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Beyond the mental pain: A case-control study on the contribution of schizoid personality disorder symptoms to medically serious suicide attempts☆

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ABSTRACT

Background: Clinical and research findings have highlighted the role of interpersonal factors in suicidal behavior with high levels of intent and lethality. Schizoid personality disorder (SPD) is at the extreme end of interpersonal difficulties. Thus, we aimed to understand the contribution of SPD symptoms to suicide behavior and specifically to more lethal suicide attempts.
Method: Four groups were investigated ($N = 338$): medically serious suicide attempters, medically non-serious suicide attempters, psychiatric and healthy controls. SPD symptoms, mental pain variants, and clinical characteristics were assessed.
Results: Overall, attempters were characterized by higher levels of most SPD symptoms. Solitary lifestyle and emotional detachment were higher among medically serious suicide attempters relative to less-serious attempters. Emotional detachment doubled the risk for high lethality, beyond mental pain variables.
Conclusions: SPD symptoms of interpersonal difficulties and low levels of emotional expressions are important risk factors for more severe suicidal behavior. Implications for identification of at-risk groups for suicide are discussed.

1. Introduction

Despite increased prevention efforts, suicide is one of the leading causes of death worldwide, accounting for 1.5% of all deaths in developed countries [1]. More than 800,000 die by suicide annually, and approximately 20–30 times as many engage in suicide behaviors [2,3]. Thus, it would seem important to continue to investigate the specific factors that may help clinicians better identify those who are at high risk for suicide.

The phenomenon of suicidal behavior comprises a diverse set of actions, including suicidal thoughts, suicide attempts, and actual death by suicide [3]. Given the significant differences between these behavioral categories, suicidologists are aware that the generalizability of research findings is dramatically affected by the population selected for study [4,5]. A promising strategy is to study individuals who have made a definite, near-fatal attempt, termed a *medically serious suicide attempt* (MSSA). As a concept, MSSA is a suicide attempt which would have been fatal had there been no provision of speedy and effective first-aid care, other forms of emergency treatment or, in some cases, mere coincidence [6]. In several studies, MSSAs have been found to closely resemble suicide completers [7] and to be twice as liable as other suicide attempters to subsequently complete suicide [8]. Thus, this group can help us understand the dynamics, processes, and risk factors that may predict suicide.

The literature has consistently identified the experience of unbearable mental pain as a risk factor for suicide attempt [9–11]. Mental pain describes feelings that are more than the sum of depression and hopelessness and indicates a qualitative experience, which borders on the unbearable [10]. Nevertheless, several studies have shown that mental pain, depression, and hopelessness differentiate suicide attempters from non-suicidal psychiatric and healthy controls but do not differentiate low lethal suicide attempters (medically non-serious suicide attempters, MNSSAs) from high MSSAs [12].

One recently studied factor regarding MSSAs is the interpersonal dimension [12–14]. Theories of the relationship between social

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communication and suicide date to Durkheim's [15] classic concept of *anomie*, which suggested that individuals who feel connected with their community are less likely to take their own life, even in the face of excessive stress. The well-established interpersonal theory of suicide [16] also emphasizes the interpersonal domains––i.e., perceived burdensomeness and thwarted belongingness––as the fundamental factors that contribute to the severe suicidal crisis (see also [17])

Other studies have also highlighted social connectedness as a factor differentiating suicide ideation from suicidal behavior [18] as well as the importance of factors such as loneliness to suicide ideation and behavior [19]. In several studies we found that although mental pain, depression, and hopelessness comprised risk factors for attempted suicide, only communication difficulties (e.g., low self-disclosure and schizoid features) distinguished MSSAs from MNSSAs [12,14,20].

Schizoid personality disorder (SPD) can be viewed as the extreme of interpersonal difficulty. According to DSM-5, SPD is associated with social detachment, significant behavioral impairment, and emotional aloofness [21]. The seven SPD diagnostic criteria include 1) lack of interest in social relationships; 2) a tendency toward a solitary or sheltered lifestyle; 3) little interest in sexual experiences with another person; 4) little interest in other, broader activities; 5) a lack of close friends other than first-degree relatives; 6) indifference to praise or criticism; and 7) emotional coldness, detachment, and flattened affect. These SPD symptoms can be gathered into three dimensions: interpersonal (Symptoms 1,2, and 5), behavioral/motivational (Symptoms 3 and 4), and affective (Symptoms 6 and 7). Thus, SPD symptoms can be represented mostly by social withdrawal, low interest in activities, lack of motivation as well as significant affective indifference [22].

Unfortunately, SPD is one of the most under-researched and poorly understood personality disorders within DSM-5 [21,23]. Consequently, accurate prevalence estimates for SPD are scarce, but they tend to range between 1% and 5% of the general population [24,25]. Some theoreticians have emphasized the presence of "secret" schizoid tendencies, in which the characteristics of the schizoid personality remain in the individual's subjective internal world, while on the outside, the individual displays an engaging, interactive interpersonal pattern [26]. Following that, Masterson and Klein [27] stressed that only by asking the individuals of their subjective experience, the presence of schizoid difficulties of emotional intimacy can be detected. Thus, it may be possible that SPD's actual prevalence is much higher than official estimates.

SPD symptoms have been found to be related to higher levels of mental pain and recurrent depression [28], acknowledged as central risk factors for suicide [9,29,30]. Some theories addressing the dynamics of the development of schizoid personality have highlighted the prospect of suicide among individuals with SPD [31,32]. However, to the best of our knowledge, no studies have directly explored suicide behavior among SPD individuals. Some research findings have revealed an association between schizoid personality disorder and homicide and violence [33], behaviors at times related to suicide. Upon examining the schizoid symptoms–suicide relationship, some findings have provided indications that SPD symptoms can serve as a risk factor for eventual suicide. In their seminal study, Apter et al. [34] conducted a psychological postmortem on 43 Israeli soldiers who died by suicide during their army service. The authors found that close to a third of the soldiers were characterized by significant schizoid symptoms. The authors coined the term, "death without warning," to address the issue of young adults' suicides which come as a complete shock to friends and relatives, caught completely unaware of the risk deriving from the victim's schizoid tendencies. Levi-Belz et al. [14] revealed that general schizoid tendencies, beyond those characterizing the mental pain dimension, contributed to more lethal suicide attempts. However, the question of identifying the prominent symptoms facilitating high lethal suicide attempts having higher levels of intent remains open. Resolving this question will enable us to target assessment and intervention strategies to the specific factors contributing to the more perilous suicide attempts.

1.1. The present study

Clinical and research findings have highlighted the role of interpersonal factors in suicidal behavior. Moreover, previous studies reported by our group found that an attempt's lethality is partly dependent on the attempter's ability to communicate their pain to others [13,18]. SPD is at the extreme end of the communication difficulties dimension, making it critically important to understand its contribution to suicide behavior in general, and specifically, to more lethal suicide attempts. Clinical experience [31,32] and research [33] have clearly shown that schizoid personality disorder is linked to unbearable and inescapable loneliness [22] and social withdrawal. In addition, SPD individuals are characterized by low interest in activities and significant affective indifference [22]. These symptoms may weaken the capacity of the individual to cope when faced with unbearable mental pain, thus creating the conditions for more lethal suicide attempts [52,53]. Taken together, the aim of the present study was to refine the associations between SPD variants (i.e., interpersonal and affective aspects) to serious suicide attempts defined both by the high medical lethality of the attempt and the by high level of intent to die.

In order to understand the specific role of SPD symptoms in suicidal attempts, we measured the seriousness of the attempt by three related but discrete aspects: 1) the medical lethality of the attempts––measuring the levels of physical injuries of the attempt; 2) the suicide intent levels, which divided to subjective component––measuring the wish-to-die levels related to the attempt; and an objective circumstances component, tapping the degree of seriousness of the planning before and during the suicide attempt.

Three hypotheses were tested in the study:

1. Suicide attempters will exhibit greater intensity on all seven noted SPD factors, compared with non-attempters (i.e., psychiatric and healthy controls groups).
2. Severe suicide attempters will exhibit greater intensity on four of the SPD symptoms––the two symptoms related to interpersonal aspects and the two related to affective aspects––compared with individuals who performed less severe serious suicide attempts.
3. The SPD interpersonal and affective symptoms will contribute positively to the severity of the suicide attempts (both medical lethality and suicide intent) above and beyond mental pain characteristics.

Resolving these hypotheses could help us to more precisely delineate the underlying psychological mechanisms that exacerbate lethal suicidal behavior––specifically, high lethality and intent to die.

2. Method

2.1. Study sample

The study described in this report incorporates findings from two consecutive studies conducted at tertiary university-affiliated general and psychiatric medical centers. Together, the study sample comprised 338 participants (197 males; 141 females), aged 19–85, divided into the following four groups:

2.1.1. Medically serious suicide attempt group (MSSA)

This group included 78 consecutive patients (44 males; 34 females) admitted to a general or psychiatric hospital in the wake of a suicide attempt, reflecting Beautrais's [35] criteria for a medically serious suicide attempt: admission for longer than 24 h and being treated either in a specialized unit (including the intensive care or burn unit) or surgery under general anesthesia (e.g., for torn tendons, stabbing injuries).

2.1.2. Medically non-serious suicide attempt group (MNSSA)

This group comprised 116 participants (65 males; 51 females) who had made a suicide attempt that warranted emergency room attention

and/or hospitalization, but did not meet the criteria for a medically serious attempt. According the inclusion criteria for suicide attempt, the Suicide Intent Scale's (SIS; [36]) item no. 13 (attitude toward living/dying) was used to detect intent-to-die levels. Only participants selecting the option 'wanted to die' on this item were included in one of the two attempters' groups.

2.1.3. Psychiatric controls

This group included 47 (33 males; 14 females) consecutive participants with a psychiatric diagnosis. Participants in the psychiatric group reported some suicide ideation but no suicide intent or attempt. All were admitted to a psychiatric hospital due to a deterioration in their mental state.

2.1.4. Healthy controls

This group consisted of 97 participants (55 males; 42 females) with no psychiatric diagnosis and with no history of suicidal behavior. We matched for the healthy control group vs. the MSSA group. The psychiatric control group and the MNSSA group could not be matched; however, they all represented consecutive admissions to units.

2.2. Measures

2.2.1. Schizoid tendencies

The Structured Clinical Interview for DSM–IV Personality Disorders (SCID-II; [37]) covers the 11 Axis II personality disorders of the Diagnostic and Statistical Manual of Mental Disorders, 4th edition.[1] For the present study, we used the seven-item section of the SCID, which reflects symptoms and behaviors of schizoid personality disorder. Each item represents one of the seven symptoms and taps one problematic issue: 1) lack of social relationships; 2) solitary lifestyle; 3) no interest in sexual experiences; 4) no interest in activities; 5) no close friends; 6) indifference to praise or criticism; and 7) emotional detachment, including flattened affect. Each item is rated on a 3-point scale, with higher scores indicating a greater schizoid tendency. The moderate to high correlations that were found between this scale and related measures such as self-disclosure and loneliness ($r = -0.40$; $r = 0.46$, respectively) indicate a good construct validity. Cronbach alpha coefficient for the current sample was high (0.81). The schizoid tendencies variable served as the main independent variable in this study.

2.2.2. The experience of mental pain

Mental pain was assessed by the self-rated Mental Pain Scale (MPS; [10]). The scale includes 45 items pertaining to nine factors: irreversibility, loss of control, narcissistic wounds, emotional flooding, freezing, self-estrangement, confusion, emptiness, and social distancing. Each item is rated on a 5-point Likert-type scale, with higher values reflecting higher levels of mental pain. In our sample, Cronbach alpha coefficients for the first eight factors ranged from 0.72 to 0.89. The social distancing factor was excluded from the data analysis because of a low Cronbach coefficient (0.42). Participants were asked about the most severe mental pain they felt during the month prior to their suicide attempt. For the control groups, participants were asked about the most severe mental pain they felt during the previous month. The variable of mental pain served as the covariate for this study.

2.2.3. Symptoms of depression and level of hopelessness

The Beck Depression Inventory (BDI; [38]) and the Beck Hopelessness Scale (BHS; [36]) were used to assess levels of depression and hopelessness which the respondent experienced over the past month. The BDI is a 21-item, 4-point Likert-type scale, ranging from 0 (*symptom not present*) to 3 (*symptom is severe*). The BDI assesses cognitive, behavioral, affective, and somatic components of depression (e.g., "I felt pessimistic during the past two weeks"). Cronbach's alpha for this sample was 0.91. The BHS contains 20 items, each rated on a 5-point Likert-type scale. The sum of the scores on the individual items yields a total hopelessness score ranging from 20 to 100, with a high score indicating greater feelings of hopelessness. Cronbach's alpha for this sample was 0.83. Depression and hopelessness variables served as the covariates for this study.

2.2.4. Severity of suicide intent

The Suicide Intent Scale (SIS; [39]) was used to assess the intent of suicide attempts, typically just after their occurrence. Each of the 15 items is scored on a 3-point classification scale of 0–2 (total score range is 0–30). Items 1–8 comprise the Objective Intent subscale, which deals with the objective planning of the suicide attempt, such as the manner of preparation and execution as well as the setting. A recent review highlighted the Objective Intent subscale as a component of the seriousness of a suicide attempt [40]. Items 9–15 comprise the Subjective Intent subscale, which deals with the participants' thoughts and feelings at the time of the attempt, such as the expectation to die and the possibility of rescue or intervention [41]. In this study, both subscales were found to be highly reliable ($\alpha = 0.83$ and $\alpha = 0.80$, respectively).

2.2.5. Lethality of the suicide attempt

The Lethality Rating Scale (LRS; [40]) was used to measure the degree of lethality. The LRS is a set of interviewer-administered rating scales, including the Medical Damage Rating Scale (MDRS), constructed by Beck, Beck, and Kovacs [43]. The MDRS rates the medical lethality of a suicide attempt on a 9-point classification scale, ranging from 0 (*fully conscious and alert*) to 8 (*death*), according to the suicidal method used (e.g., shooting, jumping, drug overdose). Scores are derived from the physical examination at hospital admission and a review of the patient's medical record. Previous research has established an adequate level of inter-rater reliability ($r = 0.80$); [42] and adequate concurrent validity with the Risk Rescue Rating Measure [45]. Both suicide intent and medical lethality served as the main outcome measures for this study.

Additionally, information regarding age, gender, religion, race, education level, socioeconomic level, and marital status was obtained from the participants. The psychiatric diagnoses were based on the Structured Clinical Interview for the DSM-IV-TR [37].

2.3. Procedure and ethical considerations

The current study constitutes part of a larger study assessing the psychosocial contributors to suicide severity (for details, see [14]). Candidates for the suicide and psychiatric control groups were identified by the medical staff and were referred for physical examination to ensure their suitability for the study. Three exclusion criteria included being psychotic at the time of the interview, suffering from severe cognitive impairment, or suffering from severe medical pain.

Participants then met individually with a licensed psychologist who explained the aims and purposes of the project, and participants were asked for their written consent to participate. The interviews and questionnaires were administered over the course of two sessions of approximately 1 h each. If the patients showed acute distress, the interviewer requested assistance from the medical staff. The mean time from the suicide attempt to the interview was 10.87 days ($SD = 20.23$), with a longer gap for MSSA ($M = 12.39$) than for MNSSA ($M = 10.08$). This difference did not reach statistical significance. The study was conducted in accordance with the 1989 revised Helsinki Declaration and received an IRB approval from the medical centers involved in the study.

2.4. Data analysis

All statistical analyses were performed using the SPSS v. 23. The level of significance (α) was set at 0.05. After excluding participants with missing data on the outcome variables, a multiple imputations

[1] DSM-V was not yet available when the study was carried out.

procedure ($n = 5$ imputations; [46]) was used to manage missing values of individual characteristics (<1% missing for each individual characteristic).

In the first step, multivariate analysis of covariance (MANCOVA) was used to examine group differences in the seven SPD symptoms. Depression, hopelessness, and Mental Pain Scale were used as covariates. Two planned comparisons were used to reveal differences between attempters and non-attempters, as well as between MSSAs and MNSSAs. Covariates were depression, hopelessness, and mental pain, which were positively correlated with suicidal outcomes. Bonferroni correction for multiple comparisons was used.

In the second step, relationships between schizoid symptoms, medical lethality, and suicide intent subscales were examined, using a series of Pearson correlation tests. This was followed by three hierarchical multiple regression analyses to determine the unique contribution of schizoid criteria in predicting the severity of suicidal behavior (lethality and intent), above and beyond the known predictors of depression, hopelessness, and mental pain levels. Based on the results of the Pearson and regression analysis, a further logistic regression analysis was applied to examine if the emotional detachment symptom could potentially contribute to a higher probable probability of MSSAs. The second step included the emotional detachment symptoms.

3. Results

3.1. Participant characteristics

For most of the examined demographics, no significant differences were revealed among the four groups. However, as seen in Table 1, the psychiatric control group was characterized by a significantly lower socioeconomic status (SES on a scale of 1–5; $M = 2.2$, $SD = 0.9$) than were the other groups. The healthy control group was characterized by higher years of education ($M = 13.7$, $SD = 2.1$). Thus, SES and education level were used as covariates in the multivariate analysis of covariance. Full detailed participant characteristics are described elsewhere [14].

The most common DSM-IV Axis I psychiatric diagnosis in the two suicide groups was affective disorder (e.g., depression, bipolar disorder), present among 60% of the MSSAs and 50% among the MNSSAs, with psychotic disorder being the dominant diagnosis in the psychiatric control group (53%). No significant group differences were found in the number of psychiatric hospitalizations. Between the two suicide attempt groups, no significant differences were found in the number of previous suicide attempts ($M = 4.1$, $SD = 5.6$). As expected, we did find differences between the two attempters' groups in suicide attempt characteristics: MSSAs were hospitalized for more days in the general hospital following the attempts (MSSA: $M = 19$, $SD = 30$; MNSSA: $M = 1.3$, $SD = 3.7$; $p < 0.01$), had significantly higher scores on the medical lethality of the suicide attempt (MSSA: $M = 5.44$, $SD = 0.96$; MNSSA: $M = 1.53$, $SD = 1.24$; $p < 0.01$), and were more likely to use violent methods (shooting, hanging), though the difference in methods did not reach significance.

3.2. Group differences on SPD symptoms

To test Hypotheses 1 and 2, which tap differences in SPD symptom between the study groups, we conducted multiple analyses of variance with two planned comparisons. However, because the groups differ in SES and education levels, we used these variables as covariates in a MANCOVA analysis, which allows inclusion of covariates with multiple continuous dependent variable analysis. More importantly, we also used three variables related to mental pain levels as covariates in order to understand the differences in SPD symptoms beyond mental pain levels. Thus, depression, hopelessness, as well as mental pain experience were used as covariates in the analyses.

The MANCOVA analysis demonstrated a significant group effect of SPD symptoms, Wilks F approximation $(21,933) = 2.52$s, $p < 0.001$, $Eta^2 = 0.07$. Table 2 shows the mean scores and standard deviations for the SPD symptoms. The univariate ANCOVAs yielded a significant group effect of five of seven SPD symptoms. In line with Hypothesis 1, the planned comparisons after the Bonferroni correction revealed that suicide attempters scored significantly higher in most of the SPD symptoms (excepting the symptom of little interest in sexual experiences), compared with participants with no history of SAs. Regarding Hypothesis 2, solitary activities and emotional detachment were the only symptoms found to be significantly different in the comparison between MSSAs and MNSSAs, with MSSAs reporting significantly higher levels on both these symptoms, compared with MNSSAs.

3.3. The contribution of SPD symptoms to suicide attempt severity

3.3.1. Preliminary analysis

To determine if the SPD symptoms predicted the severity of suicide attempts, beyond mental pain experience, we first examined the relationships between the seven SPD symptoms factors and measures of LRS and SIS by conducting a series of Pearson correlation analyses. In this and in further analyses, only suicide attempters were included. The symptom of emotional detachment was positively correlated with medical lethality of attempt ($r = 0.24$, $p < 0.001$). The symptom of 'no close friends' was significantly and positively correlated to both

Table 1
Demographic characteristics of the study groups ($N = 338$).

Characteristic	MSSA	MNSSA	Psychiatric controls	Healthy controls	Statistical analysis
	$n = 78$	$n = 116$	$n = 47$	$n = 97$	
Gender, n(%)					
Male	(56.4) 44	(44.0) 65	(70.2) 33	55 (55.7)*	$\chi^2 = 3.54$, NS
Female	(43.6) 34	(56.0) 51	(29.8) 14	42 (43.3)**	
Age (yr)	38.5 (14.2)	38.5 (13.9)	40.9 (14.0)	38.5 (14.2)***	$F = 1.17$, NS
Marital status, n (%)					
Single	(51.3) 40	(48.3) 56	(44.7) 21	(44.2) 43	$\chi^2 = 6.08$, NS
Married	(29.5) 23	(31.0) 36	(25.5) 12	(44.2) 43	
Divorced/widowed/separated	(19.2) 15	(20.7) 24	(29.8) 14	(11.6) 11	
Living status, n (%)					
Alone	(26.9) 21	(21.6) 25	(29.8) 14	(24.0) 25	$\chi^2 = 1.50$, NS
With family/roommates	(73.1) 57	(78.4) 91	(70.2) 33	(76.0) 71	
Income[a]	3.1 (1.2)	3.0 (1.1)	2.2 (0.9)	3.3 (0.9)	$F = 12.17$, $p < 0.001$
Education (no. yrs)	12.0 (2.9)	11.6 (2.6)	12.4 (2.0)	13.7 (2.1)	$F = 14.03$, $p < 0.001$

Note. MSSA = medically serious suicide attempters; MNSSA = medically non-serious suicide attempter. NS = not significant.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.
[a] Rated on 5-point scale.

Table 2
Means, standard deviations, MANCOVA results and two planned contrasts of dependent measures in the groups ($N = 338$).

Characteristic	MSSA	MNSSA	Psychiatric controls	Healthy controls	Statistical analysis		Contrast attempters vs non-attempters	Contrast MSSA vs MNSSA
Schizoid symptoms (symptom's number in DSM-IV)	$n = 78$	$n = 116$	$n = 47$	$n = 97$	F	Eta^2	t	t
Lack of interest in social relationships (1)	1.71 (0.84)	1.53 (0.74)	1.33 (0.59)	1.40 (0.28)	1.83 NS	0.01	3.22***	1.87†
Solitary lifestyle (2)	2.12 (0.82)	1.89 (0.91)	1.72 (0.85)	1.67 (0.34)	1.94 NS	0.01	3.52***	2.15*
No interest in sexual experiences (3)	1.87 (1.01)	1.74 (0.91)	1.61 (0.89)	1.77 (0.48)	1.14 NS	0.01	1.02	1.45
No interest in general activities (4)	1.80 (0.84)	1.67 (0.81)	1.44 (0.65)	1.49 (0.39)	2.35 $p = 0.06$	0.02	3.51**	1.13
No close friends (5)	2.06 (0.90)	1.90 (0.924)	1.34 (0.73)	1.53 (0.31)	9.56 $p < 0.001$	0.08	6.35***	1.35
Indifference to praise/criticism (6)	1.63 (0.82)	1.66 (0.82)	1.46 (0.77)	1.45 (0.29)	1.32 NS	0.05	2.09*	−0.09
Emotional detachment (7)	1.75 (0.89)	1.41 (0.72)	1.23 (0.56)	1.41 (0.34)	6.30 $p < 0.001$	0.05	3.34**	3.07**

Note. MSSA = medically serious suicide attempters; MNSSA = medically non-serious suicide attempters. BHS = Beck Hopelessness Scale; OMMP = Orbach and Mikulincer Mental Pain Scale. NS = not significant.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.
† 0.06.

Table 3
Summary of logistic regression coefficients of MSSAs vs MNSSAs by mental pain and emotional detachment symptom of SPD ($n = 194$).

Predictors	B	SE	Wald	p value	OR	CI
Step 1 – mental pain variables						
BDI	0.505	0.315	2.57	0.109	1.557	0.89–3.07
BHS	0.001	0.208	0.000	0.995	1.001	0.66–1.05
OMMP	0.171	0.260	0.323	. 651	1.124	0.67–1.87
Step 2 - SPD symptom						
Emotional detachment (7)	0.595	0.188	10.05	0.002	1.913	1.25–2.79

Note. SE = standard error, OR = odds ratio, CI = confidence interval. MSSA - medically serious suicide attempters, MNSSA - medically non-serious suicide attempters. BDI = Beck Depression Inventory; BHS = Beck Hopelessness Scale; OMMP = Orbach and Mikulincer Mental Pain Scale.

Subjective ($r = 0.32$, $p < 0.001$) and Objective Intent subscales of the SIS ($r = 0.33$, $p < 0.001$). Moreover, the symptom of 'no interest in sexual experiences' was significantly and positively correlated to the Subjective Intent subscale of the SIS ($r = 0.16$, $p < 0.05$).

3.3.2. Multiple regression analyses

To examine Hypothesis 3 and to further clarify the contribution of the SPD symptoms to the SIS subscales and to LRS, beyond the mental pain experience, a series of three hierarchical linear 2-step regression analyses were conducted, as recommended by Cohen et al. [47]. The steps in the analyses were the same: At Step 1, we entered the covariates of BDI, BHS, and the OMMP to control for the mental pain severity experienced by the attempters. At Step 2, we entered the seven SPD symptoms. To ensure that the regression analysis had the power to detect significant effects, we calculated achieved power. Based on the alpha, sample size, and effect size, the achieved power was calculated as 0.937, indicating a good power of detection of prediction effect.

After examining the contribution of SPD symptoms to the medically lethality levels, we proceeded to assessing SIS dimensions by the SPD symptoms. When the Objective Intent subscale of the SIS served as the dependent variable, the model reached significance, $F(10,170) = 3.87$, $p < 0.001$, and together, the variables accounted for 18.6% of the variance of objective intent. Specifically, as can be seen in Table 3, in Step 1, the model containing BDI, BHS, and OMMP was not significant, indicating that mental pain severity is not uniquely predictive of objective intent of suicide attempt. In Step 2, the model containing the main effects SPD symptoms accounted for 16.5% of the variance and significantly predicted the levels of objective intent, $F_{change}(7, 170) = 4.91$, $p < 0.001$.

When the Subjective Intent subscale of the SIS served as the dependent variable, the model achieved significance, $F(10,170) = 5.88$, $p < 0.001$, and together, the variables accounted for 25.7% of the variance of Subjective Intent subscale. Specifically, as can be seen in Table 3, in Step 1, the model containing BDI, BHS, and OMMP was marginally significant, accounting for 4.1% of the variance in the outcome measure. In Step 2, the model containing the main effects SPD symptoms accounted for 21.6% of the variance and significantly predicted the levels of objective intent, $F_{change}(7, 170) = 7.05$, $p < 0.001$.

When the LRS served as the dependent variable in the hierarchical regression, the model was non-significant. In Step 1, the model containing BDI, BHS, and OMMP was not significant. In Step 2, the model containing the main effects SPD symptoms accounted for 5% of the variance and was non-significant. Interestingly, the specific contribution of the emotional detachment symptom was highly significant (Beta = 0.24, $p < 0.003$).

Following these results, and to fully understand the specific role of the SPD symptom of emotional detachment in differentiating MSSAs from MNSSAs, a hierarchical logistic regression was conducted using the dichotomous variable of MSSAs vs. MNSSAs as the outcome measure. To statistically control for the effect of mental pain we entered BDI, BHS, and OMMP variables in Step 1 of the model. As can be seen in Table 4, depression levels were marginally related to a greater likelihood of MSSAs. In Step 2, the emotional detachment symptom of SPD

Table 4
Findings on multiple regression analysis of SIS Objective and Subjective Intent Subscales in medically serious and non-medically serious suicide attempters ($n = 194$).

Predictor variables	Regression steps for objective intent subscale				Regression steps for subjective intent subscale			
	Step I		Step II		Step I		Step II	
	β	*t*	β	*t*	β	*t*	β	*t*
Constant		2.76**		1.52		3.98***		2.87*
BDI	0.21	1.79†	0.21	1.88†	0.30	2.61*	0.32	2.98*
BHS	−0.05	−0.49	−0.10	−1.02	−0.17	−1.70	−0.22	−2.42*
OMMP	−0.07	−0.68	−0.05	−0.59	−0.05	−0.51	−0.04	−0.46
Schizoid symptoms								
Lack of interest in social relationships (Symptom 1)			−0.26	−2.83**			0.33	3.83***
Solitary lifestyle (Symptom 2)			−0.05	−0.57			−0.07	−0.72
No interest in sexual experiences (Symptom 3)			0.16	2.14*			0.21	3.03**
No interest in general activities (Symptom 4)			0.05	0.56			0.05	0.62
No close friends (Symptom 5)			0.38	4.40***			0.41	5.04***
Indifference to praise/criticism (Symptom 6)			−0.09	−1.23			−0.12	−1.58
Emotional detachment (Symptom 7)			0.09	1.17			0.08	1.14
R^2	0.021		0.186***		0.041		0.257***	
ΔR^2	0.021		0.165***		0.041		0.261***	

Note. MSSA = medically serious suicide attempters; MNSSA = medically non-serious suicide attempters. BDI = Beck Depression Inventory; BHS = Beck Hopelessness Scale; OMMP = Orbach and Mikulincer Mental Pain Scale; SIS= suicide intenr scale.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.
† = 0.06.

was added to the model, significantly improving the model fit, $\chi^2(1) = 10.39$, $p < 0.001$, Nagelkerke $R^2 = 0.07$. Higher levels of emotional detachment were found to be significantly associated with MSSAs, with twice the likelihood of carrying out a MSSA in the presence of emotional detachment symptom.

4. Discussion

Medically serious suicide attempts are valid proxies for studying suicide. Thus, there is an essential need to enhance our knowledge regarding the specific risk factors for more dangerous suicide behavior, notwithstanding the general risk factors for SA. Earlier studies reported by our group [20,29,48] showed that mental pain variables (depression, hopelessness) differentiated suicide attempters from non-attempters. However, mental pain variables were found to be an inadequate indicator for detecting more lethal attempts with higher intent to die. The severity of the attempt was partly dependent on the attempters' ability to communicate their pain to others [14,20]. In this study, we sought to understand the relationship between SPD symptoms and suicidal behavior. More specifically, the key aim of the present study was to refine the associations between SPD variants to high lethal suicide attempts, defined both by the medical lethality of the attempt and the intent to die. Thus, the current findings expand the literature on suicide behavior by providing empirical evidence that SPD symptoms comprise a major risk factor for suicidal behavior in general and serious suicide attempts in particular.

4.1. SPD factors and the severity of suicide attempts

Hypothesis 1, that suicide attempters will exhibit greater intensity on all seven factors of the SPD, compared with non-attempters (psychiatric group and healthy controls), was supported by the data. As expected, most of the SPD symptoms (excepting 'little interest in sexual experiences') differentiated suicide attempters from psychiatric and healthy controls. These results indicate that suicide attempters suffer from all three aspects manifested in SPD: interpersonal problems; emotional aloofness; and difficulties in interpersonal, behavioral, and affective aspects. These results are interesting and novel, as research linking SPD and suicide behavior is notably lacking. Our results are in line with a recent systematic review on personality and suicidality in old age, reporting positive correlations between schizoid traits and suicidal ideation [49].

In Hypothesis 2, we posited that severe suicide attempters will manifest greater intensity on the two symptoms related to interpersonal aspects and the two related to affective aspects in comparison with non-severe attempters. This hypothesis was partially confirmed. Severe attempters reported significantly higher solitary lifestyle levels and emotional detachment compared with low lethal attempters, after controlling for mental pain dimension levels. This finding is robust, since these are the only two SPD facets that appear to distinguish medically severe attempters from medically non-severe attempters. These findings further imply that while SPD symptoms are common to all suicide attempters, the need to engage in solitary life style and the tendency for emotional detachment is central to those who decide to engage in highly lethal suicide attempts.

The results related to the interpersonal aspect comply with Durkheim's classic work [15] and the concept of *anomie* that suggest that when a person feels connected to the community, he is less prone to attempt suicide, even when having to confront considerable mental pain. The interpersonal theory of suicide [16] suggests that the most dangerous form of suicidal wish is facilitated by the concurrent presence of two constructs: perceived burdensomeness and thwarted belongingness. While burdensomeness can be considered partly related to the mental pain domain, which captures the feeling that one's presence is a burden to family and friends, thwarted belongingness is, to a certain degree, an overlapping construct, with communication difficulties manifested in the features of SPD, especially by a solitary life style.

Importantly, emotional detachment was revealed as a significant risk factor for MSSAs, as it doubles the risk for more severe suicide attempts, as reflected in the logistic regression. This result is in line with several studies emphasizing the importance of expressing and regulating emotion as a moderator of suicidality [50,51]. We may posit that the capacity to regulate and express emotion can enable a 'cathartic' effect that reduces both mental pain and suicide risk. This phenomenon may be related to the finding on the association between alexithymia and suicide [52], as in both cases are unable to share their true emotions with significant others. In addition, the symptom of emotional detachment and flat affect may be also related to higher undetected depression levels [53], which indeed appear to play an important role in facilitating suicide ideation and attempt. Taken together, our findings suggest that the SPD tendencies for a solitary life style and emotional detachment are central to those deciding to execute high lethal suicide attempts and can thus imply a more effective indicator for the short-term prediction of severe suicidal behavior (e.g., in hospital emergency rooms).

4.2. SPD and suicide intent

In our final hypothesis (Hypothesis 3) we hypothesized that interpersonal and affective SPD symptoms will contribute to both the subjective and objective levels of suicide intent. This hypothesis was partially confirmed. The interpersonal SPD symptom 'no close friends' as well as the behavioral/motivational symptom 'no interest in sexual experiences' contributed to both objective and subjective suicide intent levels beyond the variants of mental pain. In other words, for those individuals experiencing *psychache*, the lack of close friends with whom to share their pain intensifies their intent to die. They lack the ability to find relief in friendships and they do not use sexual experiences to achieve warmth, closeness, or even the ability to discharge and regulate difficult emotions. Thus, trapped within their pain, they turn to suicide as a solution. Consequently, they express high subjective intent to die, end previous commitments, and plan the suicidal act (the objective intent).

A different and interesting pattern was discovered between the 'lack of interest in social relationships' symptom and the Objective and Subjective Intent subscales. While this symptom was found to contribution positively to subjective intent, it contributed negatively to the objective suicide intent level. The positive relationship with subjective intent is intuitively and theoretically congruent. Bearing in mind that these individuals are characterized by high levels of depression and hopelessness, it appears that individuals who are in great pain as well as lacking interest in others are more prone to higher levels of psychache and consequently, high levels of subjective suicide intent, as reflected in a greater wish to die. As posited by the interpersonal theory of suicide [18], in the absence of interpersonal-based relief to the psychache, the desire to die increases and is reflected in the subjective suicidal intention.

How can the negative contribution of the 'lack of interest in social relationships' symptom to objective suicide intent level be explained? This finding seems at first glance counterintuitive. However, close examination of the Objective Intent subscale items reveals an interesting understanding. The Objective Intent scale primarily relates to organizing the setting of the suicide act: planning, preparing, leaving a note, writing a will. Thus, it is feasible to suggest that the less individuals have interest in others, the less likely they will be engaged in such acts and thus, will receive lower Objective Intent subscale scores. For example, those lacking interest in others will probably not consider writing a note, saying farewell to people, or even verifying that there is no one in the next room to interrupt the suicide act. One can also assume that in the interval between thinking about the attempt and acting on it, individuals lacking interest in others will have no forethought, as they are neither interested nor preoccupied with the surroundings. Taken together, it can be suggested that among SPD individuals with no interest in social relationships, lack of objective intent does not accurately reflect low objective intention to die but rather a lack of significant others with whom to engage while contemplating suicide. Importantly, this result may emphasize the need to seek better ways of addressing objective intent among SPD individuals, considering their interpersonal difficulties precluding any social interaction, even during suicide planning.

4.3. Limitations

Our study has several important limitations. The use of questionnaires and self-report measures, along with the retrospectivity of the study, poses major limitations. Although self-report methodology may be susceptible to recall and self-presentation biases, interviewing live individuals who have come as close as possible to death from suicide enables researchers to glean vital information on risk factors and warning signs of completed suicide [7]. This is particularly important, given reports showing that medically serious suicide attempters are twice as likely as medically non-serious suicide attempters to die by suicide [8].

The cross-sectionality of the design limits conclusions regarding causality. Further studies adopting a longitudinal design could overcome this important issue. The focus on specific symptoms of schizoid personality disorder, while important for understanding their associations with medical lethality, can limit the statistical power of the analyses. Thus, future studies could include other schizoid tendencies measures such as the Millon Clinical Multiaxial Inventory (MCMI-III; [54]). Moreover, the fact that other variables beside mental pain (e.g., neurocognitive or metacognitive variables [30]), were not tested is also a limitation. These unexamined variables may contribute to the relationship between schizoid personality disorder symptoms and suicidal behavior, and thus, Thus, future studies should consider them as elements in an integrative model to explain more severe suicidal behavior.

Finally, the fact that mental pain variables were assessed after the attempt is a limitation, as the ramifications and the medical complications of the attempt may have contributed to differences in mental pain between the groups. This would be especially true for the MSSA group, which, by definition, had higher medical severity and endured more intensive medical procedures.

4.4. Conclusions and clinical implications

In terms of clinical implications, solitary lifestyle as well as emotional detachment seem to differentiate more serious suicide attempters from less serious suicide attempters. Thus, these characteristics can be viewed as important risk factors for MSSAs. Moreover, the symptoms of no close friends, no interest in sexual experiences, as well as high emotional detachment and diminished interest in social relationships may facilitate higher suicide intent when mental pain levels are high. Together, these specific symptoms appear to comprise key factors that are closely associated with high-risk suicide attempts. Further empirical exploration is needed to delineate these relationships, However, we can suggest that hospital emergency clinicians and medical staff adopt not only general questions regarding pain and suffering, but also incorporate questions pertaining to these schizoid symptoms in their interviews and screenings with suicidal patients, given our finding that these symptoms are associated with more serious suicide attempts, beyond mental pain variables. Asking directly about the interpersonal dimension (e.g., "Do you have any close friends?"), the behavioral dimension (e.g., "Can you be described as having a solitary lifestyle?"), and the affective dimension (e.g., "Can you be described as being aloof or emotionally detached?") is critical in evaluating individuals arriving at emergency units. These questions, along with assessing the experience of pain, its severity, its irreversibility, and the experience of cognitive confusion [29], may help clinicians more effectively assess individuals at high risk for engaging in severe suicidal acts, alongside the well-established predictors of hopelessness and depression.

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