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THE ROLE OF IMPULSIVITY IN ORIENTATION TO SUICIDE OF UNIVERSITY STUDENTS WITH A HISTORY OF SELF-INJURY BEHAVIOR

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Abstract

The aim of this research was to describe the effect of depression, hopelessness, and impulsivity on orientation to suicide and the role of impulsivity as a mediator of suicidal orientation in university students with a history of self-injury behaviors. 1645 young people between 18 and 29 years old participated, from two Colombian cities. 218 young people were selected (*M*= 21.00; *SD*= 2.99) who reported at least one suicide attempt in the last year, who answered the "Suicidal Orientation Inventory", the "Beck Hopelessness Scale", the "Beck Depression Inventory" and the "Barratt Impulsivity Scale". Depression, hopelessness, and impulsivity explained 63% of the variation in suicidal orientation (R^2= .635, IC 95% [.555, .713], *p*= .001). Impulsivity mediated with depression in those cases in which suicidal orientation was high, whose total, direct and indirect effects were statistically significant (*p*< .001). Impulsivity plays a mediating role between depression and hopelessness in predicting suicidal orientation.
KEY WORDS: *depression, hopelessness, impulsivity, suicidality, college youth.*

Resumen

El objetivo de esta investigación fue describir el efecto de la depresión, la desesperanza y la impulsividad sobre la orientación al suicidio y el papel de la impulsividad como mediador de la orientación suicida en universitarios con antecedentes de conductas autolesivas. Participaron 1.645 jóvenes entre los 18 y 29 años, de dos ciudades colombianas. Se seleccionaron 218 jóvenes (*M*= 21,00; *DT*= 2,99) que informaron de al menos un intento de suicidio en el último año, quienes contestaron el "Inventario de orientación suicida", la "Escala de desesperanza de Beck", el "Inventario de depresión de Beck" y la "Escala de impulsividad de Barratt". La depresión, la desesperanza y la impulsividad explicaron el 63% de la variación de la orientación al suicidio (R^2= 0,635; IC 95% [0,555; 0,713]; *p*= 0,001). La impulsividad medió con depresión en aquellos casos en los que la orientación suicida era alta, cuyos efectos totales, directos e indirectos,

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fueron estadísticamente significativos (p< 0,001). La impulsividad desempeña un papel mediador entre la depresión y la desesperanza en la predicción de la orientación suicida.
PALABRAS CLAVE: *depresión, desesperanza, impulsividad, suicidio, jóvenes universitarios.*

Introduction

One of the mental health problems that most affects young people worldwide and particularly in the Colombian context is suicide (Hadzic et al., 2020; Núñez et al., 2023; Wang et al., 2017; World Health Organization, 2021). Such a phenomenon has been considered an impulsive behavior present in people with depressive symptoms and hopelessness. However, the findings reported on the role of these variables in people who have a high suicidal orientation are still not conclusive.

According to figures from the Instituto Nacional de Medicina Legal y Ciencias Forenses [INMLCF] (2022), in Colombia, between the period of January and August 2021 and 2022 there was an increase in suicides from 1,688 to 1,860 cases; such increase was reflected in men from 1,374 to 1,483, while in women it was from 314 to 377. It is noteworthy that as of August 2022, 3,548 people committed suicide, of which 848 were under 29 years of age; additionally, the cities of Medellin and Manizales reported 172 cases in total. These figures show the magnitude of this public health problem.

Although people who have suicidal ideation do not always reach the attempt or its consummation (Klonsky et al., 2016; May & Klonsky, 2016; O'Connor et al., 2013; Wang et al., 2017), suicidal orientation has been considered a dimensional process that can go from ideation and attempt to consummated self-injurious behavior, which implies carrying out studies that allow understanding such differences, particularly in young people who have attempted it with the purpose of strengthening prevention actions.

One of the theoretical perspectives with greatest empirical support that allows predicting self-injurious behavior is the interpersonal psychological theory of suicide (Chu et al., 2017; Hadzic et al., 2020; Joiner, 2005; Ma et al., 2016). This theory suggests three components that explain suicidal orientation: the first, refers to feelings of self-alienation generated by distorted thoughts of frustrated belonging to the social environment; the second, is the perception of being a burden to others; the third, involves the ability to engage in suicidal behaviors. These aspects, along with feelings of hopelessness, contribute to the person showing a suicidal orientation (Joiner, 2005).

Even though the components of the interpersonal theory of suicidal orientation have shown empirical evidence (Goodwill, 2022; Talley et al., 2022; Walker et al., 2017), the relationships between its components have been modest, which merits further exploration with other psychopathological factors that have also been associated with suicide such as impulsivity, depression, and hopelessness.

In accordance with the above, from the cognitive behavioral model it is assumed that young people with high suicidal risk gradually develop a high orientation towards suicide based on a system of beliefs of uselessness and little connection with significant people, which ends in plans concrete to engage in self-harming behavior. Furthermore, suicide orientation is made up of five dimensions: hopelessness, low self-esteem, inability to cope with emotional problems, social isolation and suicidal ideation. These variables have been measured by applying the Suicidal Orientation Inventory [SOI-30] (King and Kowalchuk 1994, Osman et al. 2005).

One of the variables that has been linked to suicidal orientation is depression, in fact, the World Health Organization (2021) points out that it is one of the most prevalent problems in the world and it is estimated that it affects 5% of adults, becoming the disease that generates the most disability in people.

Different studies have reported the role of depressive symptoms and hopelessness in suicidal orientation with varying results (Kan et al., 2022; Núñez et al., 2023; Wang et al., 2015). Furthermore, it has been found that hopelessness represents a greater risk for suicide than depression (Grafiadeli et al., 2021). In this regard, hopelessness theory postulates negative expectancy about the occurrence of a highly valued event in addition with feelings of helplessness about the possibility of modifying the probability of occurrence of that event are sufficient factors for people to become depressed and at greater risk for suicidal orientation (Abramson et al., 2000).

In Colombia, findings have not been consistent on the psychological risk variables for suicidal orientation, possibly because there has been a tendency to rely on descriptive theories rather than explanatory models about this phenomenon (Benavides Mora et al., 2019). Nevertheless, some studies highlight that impulsivity could play an important additional predictor role (Arango-Tobón et al., 2021; Bedoya Cardona & Montaño Villalba, 2016; Gómez et al., 2020; Gómez Tabares et al., 2019; Nock et al., 2008).

The accumulated empirical evidence has shown impulsivity as a suicide orientation vulnerability factor that contributes to the transition from suicidal ideation to the suicidal act, because impulsive suicide attempts are characterized by a lack of foresight and control (Anestis Soberay et al., 2014; Colborn et al., 2017; Gvion y Apter, 2011; Hadzic et al., 2020; Wang et al., 2017). Impulsivity has been conceptualized as a tendency toward rapid reactions to both external and internal stimulation without sufficient planning for the possible negative consequences of such reactions (Colborn et al., 2017). It has also been defined as a personality trait and as a transient state (Wang et al., 2017).

Additionally, it has been documented that the presence of elevated impulsivity could differentiate individuals who attempt suicide from those who present only with ideation (Aandi Subramaniyam et al., 2022; Swann et al., 2020; Wang et al., 2017). In order to analyze the performance of trait impulsivity measures in the development of suicidal orientation, it has been suggested that there is a need to examine the role of impulsivity in individuals with psychological disturbances such as depression (Glicksohn Hadad & Ben-Yaacov, 2016).

More recent studies have found variability in the associated factors that would lead individuals to develop a high suicidal orientation (Weiss et al., 2022), lack of social support networks (Gouveia-Pereira et al., 2022), low self-esteem (Soto-Sanz et al., 2019) and history of previous suicidal behaviors (Aaltonen et al., 2019; Li et al., 2022). Given the above, it seems promising to delve deeper with further studies that account for predictive models on such associations in young people.

With the purpose of reinforcing suicide prevention actions in young university students, and also to contextualized them to different populations, the present research aims to describe the effect of depression, hopelessness and impulsivity on orientation to suicide and the role of impulsivity as a mediator of suicidal orientation in university students with a history of self-injury behaviors in two Colombian cities. It is hypothesized that impulsivity plays a mediating role between depression and hopelessness in predicting suicidal orientation (see Appendix).

Method

Participants

A sample of 1,645 young people between the ages of 18 and 29 was collected. From the results, 218 young people were selected who reported at least one suicide attempt in the last year, regardless of the method or severity of the injury. The sample was chosen taking into account that the highest rate of attempted and completed suicides in Colombia and in the world is reported in young people between 18 and 29 years of age (Delgado et al., 2017, INMLCF, 2022, WHO, 2019). The 218 young people selected for this study are linked to three private universities in two Colombian cities: Manizales and Medellín.

The ages ranged from 18 to 29 years and the mean age (M= 21.00; SD= 2.99). A total of 31.2% were men and 68.8% were women. Of the participants, 64.2% were single, 28.9% reported being in a relationship (dating) and the remaining percentage was distributed as common law marriage (5%), married (1.4%) and divorced 3(0.5%). Regarding the distribution by semesters: 43.6% were between the first and third academic semesters, 28.9% between the fourth and sixth semesters, and 27.5% between the seventh and tenth semesters. In relation to socioeconomic level: 22% were at a low level, 48.2% were medium, 17.9% were medium-high and 11.9% were high. 61.5% were from Manizales and 38.5% from Medellín. Participants not differ in terms of socioeconomic level (z= -.425; p= .671), sex (z= -.839; p= .402) and marital status (x^2=2.678; p= .617).

Instruments

a) Self-report form, to collect sociodemographic information and previous suicide attempt in the last year
b) *Suicide Orientation Inventory* (SOI-30; King & Kowalchuk, 1994), version adapted and validated in Spanish by Fernández-Liporace and Casullo (2006). The SOI-30 assesses the presence of risk factors associated with suicidal ideation and behavior. It contains 30 items and five dimensions: hopelessness, low self-

esteem, inability to cope with emotions, social isolation, and suicidal ideation. The total score estimates the person's suicidality orientation at three levels: low risk (< 30), moderate risk (≥ 30), and high risk (≥ 45). Spanish version of the SOI-30 reported a Cronbach's alpha reliability index of .89. In Colombia it has been used with university population, showing an internal consistency with Cronbach's alpha of .89 (Arango-Tobón et al., 2021; Gómez & Montalvo, 2021). The internal consistency for this study was .932 (Cronbach's alpha) and .93 (McDonald's Omega).

c) *Beck Hopelessness Scale* (BHS; Beck et al., 1974). BHS allows the assessment of hopelessness and pessimism in people at risk of suicide. It consists of 20 statements, whose response options are true and false. Items indicating hopelessness are scored with 1 point, and those not indicating hopelessness are scored with 0 points, for an overall score ranging from 0 to 20. The level of severity of hopelessness is established as follows: minimum= 0 to 3, mild= 4 to 8, moderate= 9 to 14 and severe= 15 to 20. This instrument was validated with a Colombian sample, showing an internal consistency of Cronbach's alpha ranging between .82 and .93, and test-retest reliability between .60 and .69 (Rueda-Jaimes et al., 2018). The internal consistency for this study was .88 (Cronbach's alpha) and .90 (McDonald's Omega).

d) *Beck Depression Inventory* (BDI; Beck et al., 1979). It is composed of 21 items that allow identification of the presence and severity of depression. Fifteen items evaluate the psychological-cognitive symptomatology, and the other six, the somatic-vegetative symptomatology. Each item is grouped on a scale ranging from 0 to 3. The cut-off points for establishing the level of severity of depression are: minimum= 0 to 9; mild= 10 to 16; moderate= 17 to 29 and severe= 30 to 63. In Colombia it has been used with a university population, showing an internal consistency with Cronbach's alpha between .85 and .88 (Gómez, 2020; Núñez et al., 2022). The internal consistency for this study was .81 (Cronbach's alpha) and .90 (McDonald's Omega).

e) *Barratt Impulsivity Scale-11* (BIS-11; Patton et al., 1995). BIS-11 assess impulsivity globally and three dimensions: cognitive, motor and unplanned impulsivity. It consists of 30 items and has 4 possible responses (rarely or never, occasionally, often, and always or almost always). The systematic review of the scale by Stanford et al. (2009) reported that the most commonly used cut-off point in psychological studies is 74 for global impulsivity. The scala was validated with a Colombian sample of adolescents and adults, showing an internal consistency of Cronbach's alpha ranging from .75 (Urrego & Valencia, 2017) to .80 (Chachín et al., 2019). The internal consistency for this study was .75 (Cronbach's alpha) and .79 (McDonald's Omega).

Procedure

This was a quantitative study with a non-experimental-transactional design and correlational-predictive scope. Data collection was conducted in groups in university classrooms; application of the instruments was with pencil and paper. The application took 30 minutes per group and was supervised by at least one of the

study researchers. Within the framework of Law 1090 of 2006 and Resolution 008430 of 1993, this research follows the ethical principles of respect, privacy and dignity, ensuring the confidentiality and anonymity of the participants. The study had the approval of the Ethics Committee of the Universidad Católica Luis Amigó and the Corporación Coetika, Manizales, Colombia, and the informed consent of the participants.

Data analysis

The SPSS v. 25.0 statistical package was used for the analysis. Initially, a sociodemographic description of the sample was performed, followed by a reliability analysis of the instruments using Cronbach's alpha and composite Omega. A descriptive univariate analysis of the risk level of suicidal orientation, indicators of depression, hopelessness, and impulsivity was performed. Data normality was verified using Kolmogorov-Smirnov and chi-square (χ^2) tests, which yielded that not all variables followed a normal distribution; therefore, the nonparametric Mann-Whitney U and Kruskal-Wallis tests were used to perform the comparative analyses. R Studio Cloud was used to calculate the effect size of the differences found in the comparative analysis, which was estimated using the eta-squared statistic (η^2). The procedure and interpretation established by Fritz et al. (2012) was followed: small effect (.01), medium effect (.06), large effect (.14). Subsequently, a correlation analysis was performed using Spearman's rho coefficient.

Finally, a structural equation model based on path analysis was proposed to examine the mediating role of impulsivity and to determine the total, direct and indirect standardized effects among the variables considered in this study. The generalized least squares method was used (Byrne, 2016). Amos v. 24.0 software was used for structural equation modeling. Total, direct and indirect standardized effects were calculated using the bootstrap method with a 95% confidence interval (Byrne, 2016; Hayes, 2018). To assess the goodness of fit of the model, the chi-square probability level (χ^2) and the chi-square / degrees of freedom ratio (χ^2/df) were used. A χ^2 probability level equal to or greater than .05 ($p \geq .05$) would indicate a good fit (Jöreskog & Sörbom, 1993), and (χ^2/df) should be less than 3 (Schermelleh-Engel et al., 2003). Comparative fit indices (IFI≥ .90 and CFI≥ .90), goodness-of-fit index (GFI≥ .90) and its corresponding corrected (AGFI≥ .90), normalized fit index (NFI≥ .90), the Tucker - Lewis index (TLI≥ .90) and root mean square error of approximation (RMSEA≤ .08). Values of IFI, CFI, GFI and AGFI equal to or greater than .90 and a value equal to or less than .08 in RMSEA are adequate (Byrne, 2016; Hu & Bentler, 1999; McArdle & Nesselroade, 2014).

A metric invariance analysis by sex and city was performed to the proposed structural equation model (Byrne, 2008). Due to the sensitivity of χ^2 to sample size and non-normality (Hair et al., 1999), Cheung and Rensvold (2002) propose to analyze the increase in CFI (ΔCFI) to determine whether the compared models are equivalent. If the change in CFI is equal to or less than 0,01 (ΔCFI≤ .01), invariance between groups is accepted.

Results

Table 1 shows the risk indicators for the variables studied in the total population as well as in men and women. It was identified that 68.2% of the young people who have had at least one suicide attempt in the last year presented between moderate and high risk of suicide. 66.5% reported some symptomatic indicator of depression between mild and severe, 46.8% reported indicators of hopelessness, and an overall impulsivity factor of 14.2% was identified.

Table 1
Risk indicators of suicidal orientation, depression, hopelessness, and impulsivity

Variable (instrument)	Risk indicator	Total		Female		Male	
		n	%	*n*	%	*n*	%
Suicidal orientation (SOI-30)	Low	76	34.9	53	35.3	23	33.8
	Moderate	78	35.8	51	34.0	27	39.7
	High	64	29.4	46	30.7	18	26.5
Depression (BDI)	Mínimum	73	33.5	50	33.3	23	33.8
	Mild	48	22.0	34	22.7	14	20.6
	Moderate	74	33.9	47	31.3	27	39.7
	Severe	23	10.6	19	12.7	4	5.9
Hopelessness (BHS)	Mínimum	116	53.2	83	55.3	33	48.5
	Mild	61	28.0	40	26.7	21	30.9
	Moderate	32	14.7	21	14.0	11	16.2
	Severe	9	4.1	6	4.0	3	4.4
Impulsivity (BIS-11)	No	187	85.8	130	86.7	57	83.8
	Yes	31	14.2	20	13.3	11	16.2

A comparative analysis was performed with the Mann-Whitney U test of the study variables according to sex. No statistically significant differences were found between men and women in suicide orientation (z= -0.063, p= .950), depression (z= -0.010, p= .992), hopelessness (z= -0,048, p= .962), and impulsivity (z= -0.363, p= .717). In addition, a comparative analysis was performed with the Kruskal-Wallis test of the psychological variables as a function of the level of risk of suicidal orientation. Since non-parametric statistics were used, in addition to the mean value and standard deviation, the average ranges and median were reported. It was found that young people with a higher level of risk for suicidal orientation evidenced higher scores on depression (H= -115.267, p< .001, η^2= .527), hopelessness (H= -87.079, p< .001, η^2= .396), and impulsivity (H=-50.212, p< .001, η^2= .224). The differences were statistically significant (p< .001), with a high effect size ($\eta^2 \geq$ .14) (Table 2).

Table 2
Differences according to the level of risk of suicidal orientation and the variables of depression, hopelessness, and impulsivity

Variables	Risk of suicidal orientation (SOI-30)	*n*	*Rp*	*Me*	*M*	*SD*	*H*	*p*	η^2
Depression (BDI)	Low risk	76	57.79	6.0	7.80	5.55	115.267	.000	0.527
	Moderate risk	78	108.13	15.0	14.77	7.16			
	High risk	64	172.57	26.0	26.34	8.38			
Hopelessness (BHS)	Low risk	76	63.41	2.0	1.87	1.49	87.079	.000	0.396
	Moderate risk	78	110.83	4.0	4.24	3.30			
	High risk	64	162.62	9.0	8.91	5.02			
Impulsivity (BIS-11)	Low risk	76	78.73	53.0	50.97	14.03	50.212	.000	0.224
	Moderate risk	78	103.27	58.0	57.35	12.73			
	High risk	64	153.63	69.0	68.25	11.75			

In the comparative analysis with the Mann-Whitney U test of the study variables according to the presence of global impulsivity traits. It was found that youth with impulsivity traits had higher scores in suicidal orientation (z= -3.417, p= .001, η^2= .055), depression (z= -4.783, p< .001, η^2= .105) and hopelessness (z= -3.992, p< .001, η^2= .073) compared to those without this trait. When assessing the effect size of statistical differences, an intermediate effect size was identified ($\eta^2 \geq$ .06) (Table 3).

Table 3
Differences according to the presence of trait impulsivity and the variables of suicidal orientation, depression, and hopelessness

Variable (instrument)	Without impulsivity				With impulsivity				Test statistics		
	M	*SD*	*Rp*	*Me*	*M*	*SD*	*Rp*	*Me*	*z*	*p*	η^2
Suicidal orientation (SOI)	34.39	15.01	103.56	34.0	46.39	17.71	145.34	46.0	-3.417	.001	0.055
Depression (BDI)	14.13	9.00	101.19	13.0	25.45	11.89	159.65	26.0	-4.783	.000	0.105
Hopelessness (BHS)	4.24	4.03	102.60	3.0	8.10	5.56	151.13	7.0	-3.992	.000	0.073

Correlation analysis, using Spearman's *Rho* coefficient, showed that suicidal orientation correlated directly and significantly (p< .001) with depression, hopelessness and impulsivity (Table 4).

Table 4
Spearman correlation coefficient (Rho) between suicidal orientation and depression, hopelessness and impulsivity

Variable (instrument)	Depression	Hopelessness	Impulsivity
1. Suicidal orientation (SOI-30)	.740**	.675**	.489**
2. Depression (BDI)	--	.643**	.465**
3. Hopelessness (BHS)		--	.411**
4. Impulsivity (BIS)			--

Note: $^{**}p < .001$

Table 5 presents the multinomial logistic regression model. The effect of the independent variables of depression, hopelessness and impulsivity on moderate and high risk of suicidal orientation was analyzed. The low risk factor was taken as the reference category. The model presented good indicators of goodness of fit (Pearson's $\chi^2 = 422.561$, $df = 424$, $p = .511$). It was found that the independent variables explained the variance of the risk of suicidal orientation between 57% (R^2 Cox & Snell= .571) and 64% (R^2 Nagelkerke= .643). In relation to the moderate risk factor, depression (OR= 1.135, 95% CI [1.064,1.212]) and hopelessness (OR=1.408; CI 95% [1.135, 1.748]) contributed significant direct effects ($p < .01$) that increased the probability of suicidal ideation and behavior. However, the effect of impulsivity was not significant ($p = .390$). For youth who presented high-risk indicators on the SOI-30 scale, depression (OR= 1.308, 95% CI [1.196, 1.432]), hopelessness (OR= 1.601, 95% CI [1.264, 2.028]) and impulsivity (OR= 1.059, 95% CI [1.013, 1.107]) were shown to have significant effects that increase suicidal orientation in youth.

Table 5
Multinomial logistic regression model of the risk of suicidal orientation

Suicidal orientation		β	*EE*	χ^2Wald	*df*	*p*	OR	95% IC for OR	
								Lower	Upper
Moderate risk	Intersection	-3.007	0.884	11.575	1	.001			
	Depression	0.127	0.033	14.609	1	.000	1.135	1.064	1.212
	Hopelessness	0.343	0.110	9.652	1	.002	1.408	1.135	1.748
	Impulsivity	0.013	0.016	0.739	1	.390	1.013	0.983	1.045
High risk	Intersection	-9.643	1.553	38.577	1	.000			
	Depression	0.269	0.046	34.302	1	.000	1.308	1.196	1.432
	Hopelessness	0.470	0.121	15.218	1	.000	1.601	1.264	2.028
	Impulsivity	0.057	0.023	6.399	1	.011	1.059	1.013	1.107

A structural equation model was estimated from path analysis (Byrne, 2016) to establish the total direct and indirect standardized effects of the independent variables on suicidal orientation in youth with a history of self-injurious behavior. Impulsivity was used as a mediating variable between depression, hopelessness, and suicidal ideation. The model obtained optimal goodness of fit indicators (Byrne, 2016; McArdle and Nesselroade, 2014) (Table 6). Additionally, an analysis of

invariance by sex and city was performed in order to corroborate whether model is equivalent between men and women and young people in the cities of Manizales and Medellín (Table 6).

Table 6 shows satisfactory goodness-of-fit results for model 2, which shows that there is a good fit of the data to the constructs proposed for the case of metric invariance by sex and city (Byrne, 2008). Taking into account the criteria of Cheung and Rensvold (2002) regarding the difference in the CFI (ΔCFI≤ .01) it was possible to corroborate the invariance in the subsamples of sex (male/female) and city (Manizales/Medellín).

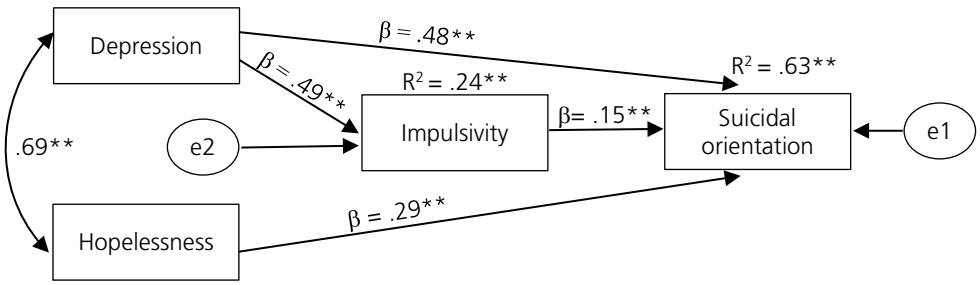
Table 6
Goodness-of-fit statistics of the model of suicidal orientation in young people

Proposed model	χ^2	*df*	χ^2/df	IFI	CFI	NFI	TLI	GFI	AGFI	RMSEA
Model 1	30.272	1	30.272	0.662	0.642	0.655	1.150	0.930	0.302	0.367
Model 2	2.278*	1	2.278	0.985	0.984	0.974	0.916	0.995	0.948	0.067
Metric invariance by sex (male / female) of model 2										
Without restrictions	2.677*	2	1.338	0.992	0.991	0.970	0.948	0.994	0.938	0.040
Structural weights	4.440*	6	0.740	1.019	0.992	0.951	1.040	0.990	0.966	0.000
Structural covariances	9.316*	9	1.035	0.996	0.996	0.896	0.995	0.978	0.952	0.013
Metric invariance by city (Manizales / Medellín) of model 2										
Without restrictions	6.040*	2	3.020	0.979	0.979	0.933	0.977	0.986	0.947	0.027
Structural weights	7.425*	6	1.237	0.983	0.982	0.918	0.964	0.983	0.943	0.033
Structural covariances	9.445*	9	1.049	0.995	0.994	0.895	0.992	0.978	0.951	0.015

Note: *$p \leq .05$.

Figure 1 shows that the variables depression, hopelessness and impulsivity explained 63% (R^2= 0.635, IC 95% [0.555, 0.713], p= .001) of the variation in suicidal orientation. Depression and hopelessness variables explained 24% (R^2= 0.243, IC 95% [0.146, 0.345], p= .001) of the variance in impulsivity. Impulsivity was found to mediate only the association between depression and suicidal orientation, whose total, direct and indirect effects were statistically significant (p< .001).

Figure 1
Structural equation modeling of suicidal orientation and the mediating role of impulsivity



Note: **p< .001.

Table 7 shows the total, direct and indirect standardized effects of the independent, mediating and dependent variables. Depression contributed the largest total effect on impulsivity and suicidal orientation. Since the direct and indirect effects are statistically significant, it can be concluded that the mediation effect of impulsivity is partial.

Table 7
Total, direct and indirect standardized effects of predictor variables on response variables

Effects	Impulsivity (Mediator)				Suicidal orientation			
	Value β	95% CI		Value *p*	Value β	95% CI		Value *p*
		lower	Upper			lower	Upper	
Hopelessness								
Total	--	--	--	--	.288	.161	.408	.001
Direct	--	--	--	--	.288	.161	.408	.001
Indirect	--	--	--	--	--	--	--	--
Depression								
Total	.493	.382	.587	.001	.558	.447	.671	.001
Direct	.493	.382	.587	.001	.485	.363	.609	.001
Indirect	--	--	--	--	--	--	--	--
Impulsivity								
Total	--	--	--	--	.150	.062	.237	.002
Direct	--	--	--	--	.150	.062	.237	.002
Indirect	--	--	--	--	.074	.029	.124	.002

Discussion

The present study aimed to describe the effect of depression, hopelessness and impulsivity on orientation to suicide and the role of impulsivity as a mediator of suicidal orientation in university students with a history of self-injury behaviors in two Colombian cities. It was identified that young people who have had at least one suicide attempt in the last year presented moderate and high risk of suicidal orientation. They also reported some symptomatic indicator of depression, hopelessness, and global impulsivity, which is consistent with what has been found in previous studies (Gómez Tabares et al., 2019; Kan et al., 2022; Núñez et al., 2022; Wang et al. 2015). A possible explanation is that people who report depressive symptoms and impulsivity tend to have a greater suicidal orientation (Hadzic et al., 2020; Wang et al., 2015).

No statistically significant differences were found between men and women in suicidal orientation, depression, hopelessness, and impulsivity. These findings are similar to those found in other studies (Gómez Tabares et al., 2019; Gómez-Romero et al., 2018; Loboa & Morales, 2016) and different from those reported in other investigations in which a greater orientation towards suicide has been documented in men compared to women (Almaghrebi, 2021; Auerbach et al., 2017; Ballester et al., 2021; INMLCF, 2022).

It was found in the comparative analyses carried out, on the one hand, that young people with a higher level of risk of suicidal orientation evidenced higher

scores in depression, hopelessness, and impulsivity. On the other hand, young people with impulsivity traits presented higher scores than those without it in suicidal orientation, depression, and hopelessness. In this regard, it has been found that in young university students, hopelessness can be another risk factor that increases suicidal orientation (Talley et al., 2022; Walker et al., 2017).

Suicidal orientation correlated directly and significantly with depression, hopelessness, and impulsivity. Depression increased the likelihood of risk for suicidal orientation, hopelessness, and impulsivity. These findings maintain concordance with what has been previously reported on the relationship between people with mental health problems such as depression, hopelessness, impulsivity, suicidal ideation, and behavior (Aandi Subramaniyam et al., 2022, Swann et al., 2020; Wang et al., 2017).

The above findings are related to recent evidence that has documented the symptoms that allow discriminating people who have attempted suicide from those who have not are depression, hopelessness, and the perception of being a failure in life (Weiss et al., 2022), which could be explained by a greater exposure to negative stressful events and lack of social support networks that would lead to habituation to different types of painful experiences, and therefore, to decrease the barriers to suicide orientation (Gouveia-Pereira et al., 2022). Additionally, it has been reported that people with a history of previous suicidal behavior are at greater risk of attempting suicide again (Aaltonen et al., 2019; Li et al., 2022).

In line with the hopelessness theory and the interpersonal theory of suicide hopelessness is strongly correlated and is considered as a vital risk factor for suicidal orientation mainly when the person considers that he or she cannot modify the interaction with the environment (Abramson et al., 2000; Grafiadeli et al., 2021), specifically when young people report feeling isolated and having difficulty integrating into university life (Goodwill, 2022; Strayhorn, 2018). In turn, feelings of alienation in combination with the perception of being a burden to others, and low self-esteem end up closing the vicious circle of hopelessness, in which case the only way out they perceive is to commit suicide. Therefore, hopelessness could be the factor that leads depressed individuals to develop the belief that suicide is the only solution to their problems (Grafiadeli et al., 2021).

The variables of depression, hopelessness, and impulsivity explained the variance in suicidal orientation. Likewise, the variables depression and hopelessness explained the variance in impulsivity. Impulsivity was found to mediate the association between depression and suicidal orientation, whose total direct and indirect effects were statistically significant. Additionally, depression contributed to the largest total effect on impulsivity and suicidal orientation. These findings are consistent with what has been reported in other research that has shown that the frustrated psychological needs present in young people with hopelessness and depression put them at greater risk of developing beliefs oriented toward suicide (Park et al., 2022; Shin & Choi, 2020).

Based on the tested model the hypothesis raised in the present study, that impulsivity plays a mediating role between depression and hopelessness in the prediction of suicidal orientation, is partially described. Thus, a possible explanation for why some young university students attempt suicide, would be mediated by the

impulsivity component (Klonsky et al., 2016; May & Klonsky, 2016; Wang et al., 2017), which in other studies has been documented as a factor that increases the likelihood of evidencing self-injurious behavior, due to the tendency toward rapid reactions to both external and internal stimulation because of the lack of foresight and control of such reactions (Anestis et al., 2014; Colborn et al., 2017; Gvion et al., 2011; Hadzic et al., 2020; Wang et al., 2017). An additional explanation to the above is that suicide orientation in people with depression is associated with cognitive impulsivity and perception of loss of control as well as difficulty coping with emotions (Aandi Subramaniyam et al. al., 2022; Swann et al., 2020).

The findings documented in the present investigation support the role of impulsivity as a mediating variable between depression and the prediction of suicidal orientation. Likewise, the results allow us to suggest suicide prevention actions in young university students aimed at reducing impulsivity and having better emotional coping strategies. Also develop activities that increase positive affect since it could become a protective factor to improve their mood, strengthen their self-esteem and prevent suicidal risk, which in turn would enable young people to focus more on constructive thoughts about themselves, and experience life satisfaction (Gomez-Baya, Mendoza, Paíno and Gillham, 2019; Londoño-Pérez et al., 2022).

The data collected in this study should be considered in light of the following limitations. In the first instance, the research was conducted through a cross-sectional study, which merits that for future works the role of the variables evaluated can be examined through a longitudinal methodology, especially if it is taken into account that the phenomenon of suicidal orientation has dimensional characteristics that may vary over time. In second instance, it is necessary to recognize that access was only obtained to a sample of young people from the cities of Medellin and Manizales that have cultural similarity in Colombia, therefore, it would be important to identify the role of the variables evaluated with a larger sample of young people from different cultural regions of Colombia and also compare the behavior of the variables with samples from other countries, which would give a greater possibility of generalization of the findings. Finally, it is important to note that the results of this study cannot be generalized to the general population, given that young people without suicide attempts were not analyzed, but rather the segment of the young population with the characteristics contemplated in this study, which limits only its predictive capacity in young people with a history of suicide attempts. In this sense, it is suggested for future studies to compare the role of impulsivity on suicidal orientation in young people with and without a history of suicide attempts in order to have greater support for the question of why some university students attempt suicide unlike of those who don't try.

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Appendix

Hypothetical model on the mediation of impulsivity between depression and hopelessness in predicting suicidal orientation