposes that CS does not exert a direct protective effect on SI. Instead, CS contribute to enhancing EI, which in turn acts as the key protective factor against SI. In this framework, EI mediates the relationship between CS and SI, meaning that the positive impact of coping behaviors on reducing suicidal thoughts operates primarily through the development of emotional competencies.

Gender and age-related differences

Factorial invariance analyses revealed the presence of invariance when comparing age groups (11-14 *vs.* 15-18), but not when comparing genders (males *vs*. females). These results indicate that the total, direct, and indirect effects between CS, EI, and SI depend on gender but not on age. This finding partially aligns with previous reports in the literature. As presented, studies on SI among adolescents have found a higher risk and a different effect of protective factors among females and younger adolescents (Canbaz & Terzi, 2018; Galindo-Domínguez & Iglesias, 2023; Im *et al.*, 2018; Ivey-Stephenson *et al.*, 2020).

A sex-based comparison of the model revealed differences between male and female adolescents in the direct and indirect effects of adaptive CS on EI and SI. Among female adolescents, emotional expression exerted a statistically significant direct effect on SI, an effect not observed in their male counterparts. In addition, only in females did social support and cognitive restructuring show statistically significant direct effects on EI and corresponding indirect effects on SI. Conversely, among male adolescents, problem-solving displayed a statistically significant direct effect on SI, a relation that was not significant in females.

Therefore, emotional expression increased SI only in females. Although emotional expression is generally considered an adaptive coping strategy, it can paradoxically become counterproductive. Females, unlike males, are more likely to engage in emotional rumination focused on negative emotions (Johnson & Whisman, 2013). This tendency to express negative emotions can create a self-sustaining cycle of distress, which may ultimately lead to depression and thoughts of self-harm (Shors *et al.*, 2017). Conversely, social support was found to directly enhance EI and indirectly reduce SI. Adolescent girls typically exhibit more advanced social development than boys, as they are often encouraged to engage in social contact and cooperation rather than withdrawal and competition. As a result, social support is generally more valued and effectively utilized by females (Rueger *et al.*, 2008).

In boys, unlike in girls, the problem-solving strategy demonstrated a reducing effect on SI. However, when compared by sex, higher levels of use of this strategy have been identified among adolescent girls than boys (Eschenbeck *et al.*, 2007; Pascual *et al.*, 2016). It can be hypothesized that male adolescents use problem-solving less frequently, but their use is more effective than that of females. Boys often approach problems in a more practical or specific manner, which facilitates a more direct and efficient application of the problem-solving strategy. Since boys use problem-solving less often, when they do adopt this strategy, it may be particularly effective in breaking patterns of negative thinking, leading to a more significant reduction in SI.

Schools should deploy sex-specific coping modules. Female students need guided sessions that convert emotional expression into regulated disclosure and peer support. These sessions must teach labeling and reappraisal and must link girls to trusted adults. Male students need workshops that drill structured problem-solving and cognitive reframing through real-life scenarios. Both modules fit within existing social-emotional periods and require teachers trained in evidence-based suicide-prevention toolkits.

Limitations

This study has several limitations. The use of non-probabilistic sampling may have introduced sampling bias, and the possibility of non-response bias cannot be excluded. Additionally, potential confounding variables such as socioeconomic status, previous mental health conditions, or family environment were not controlled for, which may have influenced the observed relationships. These factors should be addressed in future research to enhance the robustness and generalizability of the findings.

This study is also subject to the typical limitations of cross-sectional research based on self-reports, which precludes determining the temporal precedence of the explanatory model with respect to the direct and indirect effects of coping strategies and emotional intelligence on suicidal ideation. In addition, self-report measures are susceptible to social desirability biases that cannot be fully controlled for in statistical analyses. Therefore, future studies should employ longitudinal and key informant-based designs.

A multi-wave design with measurement points spaced six

months apart would allow us to establish temporal ordering among coping strategies, emotional intelligence, and subsequent suicidal ideation. A longitudinal mediation model could test whether emotional intelligence prospectively mediates the relationship between coping and suicidality, addressing potential reverse causality. Latent growth and growth-mixture modelling in a prospective cohort could identify discrete developmental trajectories of suicidal ideation and their predictors over time.

Conclusions

The practical implications of this study underscore the importance of developing intervention programs that promote emotional intelligence and adaptive coping strategies in adolescents, with particular emphasis on gender personalization. Interventions that integrate social support, cognitive restructuring, and appropriate management of self-criticism may be effective in reducing the risk of suicidal ideation. In addition, the findings suggest the need to strengthen support networks and provide specialized training for professionals to identify and address risk and protective patterns, which would significantly contribute to suicide prevention and promote mental health in adolescents.

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