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Understanding suicidal ideation in Latino/a adolescents living in Puerto Rico

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Keywords

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Latino/a adolescents in the United States (US), particularly females, have been identified as a group with a higher rate of suicidal ideation and attempts, compared to other ethnic-sex groups (Kann et al., 2014; Kann et al., 2016). However, different rates of suicidality (suicidal ideation, attempt, and death by suicide) are found among different groups of Latino/a adolescents (Duarté-Vélez & Bernal, 2007, 2008). In this paper, a socio-cognitive vulnerability model is proposed to explain the phenomenon of suicidal ideation in Latino/a youth living in Puerto Rico (PR) exploring differences by sex. The proposed socio-cognitive vulnerability model of suicidal ideation is a combination of the cognitive vulnerability model proposed by Ingram, Miranda, & Segal (1998) to understand depression, and an ecological approach to suicidality (Ayyash, 2002). This ecological model proposes different system levels in which different factors interact within and between levels (ontogenic development, microsystem, exosystem, and macrosystem). One of the main propositions in the cognitive vulnerability model is that a progressive chain of negative patterns of cognitions is a key vulnerability factor that mediates the relationship between socio-environmental factors and suicidality, as suggested by others (Dieserud, Roysamb, Ekeberg, & Kraft, 2001; Wenzel & Beck, 2008). However, distal risk factors, such as a history of child maltreatment and abuse, and proximal risk factors, such as bullying or dating conflicts, interacting with stressors are necessary to trigger vulnerability.

With some exceptions (Kuhlberg, Peña, & Zayas, 2010; Locke & Newcomb, 2005; Zayas, 2011), most studies, including those specifically studying Latinos/as, have used an atheoretical descriptive approach to examine correlates with suicidality (Duarté-Vélez & Bernal, 2007; Franklin et al., 2016). The model proposed here to understand suicidal ideation in Latina and Latino adolescents in Puerto Rico (PR) has some similarity to the one

proposed by Zayas and collaborators for females (Kuhlberg, Peña, & Zayas, 2010; Zayas, 2011; Zayas, Lester, Cabassa, & Fortuna, 2005) and Locke and Newcomb (2005) for males. Both consider the influences of socio-environmental factors, with a particular emphasis on the family, the developmental phase of the adolescent, and the importance of developing sex specific models. However, the current proposed model posits a particular role for cognitive vulnerability (See Figure 1) in a population of adolescents from PR.

PR is an unincorporated territory of the US, with its own language (Spanish), culture, political and socio-economical history. Since 2005, PR has been in an economic decline (Krueger, Teja, & Wolfe, June 29 2015). Currently, 45% of its population is below the poverty level, unemployment rate is high (13% average since 1990) (Bishaw, 2013; Traiding Economics, 2017) as well as criminality (e.g. homicide age adjusted rate 19.9 in comparison to 5.1 in US) (Kochanek, Murphy, Xu, & Tejada-Vera, 2016). These socio-economic realities also affect the public school system (e.g. low graduation rates and school violence), as well as social and family life (Lippe, Brener, McManus, Kann, & Speicher, 2008; NCES). Our model posits that these macro level factors affect risk/protective factors such as parenting, family communication, family cohesion, and family functioning that have been associated with suicidality in adolescents in Latino and Non-Latino samples (Boeninger, Conger, & Masyn, 2012; Duarté-Vélez, Lorenzo-Luaces, & Roselló, 2012; Kuhlberg et al., 2010; Locke & Newcomb, 2005; Turner, Kaplan, Zayas, & Ross, 2002). Macro level factors affect other individual/family level variables including social support, particularly from parents, which can protect adolescents from suicidality (Cho & Haslam, 2010; Garcia, Skay, Sieving, Naughton, & Bearinger, 2008; Kerr, Preuss, & King, 2006). Life stress, exacerbated by economic factors, can also serve as a trigger for suicidality (Hill, Pettit, Green, Morgan, & Schatte, 2012; R. A. King et al., 2001; Lewinsohn, Rohde, & Seeley, 1994), with some studies specifically examining Latino/a adolescent samples (Locke & Newcomb, 2005; Rosselló & Berríos, 2004) and Non-Latino/a samples (R. A. King et al., 2001).

Common cultural values in Puerto Rico, such as “familismo” and “machismo”, also influence the way family and interpersonal relationships are built (Ayyash, 2002). *Familismo* prioritizes the centrality of the family versus individual interest. *Machismo* promotes gender roles in which males are seen as having privileges and societal roles as leaders, protectors, and providers. Females are seen as needing protection, as more emotional, and more sensible than males. Consequently, it is more acceptable for females to express their feelings, whereas for males it is a sign of weakness. Thus, it is understandable why female teens report sadness and suicidal ideation more often than males (CDC, 2005–2015; Kann et al., 2014; Kann et al., 2016). In PR, the most prevalent disorders associated with suicidality in female adolescents were major depressive disorder in a clinical sample and anxiety disorders in a community sample; while disruptive behavior disorders are associated with suicidality in both clinical and community representative samples of male adolescents (Jones, Ramirez, Davies, Canino, & Goodwin, 2008).

Cognitive vulnerability factors, such as poor self-concept, dysfunctional thoughts, and hopelessness, have been highly correlated with suicidal ideation in Puerto Ricans, as well as other ethnic groups (Duarté-Vélez & Rosselló, 1999; Rosselló & Berríos, 2004; Rosselló, Duarté-Vélez, Gema-Zuluaga, & Bernal, 2008). All of these are components of the

depressive cognitive schema (Beck, 1976; Ingram et al., 1998). An increase in depressive symptoms, which includes a highly cognitive component, has been significantly correlated with suicidality in many studies (Capron, Allan, Ialongo, Leen-Feldner, & Schmidt, 2015; Jones et al., 2008; Kerr et al., 2006).

Study aims and objectives

Based on a comprehensive review of the scientific literature on suicidality in Latino/a adolescents from 1990 to 2006, Duarté-Vélez and Bernal (2007) concluded that research in this area should integrate ecological, developmental, and gender specific perspectives. Also, based on differences found in frequencies of suicidal outcomes (suicidal ideation, attempts, and complete suicide) and risk factors among male and female Latino subgroups, they recommended studies focusing on specific Latino groups (e.g. Mexicans, Puerto Ricans) and across group comparisons (e.g. Cubans vs. Mexicans vs. Puerto Ricans). A recent meta-analysis (Franklin et al., 2016) of studies conducted over the past 50 years on suicidal risk factors with a longitudinal design found weak evidence for the predictive validity of well-known risk factors when examined individually. Most studies were atheoretical and ignored the interplay between risk and protective factors. Franklin and collaborators (2016), as well as other researchers (Capron et al., 2015; Kerr et al., 2006; Thatcher, Reininger, & Drane, 2002) point out that there may be different paths to suicidal ideation and behaviors and recommended that researchers develop separate risk algorithms for different subpopulations. However, few studies have used path analysis or structural equation modeling to test conceptual models to explain suicidal ideation in community samples of adolescents.

The present study represents a step forward in the field of Latino/a studies by focusing on a specific, understudied, population of Puerto Rican adolescents in the school system, exploring differences by sex. Both socio-environmental and individual vulnerability factors are examined in a path analysis based on a socio-cognitive vulnerability model. Based on the conceptual model and the research literature, a depressive cognitive schema is conceptualized as a key mediator between socio-environmental factors and other vulnerability factors, in this case externalizing behavior and hopelessness. All vulnerability factors are hypothesized to have a direct influence on suicidal ideation, as are negative events, with differences by sex expected. Our analysis is descriptive and hypothesis generating, guided by the conceptual framework described above and the following research questions: 1) To what degree do socio-environmental factors (social support, negative life events, and family dysfunction) affect suicidal ideation indirectly, mediated by proximal vulnerability factors (hopelessness, depressive symptoms, and externalizing behaviors)? 2) To what degree do proximal vulnerability factors have a direct effect on suicidal ideation? 3) To what degree do negative life events will have a direct effect on suicidal ideation? and 4) Does sex moderate the effect of socio-environmental factors and vulnerability factors on suicidal ideation?

Method

Participants

A total of 233 students between 11 and 19 years old participated in the study (see Table 1). They were recruited from public and private schools randomly selected from an educational district of the Metropolitan area of San Juan, Puerto Rico. One hundred and fifty-four participants (66%) were female and 79 (34%) were male. Fifty-six percent ($n = 132$) were from private schools. Eighty-five percent were born in Puerto Rico, 10% were born in another Hispanic country, and 5% were Latinos/as born in the United States. All participants had been living in Puerto Rico for at least two years. Their mean age was 15 years ($SD = 1.8$). Thirty-one percent of the participants' parents were married or lived together (intact family), 33% were divorced, 23% were separated, and 12% identified their family status as Other (e.g. single, widow). The eligibility criteria for the selection of schools were: 1) Spanish as the primary language in school, and 2) a standard high-school curriculum (not vocational).

Procedures

The survey was carried out in 2003, following approval by the University of Puerto Rico's Institutional Review Board from the Río Piedras Campus. Administrative staffs of the selected schools, such as counselors and social workers, were trained in the research design and in the suicide risk protocol. Written consent was obtained from parents and an assent form was signed by adolescents who were interested in participating in the research. The lead researcher was available to answer any questions and concerns that the adolescents and/or their parents presented. The voluntary nature of participation was emphasized, as well as the right to withdraw from participation, even after they signed the consent and assent forms.

Assessments were two hours long and were conducted in a group format. Every participant received a brochure with basic information about depression in adolescents, as well as emergency contact information and a suicide hotline. If adolescents scored high on suicidal ideation during their assessment, they were individually interviewed on the same day. A total of 21 individual interviews were completed. Referrals were arranged according to the level of suicide risk; some were referred for outpatient treatment and others were already in treatment. No participants were referred to the emergency department. Parents were alerted in all cases.

Measures

Demographic Data—Information on sex, age, parental marital status, residential zone (rural or urban), type of school (public or private), and ethnicity was collected.

Life Events Checklist (LEC)—The LEC assesses 46 life-events that during the last year with yes or no questions and four open items to address other situations not specified on the list (Johnson & McCutcheon, 1980). Participants identify whether the events were subjectively good or bad. The scale was translated into Spanish and adapted for Puerto Rican adolescents (Duarté-Vélez, 2007). As part of the adaptation, two additional items were

added to the list, making a total of 48 items, “Too much school work” and “Father/mother or a close family member activated in the military service.”

Multidimensional Scale for Perceived Social Support (PSS)—The PSS is a 12 item scale that assesses the social resources perceived as a source of strength and well-being for the participant (Zimet, Dahlem, Zimet, & Farley, 1988). Three specific sources are evaluated: family, friendships, and significant others. Serrano-Goytía (1999) translated and adapted this instrument for Puerto Rican adolescents.

Brief Family Assessment Measure III-Spanish version (BFAM-III)—The BFAM-III is a self-report instrument of 14 items designed to measure family functioning. It evaluates strengths and weaknesses of functioning and higher scores indicate worse functioning. The BFAM-III has a correlation of .96 with the standard/long version of the instrument (30 items) (Skinner, Steinhauer, & Santa Barbara, 1995).

Suicide Ideation Questionnaire-Junior (SIQ-Jr) measures severity or seriousness of suicidal ideation during the past month with 15 items with a 7-point Likert scale from never had this thought (0) to almost every day (6) (Reynolds, 1988). A cut-off point of 31 or higher indicates a clinically significant level of suicidal thinking. This scale was translated into Spanish and adapted for Puerto Rican adolescents by Duarté-Vélez (2007).

Hopelessness Scale for Children (HSC)—The HSC evaluates negative expectations of the future (Kazdin, Rodgers, & Colbus, 1986). It was translated into Spanish and adapted for Puerto Rican adolescents (Duarté-Vélez, 2007).

Children’s Depression Inventory-Spanish version (CDI)—The CDI is a self-report instrument for the evaluation of symptoms of depression in children and adolescents during the last two weeks (Kovacs, 1992). Item 9, which measures suicidal ideation, was excluded from the analysis in order to eliminate possible inflation in the association with the SIQ-Jr. The CDI has six subscales: emotional problems, physical symptoms, negative self-esteem, functional problems, ineffectiveness, and interpersonal problems.

Youth Self-Report-Spanish version (YSR).—The YSR measures psychopathology using a 113 item self-report instrument with two broadband subscales: the Internalizing (Inter) and the Externalizing (Exter) that includes subscales on aggressive behaviors and delinquency problems (Achenbach, 2001). The instrument assesses behaviors during the past six months. Only the Externalizing subscale was use in this study.

Data Preparation

Prior to analyses, the distributional properties of all study variables were explored. Most scores were normalized using Blom transformation (Blom, 1958). Exceptions included the family dysfunction (B-FAM), which was sufficiently normal and not transformed, and the hopelessness and social support variables (HSC & PSS), which were recoded into four ordinal categories in order to better distribute the lower numbers in each scale. Descriptive statistics for non-transformed variables are reported in Table 2 and transformed variables are

in Table 3. Comparisons (*t-test*) were performed using the non-transformed variables to explore differences in suicidal ideation by demographics variables and risk factors by sex.

Analytic approach

Path analyses were used to address the analytic goals. The hypothesized model examined socio-environmental risk factors as explanatory variables of suicidal ideation, controlling for age, as a continuous variable, family status (intact vs. non-intact family), and type of school (private vs. public). Putative mediators of the relationship between socio-environmental factors and suicidal ideation were specified as follows: each socio-environmental factor (negative life events, social support, and family dysfunction) would have an effect on depressive symptoms, and depressive symptoms would have an effect on externalizing behaviors and hopelessness which in turn would have an effect on suicidal ideation. Also, each socio-environmental factor and vulnerability factor would also have a direct effect on suicidal ideation. SPSS software was used for analyses with non-transformed variables and AMOS software for analyses with transformed variables. The final model was trimmed of paths that were not significant at a 10% level using a backwards step-wise procedure. The motivation for using a liberal cut-off for retention of paths was to include small effects. Estimated model parameters for the path were obtained using a multiple group model, in which parameters were estimated in males and females at the same time and equivalence tested across groups. A final model was obtained with some parameters constrained to be equal across sex, based on a pairwise comparison test of critical values model chi-square difference tests.

Results

Comparison of means by demographic variables

In this sample, 9% ($n = 21$) met the criterion of severe suicidal ideation according to the SIQ-JR cut-off point (5% of males and 11% of females). Table 2 shows *t-test* results and the means and standard deviations of each variable by sex. Overall, females reported higher levels of suicidal ideation, depressive symptoms, and family dysfunction. No other measures differed significantly by sex ($p > .05$).

t-test results showed that there were no significant differences in the SIQ-Jr by school type (private vs public), academic level (intermediate vs high school), and family type (intact vs non-intact). However, there was a significant difference by developmental stage, in which older adolescents had higher levels of suicidal ideation ($t = -2.84$, $p = .01$).

Correlations among the measures

Table 3 displays Pearson correlations among all the study variables. Among females, most correlations were medium to large in magnitude (r 's $> .3$) (Cohen, 1988) in the expected direction. An exception was negative life events and hopelessness which had a small correlation ($r = .22$). Among males, most correlations were medium in size and all were in the expected direction. However, the correlations of negative life events were trivial in magnitude with hopelessness, social support, and family dysfunction. Also, hopelessness and externalizing behaviors were not strongly correlated in males. In both groups, depressive

symptoms had the strongest correlation with suicidal ideation ($r = .69$ for females and $r = .53$ for males).

Path analyses

The results of the path analyses for the total sample and by sex are summarized in Table 4 (Model Fit: RMSEA = .0, CFI = 1; TLI = 1.063). The total, direct, and indirect effects of explanatory variables on suicidal ideation for the final fitted model in the total sample are reported in Table 5 and by sex in Table 6. The general concept was that proximal vulnerability factors of depressive symptoms, hopelessness, and externalizing behaviors, would mediate the relationship between socio-environmental factors and suicidal ideation. Depressive symptoms were also expected to be a mediator between the socio-environmental factors and the other two proximal vulnerability factors of externalizing behavior and hopelessness. Also, it was expected that negative life events would have a direct effect on suicidal ideation. Results suggested that socio-environmental factors may have an indirect effect on suicidal ideation through vulnerability factors. Also, negative life events may have a direct effect on suicidal ideation.

In this sample, vulnerability factors (depressive symptoms, hopelessness, and externalizing behaviors) had a direct effect on suicidal ideation, with the exception of hopelessness that did not have a direct effect on suicidal ideation for females. There were significant differences by sex in the final models to explain suicidal ideation (See Figure 1). All paths shown in Figure 1 were statistically significant, although at times only for males. The Goodness of Fit Index or GFI was 1 for both males and females, suggesting that both models fit the data well, as perfect model fit is expected from a just identified path model.

Depressive symptoms were directly related to suicidal ideation in the total sample ($B = .39$). In males, depressive symptoms were also indirectly related to suicidal ideation via hopelessness and externalizing behaviors ($B = .08, .03$, respectively). In females, depressive symptoms were indirectly related to suicidal ideation exclusively via externalizing behaviors ($B = .19$). Finally, depressive symptoms were a significant mediator of the effects of social support, family dysfunction, and negative events on suicidal ideation for both sexes (See Figure 1). There was no difference by sex on the effect of socio-environmental factors on depressive symptoms (See Table 4). All paths were constrained, with the exception of the covariate family status, in which non-intact family status was related to depressive symptoms only for males ($B = .20$). Overall, depressive symptoms had the strongest total effect on suicidal ideation for both sexes (.56 for females and .48 for males).

Externalizing behaviors had the highest direct effect on suicidal ideation among females ($B = .39$) and the lowest among males ($B = .18$) (See Table 4). Externalizing behaviors were a significant mediator of negative events, age (older), type of school (private), and depressive symptoms on suicidal ideation in both sexes. However, the magnitude of the effect of explanatory variables on externalizing behaviors was different. Negative events exerted a greater influence on externalizing behaviors in males ($B = .48$) compared to females in which the effect was lower ($B = .15$). Depressive symptoms had a larger effect on externalizing behaviors in females ($B = .49$) in comparison to males which was smaller (B

= .17, $p = .06$). The effects of the covariates of age (older) and school type (private) on externalizing behaviors were small or trivial, but significant for both sexes ($p < .05$).

Hopelessness had no direct effect on suicidal ideation in females, but did have a direct small effect among males ($B = .25$). In males, hopelessness was a significant mediator on the effect of social support ($-.20 \times .25$ or $B = -.05$), type of school (in the direction of public school, $.15 \times .25$ or $B = .04$) and depressive symptoms ($.34 \times .25$ or $B = .08$) on suicidal ideation (See Figure 1).

All socio-environmental factors had a significant indirect effect on suicidal ideation for both sexes ($p < .05$). Negative events had the highest total effect for both sexes (.33 for females and .38 for males). Also, this was the only socio-environmental factor with a direct effect on suicidal ideation (See Table 6). The second factor, in order of importance, was social support, for both sexes, and the last was family dysfunction, with a trivial total effect of .10 for females and .08 for males.

Overall, the proposed model explained a large amount of the variance in suicidal ideation suggesting that important risk factors were included (.59 for females and .48 for males) (See Table 4). Also, a considerable amount of the variance of depressive symptoms (.48 for females and .43 for males), externalizing behaviors (.43 for females and .42 for males), and to a lower degree of hopelessness (.26 for females and .23 for males) was explained in this model.

Discussion

The outcomes of this study underscore the importance of understanding the emergence of suicidal ideation from a multidimensional perspective, as well as by sex. All of the socio-environmental factors proposed in this study had influences on at least one of the vulnerability factors. However, the only factor with a direct effect on suicidal ideation was negative life events. Study outcomes supported the diathesis-stress model, which posits that stress, in this case the accumulation of negative life events, increases vulnerability (e.g. depressive symptoms and externalizing behaviors) and triggers suicidal ideation. In one hand, considering the increment in social and economic stressors for families in Puerto Rico is understandable why Latino/a adolescents in the Island are at an increased risk for suicidality.

In the other hand, lack of social support had a large contribution to depressive symptoms which was the vulnerability factor most strongly related to suicidal ideation. If the social structures in Puerto Rico are struggling on providing appropriate support to the families and to its youths it would be harder to keep adolescents at risk safe. The buffering effect of social support has also been found in other studies (Kidd et al., 2006; C. A. King & Merchant, 2008) but in this study social support variable was embedded at different microsystem levels because it captured the perceived support from family members, friends, and significant others. Creating support groups at schools or in the community and providing support to families may be one way of prevention. Teaching families how to provide support, a valued

concept in the Latino culture, to their adolescents may be one aspect of family life that is easier to address than family conflict.

Depressive symptoms were the strongest vulnerability factor for suicidal ideation for both males and females, but externalizing behavior's direct effect was larger for females than males. Family functioning had an influence on suicidal ideation only through depressive symptoms, and non-intact family status, was related to depressive symptoms only for males. Externalizing behavior was mostly explained by depressive symptoms in females and by negative events in males. Path analyses for females, pertaining to the possible relationship between depressive symptoms and externalizing behaviors, were more consistent with the "acting out" model (Kerr et al., 2006) in which depressive symptoms increased externalizing behavior and consequently, suicidality. Male outcomes were more consistent with the "failure model", in which externalizing behavior arises as a result of the environment (Kerr et al., 2006), and as a consequence, depressive symptoms increase and in turn, suicidal ideation.

Hopelessness had a direct effect on suicidal ideation for males only. Males within the Latino culture have the "social responsibility" to economically support one's family, to be protectors, and to serve as leaders. Consequently, there are higher expectations of them to accomplish things in the future. The negative pattern of thoughts for males may go from negative thoughts about themselves, to the future, and then to thoughts that "if there is nothing for me in the future, [I am] not worthy [of being] alive". This may be different for Latina girls in which the negative pattern of thoughts go from poor self-concept or self-esteem directly to suicidal ideation without necessarily having to pass through negative thoughts of the future. This outcome is similar to findings with a clinical sample of depressed Latino/a adolescents in Puerto Rico (Rosselló et al., 2008).

Limitations

Theory and the research evidence guided the proposed model; however, this was a cross-sectional study and no causality can be determined. We make strong assumptions regarding the relationship of variables in the model, and different results could have been obtained with different assumptions about the directionality of relationships among concepts studied. Future studies to understand developmental paths to suicidal ideation should use a longitudinal design. Although a variety of socio-environmental factors and vulnerability factors were included in the model, there are other important factors that were not included, such as history of trauma, and family history of suicidality. Another limitation is that all the measures were self-report. Other perspectives should be included in future studies. Adolescents out of school or incarcerated were not able to participate in this study. Adolescents under these circumstances may have different developmental paths to suicidal ideation. Also, adolescents at higher risk for suicidal ideation may have decided not to participate in the study. The sample was a convenience sample from the metropolitan area of Puerto Rico thus generalization to other Latino samples may not be appropriate. Finally, the proposed relationships among risk factors were studied in the cultural context of adolescents living in Puerto Rico. The same risk and vulnerability factors may have different meanings or interact in different ways depending on the socio-cultural context of specific populations.

Conclusion and Implications

A multidimensional model in which socio-environmental factors and vulnerability factors related to explain suicidal ideation among Latino/a adolescents living in Puerto Rico was proposed and guided by a socio-cognitive vulnerability framework. The outcomes of the study support this approach and underscore the importance of exploring differences by sex. This approach facilitated identification of different points of intervention at the social and individual level. Girls with acting out behavior and boys with depressed mood should be of particular concern. Also, interventions could be designed to provide support for these at-risk groups as well as help them cope with stressful situations. At the community level, providing structural and emotional support, as well as psychoeducation to families at risk may have a positive influence on the family environment which, in turn, may benefit the adolescent.

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Figure 1. Fitted model for females and males.

Table 1.

Distribution of socio-demographic variables

Variable	Frequency	%
Sex (<i>N</i> = 233)		
Females	154	66
Males	79	34
Age (<i>N</i> = 231)	77	33
Early adolescent (11–14)	154	67
Late adolescent (15–19)		
Grade (<i>N</i> = 232)		
7 th	30	13
8 th	28	12
9 th	41	17
10 th	57	25
11 th	39	17
12 th	37	16
Type of school (<i>N</i> = 233)		
Public	102	44
Private	131	56
Place of Born (<i>N</i> = 233)		
Puerto Rico	195	84
Born elsewhere	38	16
Parents Marital Status (<i>N</i> = 233)		
Intact family	73	31
Non-intact family	160	69

Table 2.

Descriptive statistics by sex and total sample, Cronbach Alpha Index by instrument, and t-tests by sex

Instrument	<i>M</i>	<i>SD</i>	Range	t-Test	Cronbach Alpha
Suicide Ideation Questionnaire-Junior (<i>N</i> = 233)					
Total	11	14	0–72	<i>t</i> = 2.1	.91
Females	13	16	0–72	<i>p</i> = .04	
Males	9	10	0–55		
Children's Depression Inventory (<i>N</i> = 233)					
Total	9	7	0–43	<i>t</i> = 2.2	.87
Females	10	8	0–43	<i>p</i> = .03	
Males	8	5	0–23		
Youth Self-Report Externalizing Subscale (<i>N</i> = 230)					
Total ^a	15	9	0–57	<i>t</i> = .32	.90
Females	15	9	0–57	<i>p</i> = .75	
Males	15	9	1–37		
Hopelessness Scale for Children (<i>N</i> = 233)					
Total	2	3	0–16	<i>t</i> = .8	.79
Females	2	3	0–16	<i>p</i> = .42	
Males	2	2	0–11		
Brief Family Assessment Measure III (<i>N</i> = 232)					
Total	16	7	1–36	<i>t</i> = 2.4	.77
Females	17	7	1–36	<i>p</i> = .02	
Males	15	6	2–29		
Multidimensional Scale for Perceived Social Support (<i>N</i> = 232)					
Total	31	5	13–36	<i>t</i> = 1.5	.86
Females	31	5	14–36	<i>p</i> = .12	
Males	32	4	13–36		
Life Events Checklist - Negative Events (<i>N</i> = 233)					
Total	5	4	0–18	<i>t</i> = 1.5	.72
Females	5	3	0–15	<i>p</i> = .15	
Males	6	4	0–18		

Note. *M* = average; *SD* = standard deviation

^a = YSR Externalizing Subscale mean value is equivalent to a t-score close to 60.

Table 3.

Pearson correlations, means, and standard deviation among transformed variables by sex

Factors	1	2	3	4	5	6	7	Female <i>M (SD)</i>	Male <i>M (SD)</i>
1. SIQ-Jr	--	.53	.42	.26	-.34	.43	.45	.073(1.00)	-.111(0.86)
2.CDI	.69	--	.37	.46	-.56	.31	.36	.087(1.00)	-.166(0.92)
3.HSC	.38	.50	--	.28	-.32	.07	.09	.054(0.93)	.012(0.82)
4.B-FAM	.36	.48	.30	--	-.43	.18	.19	16.9(6.71)	14.7(5.78)
5.MSPSS	-.49	-.65	-.45	-.54	--	-.16	-.20	-.075(1.00)	.096(0.88)
6.LEC-NE	.49	.42	.22	.32	-.40	--	.57	-.045(0.95)	.131(1.01)
7.YSR-Exter	.66	.58	.31	.30	-.42	.57	--	-.008(0.99)	.023(0.97)

Note. SIQ-Jr = Suicide Ideation Questionnaire-Junior; CDI = Children's Depression Inventory; HSC = Hopelessness Scale for Children; B-FAM = Brief Family Assessment Measure III; MSPSS = Multidimensional Scale for Perceived Social Support; LEC-NE = Life Events Checklist - Negative Events; YSR-Exter = Youth Self-Report- Externalizing Subscale; *M* = mean; *SD* = standard deviation. Correlations for male participants (*n* = 79) are presented above the diagonal, and correlations for female participants (*n* = 154) are presented below the diagonal. All variables, except B-FAM, were normalized using Blom transformation.

Table 4.

Standardized parameter estimates for the total sample and by sex

Model parameter	Total	Female	Male
SIQ-Jr on			
CDI	.39	.36	.36
YSR-Exter	.31	<u>.39</u>	<u>.18</u>
LEC-NE	.15	.16	.19
HSC	.11	<u>.04^{ns}</u>	<u>.25</u>
Age	.00 ^{ns}	-.00 ^{ns}	-.00 ^{ns}
School	.06 ^{ns}	.05 ^{ns}	.05 ^{ns}
Family Status	.03 ^{ns}	.03 ^{ns}	.03 ^{ns}
	R ² .54	R ² .59	R ² .48
CDI on			
MSPSS	-.49	-.49	-.48
LEC-NE	.18	.19	.22
B-FAM	.19	.18	.17
Age	-.05 ^{ns}	-.07	-.07
School	-.02 ^{ns}	-.03 ^{ns}	.03 ^{ns}
Family Status	-.04 ^{ns}	<u>.03^{ns}</u>	<u>.20</u>
	R ² .46	R ² .48	R ² .43
YSR-Exter on			
LEC-NE	.28	<u>.15</u>	<u>.48</u>
CDI	.38	<u>.49</u>	<u>.17[#]</u>
Age	.1 [#]	.04	.12
School	-.19	-.21	-.21
Family Status	.08 ^{ns}	.06 ^{ns}	.07 ^{ns}
	R ² .40	R ² .43	R ² .42
HSC on			
CDI	.33	.34	.33
MSPSS	-.20	-.20	-.19
Age	.04 ^{ns}	.04 ^{ns}	.04 ^{ns}
School	.14	.15	.15
Family Status	-.06 ^{ns}	-.05 ^{ns}	-.06 ^{ns}
	R ² .26	R ² .27	R ² .23

Note. SIQ-Jr = Suicide Ideation Questionnaire-Junior; CDI = Children's Depression Inventory; YSR-Exter = Youth Self-Report- Externalizing Subscale; HSC = Hopelessness Scale for Children; MSPSS = Multidimensional Scale for Perceived Social Support; LEC-NE = Life Events Checklist - Negative Events; B-FAM = Brief Family Assessment Measure III. All parameters significant at $p < .05$ unless indicated by ^{ns}

[#] $p = .06$. Total model includes all parameters with a p -value of $< .10$. Sex specific models are from a final fitted model where we iteratively constrained parameters across sex group with low pairwise comparison critical values, stopping when adding a constrained significantly ($p < .05$) worsened model fit. Underlined estimates are not constrained to be equal by sex. The unstandardized parameters are constrained across group. However, standardized parameter estimates may be different because the variances of the predictors or outcome may be different by sex. Total sample = 233; Female participants ($n = 154$); Male participants ($n = 79$).

Table 5.

Total, direct, and indirect effect of explanatory variables on suicidal ideation for the total sample

Risk Factors	Total	Direct	Indirect
Socio-environmental			
MSPSS	-.29	.NA	-.29
LEC-NE	.33	.15	.18
B-FAM	.10	NA	.10
Psychological			
CDI	.54	.39	.15
YSR-Exter	.31	.31	NA
HSC	.11	.11	NA

Note. MSPSS = Multidimensional Scale for Perceived Social Support; LEC-NE = Life Events Checklist - Negative Events; B-FAM = Brief Family Assessment Measure III; CDI = Children's Depression Inventory; YSR-Exter = Youth Self-Report- Externalizing Subscale; HSC = Hopelessness Scale for Children. NA = No direct/indirect effects included in the model; ($N = 233$). Total model includes all parameters with a p-value of $< .10$.

Table 6.

Total, direct, and indirect standardized effect of explanatory variables on suicidal ideation by sex

Risk Factors	Female			Male		
	Total	Direct	Indirect	Total	Direct	Indirect
Socio-environmental						
MSPSS	-.29	NA	-.29	-.28	NA	-.28
LEC-NE	.33	.16	.16	.38	.19	.19
B-FAM	.10	NA	.10	.08	NA	.08
Psychological						
CDI	.56	.36	.20	.48	.36	.11
YSR-Exter	.39	.39	NA	.18	.18	NA
HSC	.04	.04	NA	.25	.25	NA

Note. MSPSS = Multidimensional Scale for Perceived Social Support; LEC-NE = Life Events Checklist - Negative Events; B-FAM = Brief Family Assessment Measure III; CDI = Children's Depression Inventory; YSR-Exter = Youth Self-Report- Externalizing Subscale; HSC = Hopelessness Scale for Children. NA = No direct/indirect effects included in the model. Sex specific models are from a final fitted model where we iteratively constrained parameters by sex with low pairwise comparison critical values, stopping when adding a constrained significantly ($p < .05$) worsened model fit. Female participants ($n = 154$); Male participants ($n = 79$).