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Identifying correlates of suicide attempts in suicidal ideators: a population-based study

JELENA BREZO[1], JOEL PARIS[2], RICHARD TREMBLAY[3], FRANK VITARO[3], MARTINE HÉBERT[4] AND GUSTAVO TURECKI[1,2]*

[1] *McGill Group for Suicide Studies, Douglas Hospital Research Center, Montreal, Canada*; [2] *Department of Psychiatry, McGill University, Montreal, Canada*; [3] *GRIP, University of Montreal, Montreal, Canada*; [4] *Department of Sexology, University of Quebec, Montreal, Canada*

ABSTRACT

Background. Identification of factors that distinguish between ideators who act on their suicidal thoughts from those who do not is an important clinical and research objective.

Method. We examined correlates of suicide attempts in suicidal ideators, members of a French-Canadian, school-based cohort. Suicidal thoughts were evaluated in adolescence and early adulthood in the total sample of suicidal ideators, who were then stratified into subgroups consisting of persistent ideators, male ideators and female ideators.

Results. In addition to persistent suicidal ideas [odds ratios (ORs) 2·1–2·8], Axis I psychopathology, female gender and childhood sexual abuse (CSA) were the most consistent correlates of suicide attempts. Externalizing disorders were significant contributors in persistent ideators [drug misuse: OR 2·8, 95% confidence interval (CI) 1·1–6·9] and in male ideators in particular (disruptive disorders: OR 5·9, 95% CI 2·2–16·0). In women, psychiatric co-morbidity also had a significant effect (OR 1·6, 95% CI 1·1–2·1). CSA was of relevance in both women (OR 1·2, 95% CI 1·1–1·4) and persistent ideators (OR 1·3, 95% CI 1·1–1·5). Personality traits showed gender-specific contribution with affective instability (OR 1·1, 95% CI 1·01–1·1) and anxiousness (OR 1·3, 95% CI 1·1–1·7) contributing in men and disruptive aggression (OR 1·1, 95% CI 1·03–1·3) in women.

Conclusions. Correlates of suicide attempts in suicidal ideators vary as a function of the persistence of suicidal ideas and gender. This heterogeneity across subgroups of suicidal ideators may be attributed, at least in part, to differences between the sexes, early environmental adversity, maladaptive personality, and psychiatric symptoms. Further exploration and continued prospective follow-up is necessary to examine these possibilities.

INTRODUCTION

Previous research has implicated suicidal thoughts as not only the correlates but also the predictors of more serious, suicidal acts (Brezo *et al.* 2006*a*). Limited research suggests that between 25% and 58% of ideators attempt suicide and up to 7% of ideators go on to commit suicide (Beck & Steer, 1989; Kessler *et al.* 1999). More knowledge about the rates and catalysts of progression from thoughts to acts is necessary, especially when it comes to young individuals – children, adolescents and young adults – a highly vulnerable age group whose prevalence of suicidal thoughts ranges from 5% to 70% (Gutierrez *et al.* 2000; Dhossche *et al.* 2002).

While suicidal thoughts may be necessary, they are not sufficient motivators of suicidal acts. To increase their specificity and predictive value in identifying individuals at risk for more serious suicidal behaviors, it is important to

* Address for correspondence: Gustavo Turecki, M.D., Ph.D., McGill Group for Suicide Studies, Douglas Hospital, McGill University, 6875 LaSalle blvd, Montreal, QC H4H 1R3, Canada.
(Email: gustavo.turecki@mcgill.ca)

consider the presence of other contributing factors as well as the properties of suicidal thoughts themselves. Previous studies have, for example, determined that severity of suicidal ideation may be directly proportional to the risk of future suicide attempts (Rudd *et al*. 1996; D'Eramo *et al*. 2004). Much less attention has been given to the possible impact of the chronicity or persistence of suicidal thoughts. A promising research avenue would be to establish whether the degree of their persistence has any bearing on the risk for suicide attempts, and, if so, whether persistent ideators represent a special group of suicidal ideators with distinct correlates of suicidal acts.

Given the emotional and socio-economic burden that often accompanies suicide attempts and completions, identification of additional factors that distinguish between ideators who act on their suicidal thoughts from those who do not is of substantial research and clinical relevance. To our knowledge, only two previous studies have investigated correlates of suicide attempts in suicidal ideators: in a community-based study, Fairweather *et al*. (2006) examined factors associated with suicide attempts in 522 suicidal ideators. In addition to previous medical conditions and negative social interactions, they found evidence of moderation by gender, age and employment status. An earlier study (Pirkis *et al*. 2000) identified current employment as the only factor that was significantly different between suicidal ideators and attempters.

In light of this evidence, we chose to focus on two objectives: (1) the identification of factors from multiple domains that could differentiate between suicidal ideators with and without suicide attempt histories; and (2) examination of the possibility that persistent ideators represent a particularly vulnerable group of suicidal ideators with distinct correlates of suicide attempts.

We explored these two objectives in a group of self-reported suicidal ideators, members of a longitudinally-followed school cohort, using a three-part approach. Our first step was to examine the distribution of lifetime suicide attempts and univariate differences between attempting and non-attempting ideators, both in the entire sample of suicidal ideators and in three of its subsamples: ideating men, ideating women, and persistent ideators (participants reporting suicidal ideas at least two times during follow-up). This stratification was guided by previous evidence recognizing the importance of both persistent thoughts of suicide (Lewinsohn *et al*. 1996; Statham *et al*. 1998) and gender (Fairweather *et al*. 2006). Accordingly, in our first primary hypothesis, we expected to see higher suicide attempt rates in suicidal ideators than non-ideators, especially in women and persistent ideators.

The second step was to conduct multivariate analyses predicting suicide attempts in the entire sample of suicidal ideators. We hypothesized that persistent suicidal ideation would be a correlate of suicide attempts and gender a correlate, and possibly a moderator, of the relationship of suicidal ideation and suicide attempts. In the third step, we followed up on this group-based analysis with three sets of subgroup analyses in ideating men, ideating women and persistent ideators to identify shared and distinct multivariate characteristics.

Several secondary hypotheses guided both our group- and subgroup-based multivariate analyses. Because of the multifactorial character of suicide attempts, we anticipated involvement of four major risk domains (Beautrais, 2000): first, having focused on suicidality in adolescence and early adulthood, we expected that psychiatric diagnoses at both life stages would be positively associated with suicide attempts. On the basis of previous research, we examined internalizing – mood (Kessler *et al*. 1999) and anxiety diagnoses (Boden *et al*. 2007) – and externalizing disorders – disruptive (Kelly *et al*. 2004), and substance abuse disorders (O'Boyle & Brandon, 1998) and psychiatric co-morbidity (Kessler *et al*. 1999).

In addition to psychiatric phenotypes, we examined contributions of four previously implicated experiential factors: childhood physical and sexual abuse (Santa Mina & Gallop, 1998), social support (Fairweather *et al*. 2006), and stressful events (King *et al*. 2001). We expected that childhood abuse and stressful events would show a positive and social support a negative association with suicide attempts.

As for sociodemographic factors, in addition to the role of gender, we expected involvement of factors determining quality of the early family environment (King *et al*. 2001) – parental education, socio-economic status, ages at birth

Table 1. *Cohort assessment schedule*

	Assessment wave		
	I	II	III
Age of cohort member, years			
Mean	N.A.	15·7	21·4
Range	6–12	15–18	19–24
Assessment frequency	Seven yearly reports	Once	Once
Informant	Teachers	Cohort members and parents	Cohort members
Variables assessed	Childhood behaviors Family Adversity Index	Psychiatric history Suicide attempt histories Suicidal ideation histories	Suicide attempt histories Psychiatric history Current and past suicidal ideation Adult personality traits Childhood abuse to age 18 Perceived social support Socio-economic and marital status

of first child, and living arrangements – and adult income (Beautrais *et al.* 2006).

The last domain of interest concerned personality. We examined main effects of personality traits contributing to two broad personality dimensions of relevance to suicide attempts (Malinovsky-Rummell & Hansen, 1993; Feingold, 1994; Brezo *et al.* 2006*b*): (1) emotional dysregulation (childhood and adult anxiousness, adult affective instability, cognitive-perceptive dysregulation, identity problems, insecure attachment) and (2) impulsive-aggressivity and dissocial behavior (childhood disruptiveness, adult impulsivity, conduct problems, stimulus seeking).

Relatedly, given the evidence of sex differences in both personality traits and suicidal behaviors (Feingold, 1994; Brezo *et al.* 2006*b*), we expected gender to act as a moderator, affecting the relationships of suicide attempts with, on the one hand, personality traits, and, on the other, suicidal ideation (van Heeringen, 1994; Beautrais, 2000).

METHOD

Study participants

In 1986–1988, families of children attending kindergarten in public francophone schools in Quebec were recruited using a multistage sampling procedure. Of 4488 participating children, two subsamples were selected for follow-up: (1) a randomly selected group of 1001 boys and 999 girls, the representative subsample (R); and (2) a group of 593 boys and 424 girls oversampled for children exhibiting disruptive behaviors, the disruptive subsample (D). To reduce cultural heterogeneity, only children whose parents were born in Canada and whose mother tongue was French were included. Eighty-eight per cent were non-Hispanic Whites.

The assessment schedule had three stages (Table 1): Wave I (sample sizes R: 2000, D: 1017); Wave II (sample sizes R: 1233, D: 482); and Wave III (sample sizes R: 1144, D: 540). Participants who died, refused participation or could not be contacted accounted for an overall attrition rate of 44% (R: 43%, D: 47%). To account for this, we performed multivariate analyses with and without weights, representing each individual's probability of remaining in the study conditional on two variables related to attrition: (1) early socio-economic adversity, which was higher in non-responders [R: 0·32 *v.* 0·25, $F(1, 1894) = 40{\cdot}64$, $p < 0{\cdot}05$; D: 0·39 *v.* 0·32, $F(1, 946) = 16{\cdot}33$, $p < 0{\cdot}05$]; and (2) gender, as males were over-represented among non-responders [R: 50% *v.* 35%, $\chi^2_1 = 46{\cdot}05$, $p < 0{\cdot}05$; D: 55% *v.* 36%, $\chi^2_1 = 36{\cdot}30$, $p < 0{\cdot}05$].

The study was approved by the research ethics boards of the University of Montreal and McGill University. Written informed consent was obtained from all subjects.

Measures

All instruments were administered in French. Psychometric indices are not provided for measures where we used only a subset of questions rather than entire subscale(s) (see A2; B1–3; C2, 5–6, 9–11).

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A. Wave I

(1) The socio-economic *Family Adversity Index* reflecting the quality of family environment was based on parental age at first child's birth, levels of education, socio-economic status and living arrangements, as reported by parents.
(2) The *Social Behavior Questionnaire* (Masse & Tremblay, 1997) has 38 items measuring several childhood behaviors and traits. We used teacher-assessed anxiousness (six items) and disruptive-aggression (13 items) at ages 6 and 12.

B. Wave II

(1) *Diagnostic Interview Schedule for Children* (DISC-2; Breton *et al.* 1998) using DSM-III-R criteria. Given the number of diagnoses and our interest in their group impact, we considered disruptive (attention-deficit-hyperactivity, oppositional-defiant and conduct disorders), anxiety (simple and social phobias, separation anxiety, panic, avoidant, overanxious, and generalized anxiety disorder), and mood disorders (major depression and dysthymia) collectively. The interviewers, who were psychology students, attended 1–1·5 days of training and a practice session before interviewing study participants.
(2) *Suicidal Ideation* was assessed with one question: 'Have you already seriously thought about suicide?'
(3) *Early-onset Suicide Attempts*: their presence and frequency over a lifetime and 6 months were assessed using parental/adolescent responses to three DISC-2 questions from the major depression module: 'Have you already attempted suicide?', 'How many times?' and 'Have you attempted suicide during the last 6 months?' Either parental report or self-report was sufficient for a person to be classified as an attempter.

C. Wave III

(1) *Adult income* in the previous year was obtained using self-reports.
(2) *Diagnostic Interview Schedule for Adults* using DSM-III-R criteria (Robins *et al.* 1995). To reduce the number of statistical tests and evaluate their collective impact, mood (major depressive episode, mania, and dysthymia) and anxiety (generalized anxiety, panic and phobias) disorders were considered collectively. Given the evidence of their independent contribution to suicidality, abuse and/or dependence on drugs, alcohol and nicotine were considered individually. The interviewers, who were psychology students, had 1–1·5 days of training and a practice session before interviewing study participants.
(3) The *Scale for Suicidal Ideation* (SSI; Beck *et al.* 1979) is a 19-item scale measuring current attitudes towards living/dying, characteristics of suicidal ideation, and actualization of contemplated attempt. A cut-off of 6 was used to identify serious ideators. Cronbach's α was 0·63.
(4) The *Suicidal Intent Scale* (SIS; Beck *et al.* 1974) is a 20-question instrument administered to suicide attempters. Relying on self-reports, it assesses the 'intensity' of the wish to die at the most recent suicide attempt. Cronbach's α was 0·64.
(5) *Suicide Attempts* (adult, lifetime): *Suicide attempt history in adulthood* was assessed with two SSI scale questions: 'Have you already attempted suicide?', 'How many attempts have you made prior to the one in question?' *Lifetime suicide attempt* status was based on both adolescent (see B3) and adult assessments. Suicide attempts were operationalized as acts of self-harm with at least some intent to die.
(6) *Suicidal Ideation* (lifetime) was a three-level composite index based on (1) current suicidal thoughts (SSI scale); (2) history of suicidal thoughts reported in adulthood (DIS scale, major depression module): 'Have you ever thought of suicide?' and (3) history of suicidal thoughts reported in adolescence (see B2). A positive report on each of the three measures carried a score of 1. Individuals scoring 0, 1 or 2–3 on this index were classified as non-ideators, transient ideators and persistent ideators respectively.
(7) *Diagnostic Assessment of Personality Pathology* (Livesley *et al.* 1998): using self-reports, seven personality traits scales evaluated affective instability, anxiousness,

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conduct problems, cognitive-perceptive dysregulation, identity problems, insecure attachment, and stimulus-seeking. Cronbach's α ranged from 0·85 to 0·93.

(8) The *Barratt Impulsiveness Scale* (Barratt, 1985) is a 30-item instrument assessing trait impulsivity using self-reports. Cronbach's α was 0·81.

(9) *Childhood Physical Abuse* (Straus *et al.* 1996): we selected a subset of 14 questions to evaluate the presence/frequency of severe/very severe physical aggression, abuse, and injuries perpetrated by each parent against the respondent as a child using self-reports.

(10) The *Childhood Sexual Abuse* (CSA; Felitti *et al.* 1998) scale measures self-reported incidences of sexual violence to age 18. We selected items evaluating abusive acts involving physical contact [fondling or sexual (vaginal, anal, oral)], perpetrated by family members, school peers/personnel, short/long-term romantic acquaintances, or strangers.

(11) *Self-reported Stressful Life Events* in the past year included atypical/severe stressful events related to finances, school/work, death of a close person, illness/serious injury to self/others, parental separation/divorce, and partner/children difficulties. Except for parental separation/divorce questions, items were adapted from another instrument (Horney, 2001).

(12) The *Social Support Scale* (Turner, 1983) relies on self-reports to measure perceived support by friends and family using 15 Likert-style statements. Cronbach's α was 0·88.

Data analysis

Our three-step analytical approach consisted of group (in the total sample of suicidal ideators) and subgroup analyses (in ideating men and women and persistent suicidal ideators).

Descriptive and univariate analyses

Having examined rates of suicide attempts in suicidal ideators using the χ^2 test, we preselected variables for inclusion in multivariate analyses with χ^2/analyses of variance (ANOVAs), correcting for the number of tests ($p=0{\cdot}0014$; 36 tests). We considered four domains: *socio-demographic* (parental education, socio-economic status, ages at birth of first child, and living arrangements; adult income; gender); *psychiatric* (adolescent/adult mood and anxiety diagnoses; adolescent disruptive and adult nicotine, alcohol and drug dependence/abuse; adolescent and adult co-morbidity; and persistent suicidal ideation); *experiential* (childhood physical and sexual abuse, social support, stressful events); *personality traits* (childhood disruptiveness, child/adult anxiousness, adult impulsivity, affective instability, conduct problems, cognitive-perceptive dysregulation, identity problems, insecure attachment, stimulus-seeking traits).

Multivariate analyses

All analyses were performed with and without weights representing participant's probability of being in the original sample, conditional on the variables related to attrition. Binary logistic regression – hierarchical model-building strategy (Hosmer & Lemeshow, 2000) – was used to identify correlates of lifetime suicide attempts. Multivariate analyses were first performed in all ideating individuals and then in three subgroups. To prevent confounding, we controlled for the following covariates: (1) subsample membership (see *Study participants* section), because disruptiveness may be related to suicidality; and (2) adolescent and adult mood disorders, because they were not independent of our response variable (see B3 and C5).

Main effect analyses involving univariately significant variables within and then across domains were followed by (first-order) moderator analyses involving gender. The same procedure, except for gender moderation, was adhered to in the three subgroups of suicidal ideators. No outliers were identified using Cook's distance test. As weighted analyses yielded similar results to our unweighted analyses, only the latter are presented.

RESULTS

Descriptive statistics

About 33% ($n=411$) of our sample reported suicidal thoughts at least once in their lives, with two-thirds being women (64%, $n=264$, $\chi^2_1=18{\cdot}65$, $p=0{\cdot}0005$). Approximately 20% of

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Table 2. *Rates of suicide attempts (%) in individuals with absent, transient and persistent suicidal thoughts*

	Suicide attempters ($n=139$)		
Suicidal thoughts (lifetime)	Men	Women	Total
Absent (408 M, 430 F)	2·7	1·2	1·9
Present			
Transient[a] (97 M, 157 F)	17·5	24·8	22·2***
Persistent[a] (50 M, 107 F)	22·0*	52·3*	42·7***
Total	19·0**	36·0**	29·9

F, Female; M, male.

[a] Suicidal ideation during follow-up period reported only once (transient) or more than once (persistent).

* Statistically significant ($p<0·05$) gender difference in suicide attempt rates among persistent ideators.

** Statistically significant ($p<0·05$) gender difference in suicide attempt rates among individuals with any degree of suicidal ideation.

*** Statistically significant difference ($p<0·05$) in suicide attempt rates between individuals with persistent *versus* transient suicidal ideation.

ideators had transient and 13% had persistent thoughts of suicide. About 68·2% ($n=107$) of the latter were women. As Table 2 illustrates, suicide attempts were 16 times more frequent in ideating than non-ideating individuals ($\chi^2_1=218·87$, $p=0·0005$). Suicide attempt rates were 12 times higher in transient and 23 times higher in persistent ideators than in non-ideators. Suicide attempts among non-ideators were more prevalent in non-ideating men than women. By contrast, women with transient and persistent suicidal thoughts reported between 1·4 and 2·4 times higher rates of suicide attempts than their male equivalents.

Univariate analyses

Table 3 compares differences between suicide attempters and non-attempters among non-ideators, transient, and persistent suicidal ideators across multiple risk domains. Differences between non-attempters and attempters with persistent suicidal thoughts were more extensive than those in non-ideators and transient ideators, extending across all risk factor domains. The only consistent difference between attempters and non-attempters across all three groups was in the trait of insecure attachment. Childhood disruptive-aggression, disruptive disorders and CSA differentiated between attempters and non-attempters in both non-ideators and transient ideators, transient and persistent ideators, and non-ideators and persistent ideators, respectively.

Correlates of suicide attempts in all ideating individuals

Five correlates showed positive associations with suicide attempts (Table 4): female gender [odds ratio (OR) 2·1, 95% confidence interval (CI) 1·2–3·8], disruptive disorder(s) (OR 2·9, 95% CI 1·6–5·6), CSA (OR 1·2, 95% CI 1·1–1·3), history of persistent as opposed to transient suicidal thoughts (OR 2·1, 95% CI 1·3–3·5), and insecure attachment (OR 1·02, 95% CI 1·002–1·03). We observed no gender-moderating effects.

Correlates of suicide attempts in persistent ideators

CSA (OR 1·3, 95% CI 1·07–1·5) and gender (OR 3·0, 95% CI 1·2–7·8)] were significant correlates of suicide attempts in persistent ideators, as in our multivariate analyses in the total sample of ideators. Drug abuse/dependence assessed in adulthood (OR 2·8, 95% CI 1·1–6·9), however, may be specific to persistent ideators (Table 4).

Correlates of suicide attempts in male ideators

Together with disruptive disorders (OR 5·9, 95% CI 2·2–16·0), affective instability (OR 1·1, 95% CI 1·01–1·1) and childhood anxiousness (OR 1·3, 95% CI 1·1–1·7) made statistically significant contributions to the final model (Table 5).

Correlates of suicide attempts in female ideators

Four factors were significant: childhood disruptiveness-aggressivity (OR 1·1, 95% CI 1·03–1·3), Axis I co-morbidity assessed in adulthood (OR 1·6, 95% CI 1·1–2·1), CSA (OR 1·2, 95% CI 1·1–1·4), and persistent suicidal thoughts (OR 2·8, 95% CI 1·4–5·6) (Table 5).

DISCUSSION

The present study indicates that correlates of suicide attempts in suicidal ideators vary as a function of the persistence of suicidal ideas and gender. This heterogeneity across subgroups of suicidal ideators extended across all risk domains investigated, corroborating the belief

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Table 3. *Univariate differences between suicide attempters and non-attempters in non-ideators ,transient and persistent ideators*

	Absent thoughts of suicide		Transient thoughts of suicide		Persistent thoughts of suicide	
	Non-attempters (F 425, M 397)	Attempters (F 5, M 11)	Non-attempters (F 118, M 80)	Attempters (F 39, M 17)	Non-attempters (F 39, M 51)	Attempters (F 56, M 11)
Abuse						
1. Childhood sexual (0–8)	0·34*	1·00*	0·73	1·14	0·77***	2·78***
2. Childhood physical (0–19)	0·65	1·56	0·97	1·61	1·53	2·48
3. Adult physical (0–22)	0·38	0·81	0·47	0·68	0·27**	1·22**
4. Social support (15–75)	67·13	66·86	64·27	65·94	61·40	60·75
5. Stressful events (0–26)	2·56	3·33	3·77	3·97	4·94	6·08
Adolescent Axis I diagnoses						
1. Disruptive disorder(s)	4·6	7·1	7·4**	16·4**	13·1*	24·6*
2. Anxiety disorder(s)	18·7	31·2	27·2	29·1	29·5**	50·8**
3. Mood disorder(s)	4·2	0·0	10·5	7·3	12·9**	32·8**
Adult Axis I diagnoses						
1. Nicotine misuse	25·5	43·8	35·9	42·9	43·4***	65·7***
2. Alcohol misuse	9·4	6·3	15·2	16·1	24·4	22·4
3. Drug misuse	7·2	12·5	11·1	8·9	14·4**	35·8**
4. Mood disorder(s)	3·6	0·0	13·1	8·9	32·2	49·3
5. Anxiety disorder(s)	16·8	18·8	21·2	17·9	33·3*	50·7*
Adult personality traits (mean)						
1. Affective instability (18–74)	39·25	44·25	43·17	46·42	49·40***	53·73***
2. Conduct problems (16–58)	26·48	32·31	28·27	28·89	31·01	33·67
3. Identity problems (15–62)	27·44**	33·06**	32·27	29·70	41·43	42·09
4. Stimulus seeking (20–78)	45·11*	52·87*	47·14	49·04	47·82	49·13
5. Anxiousness (16–74)	35·76	40·00	40·01	37·71	48·62*	49·19*
6. Insecure attachment (16–79)	39·54**	46·87**	40·82*	45·37*	42·33**	49·03**
7. Cognitive dysregulation (16–63)	27·23*	31·06*	30·61	30·29	35·26	38·06
8. Impulsivity (44–97)	64·48	69·13	66·93	69·57	69·46	70·27
9. Anxiety 6 (0–10)	1·67*	2·94*	1·77	2·29	1·59	1·78
10. Disruptiveness 12 (0–21)	2·61*	5·58*	2·33*	3·75*	2·45	3·25

F, Female; M, male.

Numerical values represent means (continuous variables) or percentages (discrete variables). Numbers in parentheses give score ranges for continuous variables.

p values: * 0·05–0·01; ** 0·01–0·001 inclusive; *** 0·0005.

that progression from thoughts to acts of suicide usually occurs in the presence of multiple predisposing factors (Wichstrom, 2000; Mann, 2002).

Ideating suicide attempters *versus* non-attempters: univariate differences

About a third of our sample reported suicidal thoughts at least once by their early twenties. This estimate is higher than the comparable figures in related cross-sectional studies (Statham *et al*. 1998; Pirkis *et al*. 2000). Approximately 13% of our participants had persistent suicidal ideas, reporting them on at least two occasions during the course of the study.

The prevalence of suicide attempts among ideating individuals in our study was, as hypothesized, significantly higher than among non-ideators. Suicide attempts were 10 and 20 times higher in persistent ideators relative to transient ideators and non-ideators respectively. Close to a third of ideating individuals made at least one suicide attempt by their twenties. In terms of related evidence, Pirkis *et al*. (2000), for example, found that 12% of their suicidal ideators attempted suicide. Some of the discrepancies between ours and related studies may lie in the study design and study population differences: our findings were based on several reports of suicidal thoughts obtained over a relatively long follow-up period, in contrast to the mostly cross-sectional approaches used by others. Unlike ours, samples used by Pirkis *et al*. (2000) and Fairweather *et al*. (2006) also included a broader range of ages.

An unexpected finding in our study concerns the presence of suicide attempts among individuals denying any suicidal thoughts. About 2% of the sample reported suicide attempts in the absence of suicidal ideas. This is surprising

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Table 4. *Significant correlates of suicide attempts in suicidal ideators*

	Individuals with any degree of suicidal ideation						Individuals with persistent suicidal ideation					
	Model fit: $\chi^2_8 = 65{\cdot}81$, $p = 0{\cdot}0005$; Nagelkerke $R^2 = 21{\cdot}9\%$ Hosmer–Lemeshow test: $\chi^2_8 = 6{\cdot}25$, $p = 0{\cdot}63$						Model fit: $\chi^2_6 = 40{\cdot}45$, $p = 0{\cdot}0005$; Nagelkerke $R^2 = 31{\cdot}3\%$ Hosmer–Lemeshow test: $\chi^2_8 = 7{\cdot}39$, $p = 0{\cdot}50$					
	B (S.E.)	$\text{Wald}_{df=1}$	Sig.	exp(*B*)	95% CI		*B* (S.E.)	$\text{Wald}_{df=1}$	Sig.	exp(*B*)	95% CI	
Control variables												
Sample membership	−0·23 (0·27)	0·76	0·38	0·79	0·47	1·34	−0·61 (0·44)	1·88	0·17	0·55	0·23	1·30
Adult mood disorder	−0·19 (0·31)	0·38	0·54	0·83	0·45	1·51	0·13 (0·41)	0·09	0·76	1·13	0·51	2·51
Adolescent mood disorder	0·10 (0·35)	0·08	0·78	1·10	0·56	2·17	0·63 (0·47)	1·83	0·18	1·88	0·75	4·68
Regressor variables												
Insecure attachment	0·02 (0·01)	4·99	0·026	1·02	1·002	1·03	—	—	—	—	—	—
Disruptive disorder(s)	1·08 (0·32)	11·13	0·001	2·95	1·56	5·56	—	—	—	—	—	—
Adult drug abuse/dependence	—	—	—	—	—	—	1·02 (0·46)	4·88	0·027	2·77	1·12	6·85
Female gender	0·76 (0·30)	6·31	0·012	2·13	1·18	3·84	1·11 (0·48)	5·35	0·021	3·04	1·18	7·79
Childhood sexual abuse	0·19 (0·06)	9·91	0·002	1·21	1·07	1·35	0·25 (0·09)	7·31	0·007	1·28	1·07	1·53
Persistent *versus* transient ideation	0·77 (0·26)	8·89	0·003	2·15	1·30	3·55	—	—	—	—	—	—

S.E., Standard error; Sig., significance level; CI, confidence interval.

Table 5. *Significant correlates of suicide attempts in suicidal ideators stratified by gender*

	Ideating women						Ideating men					
	Model fit: $\chi^2_7 = 54{\cdot}72$, $p = 0{\cdot}0005$; Nagelkerke $R^2 = 30{\cdot}1\%$ Hosmer–Lemeshow test: $\chi^2_8 = 13{\cdot}01$; $p = 0{\cdot}11$						Model fit: $\chi^2_6 = 25{\cdot}62$, $p = 0{\cdot}0005$; Nagelkerke $R^2 = 26{\cdot}9\%$ Hosmer–Lemeshow test: $\chi^2_8 = 3{\cdot}36$, $p = 0{\cdot}91$					
	B (S.E.)	$\text{Wald}_{df=1}$	Sig.	exp(*B*)	95% CI		*B* (S.E.)	$\text{Wald}_{df=1}$	Sig.	exp(*B*)	95% CI	
Control variables												
Sample membership	−0·47 (0·37)	1·58	0·21	0·63	0·30	1·30	0·44 (0·53)	0·69	0·41	1·55	0·55	4·36
Adult mood disorder	−0·84 (0·51)	2·70	0·10	0·43	0·16	1·18	−0·74 (0·75)	0·99	0·32	0·47	0·11	2·05
Adolescent mood disorder	0·21 (0·42)	0·25	0·62	1·23	0·54	2·82	−0·83 (1·3)	0·39	0·53	0·44	0·03	5·83
Regressor variables												
Childhood disruptive aggression	0·13 (0·05)	6·52	0·01	1·15	1·03	1·27	—	—	—	—	—	—
Childhood anxiousness	—	—	—	—	—	—	0·30 (0·11)	8·42	0·004	1·35	1·10	1·66
Adult affective instability	—	—	—	—	—	—	0·05 (0·02)	5·69	0·017	1·05	1·01	1·10
Disruptive disorder(s)	—	—	—	—	—	—	1·78 (0·51)	12·25	0·0005	5·91	2·19	16·00
Adult Axis I co-morbidity	0·45 (0·16)	8·20	0·004	1·57	1·15	2·13	—	—	—	—	—	—
Persistent *versus* transient ideation	1·03 (0·35)	8·47	0·004	2·79	1·40	5·58	—	—	—	—	—	—
Childhood sexual abuse	0·20 (0·07)	7·54	0·006	1·22	1·06	1·41	—	—	—	—	—	—

S.E., Standard error; Sig., significance level; CI, confidence interval.

considering that, by necessity, acts of self-harm are preceded by such thoughts. Recall bias is one possible source of this incongruity. Suicidal thoughts may, additionally, be perceived as less salient experiences than non-fatal suicidal acts and are, consequently, not remembered as readily as suicide attempts. Cognitive processes involving perceptual aberration and memory impairments are alternative explanations (Williams & Pollock, 2001; Martinez-Aran *et al.* 2004).

Persistent suicidal ideas, gender and other correlates of suicide attempts in suicidal ideators

In line with one of our primary hypotheses, persistent ideation was a significant correlate of suicide attempt histories, doubling their likelihood in the total group ideators and tripling it in female ideators. Prior research indicates that the predictive value of suicidal ideation for suicide attempts increases with its frequency (Lewinsohn *et al.* 1996; Statham *et al.* 1998). Nevertheless, the profiles of univariate differences between attempters and non-attempters with persistent ideas suggest that, even in the presence of repeated suicidal thoughts, suicide attempts occur mostly in the context of additional adversity.

As for gender, as expected (Lewinsohn *et al.* 1993), we observed several sex differences in suicidality in our sample. Women represented two-thirds of all ideators and over one-third of our persistent ideators. Ideating women, especially those with persistent suicidal ideas, had higher rates of suicide attempts than their male counterparts. Gender bias, although in the opposite direction, was also observed among suicide attempters reporting negative histories of suicidal ideas: suicide attempts were more prevalent in our non-ideating males than in their female equivalents.

Female gender was also associated with a 2–3 times greater likelihood of suicide attempts. Related studies have reported a similar pattern: both suicide attempt and suicidal ideation rates are higher in women (Pirkis *et al.* 2000; Fairweather *et al.* 2006). In contrast to Fairweather *et al.* (2006), however, we found no evidence of gender-specific moderation, possibly because our sample was underpowered to detect interactive effects.

Overall, in terms of the four risk domains we investigated in relation to suicide attempts, each was represented by at least one associated factor. In the psychiatric domain, this was a diagnosis of disruptive disorder. Disruptive behavior disorders such as attention-deficit/hyperactivity disorder (ADHD) and conduct disorder were previously found to be higher in adolescent boys who attempt suicide relative to their non-attempting peers (Kelly *et al.* 2002, 2004). Previous studies have, furthermore, suggested that substance abuse disorders may mediate the effects of disruptive behaviors on suicide attempts (Gould *et al.* 1998; Renaud *et al.* 1999), a possibility that we could not examine in the present study.

Somewhat surprisingly, our Axis I covariates, adolescent and adult mood disorder diagnoses, were not associated with suicide attempts, which is in contrast to some (Kessler *et al.* 1999), but not all, previous studies. Findings by Pirkis *et al.* (2000) and Fairweather *et al.* (2006), for example, implicated neither affective nor anxiety disorders as factors that can discriminate between attempting and non-attempting ideators. These and our own results may also be attributed to our reliance on self-reports in normative populations whose mood and anxiety disorder symptoms may be less severe than in clinical populations. Alternatively, mood disorder effects on suicide attempts may be to a large degree mediated by suicidal ideation, a pathway that requires formal testing.

CSA was one experiential factor of relevance to suicide attempts, as suggested by extensive previous evidence (Santa Mina & Gallop, 1998; Gladstone *et al.* 2004; Talbot *et al.* 2004). Its effect size was, however, closer to the lower end of the reported risk range (Beautrais, 2000), suggesting, perhaps, that in ideating individuals, contribution of CSA may not be equivalent to that in other samples.

The contribution of sociodemographic factors was limited to gender. The effects of other factors in this domain may be mediated through maladaptive personality traits or increased psychiatric and childhood abuse risk. These possibilities need further examination.

The only personality trait contributing in our combined group of suicidal ideators was insecure attachment, an internalizing trait defined as 'excessive proximity seeking and intolerance

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of aloneness' (Livesley *et al.* 1998; De Leo *et al.* 2005). This trait was also the only univariate factor differentiating between attempters and non-attempters across all three subpopulation of suicidal ideators. Insecure attachment may impair one's ability to form and maintain social relationships, an important protective factor against suicidal behaviors (Bowlby, 1989; De Leo *et al.* 2005).

Suicide attempts in subgroups of suicidal ideators

The most consistent correlates across our three groups of suicidal ideators were psychiatric disorders, CSA, and maladaptive personality traits. The type of Axis I diagnosis was conditional on group membership. Disruptive disorder(s) assessed in mid-adolescence, for example, increased the odds of lifetime suicide attempts in all suicidal ideators, and in ideating men in particular. That this factor is particularly salient in men rather than women may be related to gender-based difference in its prevalence.

The effect of another significant correlate, drug abuse/dependence, on the contrary, was limited to the group with persistent suicidal ideas. Use of cocaine, sedatives, inhalants and hallucinogens was reported to increase the odds of suicide attempts between 2·5 and 4·9 times (Kirmayer *et al.* 1998; Kelly *et al.* 2002). Related evidence also suggests that the effects of some illegal drugs on suicidality may be mediated by sociodemographic and psychiatric variables (Beautrais *et al.* 1999). In terms of other psychiatric phenotypes, adult Axis I co-morbidity, involving mood, anxiety and substance use disorders, contributed only in female ideators. Each of these groups of disorders has been independently linked to suicide attempts (Brent *et al.* 1993; Fergusson *et al.* 2000). Furthermore, psychiatric co-morbidity has been associated with past and repeated suicide attempts, as well as with the severity of suicidal behaviors (Lewinsohn *et al.* 1995; Beautrais, 2000). In women, in particular, mood and substance use co-morbidity may be especially relevant for suicide risk (Wagner *et al.* 2000; Suokas *et al.* 2001; Kelly *et al.* 2004; Tournier *et al.* 2005).

CSA was also one of the more consistent correlates in our study, increasing the risk of suicide attempts between 20% and 30%. Nevertheless, its contribution in males reporting suicidal thoughts was not significant. This pattern may be related to previously recognized gender differences in both the rates and long-term psychiatric outcomes of childhood abuse (McClellan *et al.* 1997; Thompson *et al.* 2004).

As anticipated, we observed a number of personality trait differences between men and women with suicidal ideas. In contrast to the pattern seen in psychopathology, our regression models implicated externalizing personality traits (disruptive-aggressivity) in female ideators and internalizing ones (childhood anxiety and adult affective instability) in their male counterparts. Whether this configuration of personality traits in our ideators may be at odds with social expectations of each gender and therefore disruptive to relationships across different social contexts, for example, requires further investigation. Research on gender differences in personality traits of relevance to suicide attempts finds that women score higher on internalizing traits such as anxiety and negative affect, and men on assertiveness, excitement-seeking and aggression (Duberstein *et al.* 2000; Brezo *et al.* 2006*b*). Prior evidence also suggests that both externalizing (impulsivity/restlessness) and internalizing childhood personality (shyness/fearfulness) increase the risk of adult suicide attempts (Caspi *et al.* 1996). In general, these personality traits may be involved in suicide risk through how they affect an individual's ability to adapt to social environments, risk for psychiatric disorders, and coping style (Dean & Range, 1996; Brezo *et al.* 2006*b*).

Limitations

At least some degree of observed heterogeneity in correlates of suicide attempts among suicidal ideators may be attributable to smaller numbers of persistent and male ideators. Additional limitations include possible measurement error related to retrospective and multi-informant assessments, attrition effects on the representativeness of the sample, and limited generalizability to other cultural groups and clinical populations. These limitations notwithstanding, our findings suggest a need for more sophisticated approaches to investigating correlates of suicide attempts in young adults presenting with varying degrees of suicidal ideation.

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DECLARATION OF INTEREST

None.

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