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Suicide attempt in young people: A signal for long-term healthcare and social needs

Sidra J. Goldman-Mellor, Ph.D.^{1,4}, Avshalom Caspi, Ph.D.^{2,5}, HonaLee Harrington, B.A.^{2,4}, Sean Hogan, M.S.W.⁶, Shyamala Nada-Raja, Ph.D.⁷, Richie Poulton, Ph.D.⁶, and Terrie E. Moffitt, Ph.D.^{2,5}

¹Center for Developmental Science, University of North Carolina at Chapel Hill, USA ²Department of Psychology & Neuroscience, Duke University, USA ³Institute for Genome Sciences & Policy, Duke University, USA ⁴Department of Psychiatry & Behavioral Sciences, Duke University Medical Center, USA ⁵Social, Genetic, and Developmental Psychiatry Centre, Institute of Psychiatry, King's College, London, United Kingdom ⁶Dunedin Multidisciplinary Health and Development Research Unit, Department of Preventive and Social Medicine, University of Otago, Dunedin, New Zealand ⁷Department of Preventive and Social Medicine, University of Otago, Dunedin, New Zealand

Abstract

Importance—Suicidal behavior has increased since the onset of the global recession, a trend that may have long-term health and social implications.

Objective—To test whether suicide attempts among young people signal increased risk for later poor health and social functioning, above and beyond pre-existing psychiatric disorder.

Design—We followed a cohort of young people and assessed multiple aspects of their health and social functioning as they approached midlife. Outcomes among individuals who had self-reported a suicide attempt up through age 24 (young suicide attempters) were compared to those who reported no attempt through age 24 (non-attempters). Psychiatric history and social class were controlled.

Setting—The population-representative Dunedin Multidisciplinary Health and Development Study.

Participants—A total of 1,037 birth cohort members, comprising 91 young suicide attempters and 946 non-attempters, 95% of whom were followed to age 38.

Main Outcome Measures—Outcomes were selected to represent significant individual and societal costs: mental health, physical health, harm towards others, and need for support.

*Corresponding author: 2020 West Main Street, Suite 201, Box 104410, Durham, North Carolina 27708, tem11@duke.edu, (p) 919-684-6679, (f) 919-684-5912.

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Results—As adults approaching midlife, young suicide attempters were significantly more likely to have persistent mental health problems (e.g., depression, substance dependence, additional suicide attempts) when compared to non-attempters. They were also more likely to have physical health problems (e.g., metabolic syndrome, elevated inflammation). They engaged in more violence (e.g., violent crime, intimate partner abuse) and needed more social support (e.g., long-term welfare receipt, unemployment). Furthermore, they reported being lonelier and less satisfied with their lives. These associations remained after adjustment for youth psychiatric diagnoses and social class.

Conclusions—Many young suicide attempters remain vulnerable to costly health and social problems into midlife. As rates of suicidal behavior rise with the continuing global recession, additional suicide prevention efforts and long-term monitoring and after-care services are needed.

INTRODUCTION

Since the onset of the global economic recession in 2007, suicide rates have risen across both the United States and Europe.¹⁻⁴ This trend is consistent with evidence that economic downturns predict increases in suicide.⁵ Completed suicides, however, are a smaller part of a deeper public health problem. Nonlethal suicide attempts greatly outnumber lethal ones: According to the CDC, there are 25 suicide attempts for every completed suicide.⁶ A rising tide of suicidal behavior in populations coping with severe recession may have long-term health and social implications. In this article, we make use of data from a New Zealand birth cohort whose country experienced escalating suicide rates just as they entered young adulthood. We followed them up into their late 30s to investigate whether youthful suicide attempt signals enduring risk for poor health and social outcomes.

Following up outcomes among young people who have attempted suicide is especially important.⁷ The overall rate of suicide attempt among youths is three times higher than the rate among adults over 30, and young people are more likely to survive an attempt.^{6,8} Therefore, the lifetime population burden of any negative outcomes post-suicide attempt may be especially concentrated among young attempters.

Both population-representative and clinical samples have now established that previous suicide attempt is one of the strongest predictors of future attempts, as well as of completed suicide.⁹⁻¹⁷ Only a few studies, however, have looked at additional outcomes following a suicide attempt. These studies have variously reported that suicide attempters appear to experience later psychiatric problems, family violence, and legal problems.¹⁸⁻²² We investigated long-term outcomes among study members who made suicide attempts up through age 24 (following the World Health Organization's current definition of youth²³). In conducting this research, we did not assume that suicide attempts are a cause of these outcomes. Rather, we tested the hypothesis that suicide attempts represent an "early warning signal" for persistent vulnerability to poor outcomes.

METHODS

Sample

Participants are members of the Dunedin Multidisciplinary Health and Development Study, a longitudinal investigation of health and behavior in a complete birth cohort. Study members (N=1,037; 91% of eligible births; 52% male) were all individuals born between April 1972 and March 1973 in Dunedin, New Zealand, who were eligible for the longitudinal study based on residence in the province at age 3 and who participated in the first follow-up assessment at age 3. The cohort represents the full range of socioeconomic status in the general population of New Zealand's South Island and is primarily white.

Assessments were carried out at birth and at ages 3, 5, 7, 9, 11, 13, 15, 18, 21, 26, 32, and, most recently, 38 years, when 95% of the 1,007 Study members still alive took part. At each assessment wave, study members are brought to the research unit for a full day of interviews and examinations. The Otago Ethics Committee approved each phase of the study and informed consent was obtained. For the present article, all analyses were limited to study members who took part in the phase 38 assessment.

Measures

Young suicide attempters—In assessments carried out at ages 18, 21, 26, 32 and 38, suicide attempts were queried during structured interviews about self-harm and suicide,²⁴ and again as a symptom of depression during structured diagnostic interviews for depression.^{25,26} Queries invoked the following behaviors: Cutting or stabbing oneself, overdosing on pills, taking poison, attempting to gas oneself, attempting to hang or strangle oneself, attempting to shoot oneself, attempting to drown, jumping from a high place, crashing a car or motorcycle on purpose, burning oneself, or “other method.” Interviewers differentiated between suicide attempts and non-suicidal self-harm; here we study incidents accompanied by self-reported intent to die. Life History Calendars²⁷ were used to ascertain the timing of suicide attempts. These sources of information were combined to create a record of study members’ age at first (if any) suicide attempt. We defined young suicide attempters as those who made at least one suicide attempt up through age 24.

Of the 1,037 original Dunedin study members, 91 (8.8%) reported a suicide attempt through age 24. Of these 91, 86 were assessed through age 38. (As of the phase 38 data collection, 30 members of the original cohort had died of any cause (2.9%). Of the suicide attempters studied here, five (5.5%) had died.) Mean age at first suicide attempt was 17.4 years (SD: 3.6). Young suicide attempters in the Dunedin cohort exhibited the same female preponderance observed in previous studies^{28,29}: 52 suicide attempters were female (57.1%) and 39 were male (42.9%). Young attempters did not differ from non-attempters on a composite measure of their family social class³⁰ ($\chi^2=4.27, p=.12$).

Outcome measures—Our analysis included four categories of outcomes that entail significant individual and societal costs. Outcomes that predict costs to the healthcare system are designated *Mental Health* (psychiatric diagnoses, treatment seeking, medication usage, hospitalization, and suicidal behaviors) and *Physical Health* (self-rated health and physical functioning, metabolic syndrome, inflammation, unintentional injuries, and two measures of “accelerated aging”). Outcomes that predict costs to the criminal justice or social services systems are designated *Harm Towards Others* (convictions for violent crime, perpetration of intimate partner violence, and removal of a child from a study member’s care). Lastly, outcomes that predict costs to the welfare system or index poor social wellbeing are designated *Need for Support/Quality of Life* (unemployment, receipt of welfare benefits, victimization from intimate partner violence, satisfaction with life, and loneliness). All measures are described in eTable 1.

Confounding psychiatric conditions—In studying long-term outcomes following suicide attempt, it is crucial to separate out the effect of suicide attempters’ mental health up to the time of the attempt. Compared to the general population, young attempters are more likely to suffer from psychiatric disorders, which themselves are linked to a poor adult prognosis. Three of the most common psychiatric disorders among young suicide attempters are depression, anxiety, and conduct disorder (CD).^{16,31,32} We thus controlled for history of these three disorders. We also considered controlling for prior substance dependence diagnosis and attention-deficit hyperactivity disorder (ADHD). However, all of our young suicide attempters with prior substance dependence or ADHD were already captured by our

diagnoses of depression, anxiety or CD. We did not control for psychotic illnesses, because these disorders were not diagnosed until after age 24, past our exposure period. To assess the sensitivity of our results to this problem, we removed individuals who were diagnosed with schizophrenia from all analyses. Results were unaffected (i.e., no statistically significant findings were lost and no new significant findings were gained, and point estimates were largely unchanged). We therefore included these individuals in all results presented here. Controlling for disorder up to the time of the attempt allowed us to establish whether suicide attempters warrant additional long-term attention beyond what their psychiatric history might indicate.

Study members were repeatedly assessed with the Diagnostic Interview Schedule-Child Version³³ at ages 11, 13 and 15 years, and the Diagnostic Interview Schedule beginning at age 18 years (DIS),^{25,26} which allowed us to identify all study members who met DSM diagnostic criteria for depression, anxiety, and CD during the exposure period. Study members who attempted suicide in youth were coded as having met diagnostic criteria for these disorders if they met criteria prior to or concurrent with their first suicide attempt. Compared to the non-suicidal study members, young suicide attempters were significantly more likely to have a history of depression (32.2% vs. 44.0%, $\chi^2=5.15$, $p=.02$), anxiety (20.3% vs. 34.1%, $\chi^2=9.35$, $p=.002$), and conduct disorder (20.8% vs. 48.4%, $\chi^2=35.16$, $p<.0001$) during the exposure period.

Statistical Analysis

We used generalized linear models to estimate the association between youth suicide attempt and adult outcomes. We used Poisson regression with robust standard errors to model risk ratios for dichotomous outcomes (all mental health indices, self-rated health, metabolic syndrome, conviction for violent crime, child removal by Social Services, and partner physical abuse). We used negative binomial or zero-inflated negative binomial regression with robust standard errors to model incident rate ratios when analyzing count data that were overdispersed (number of unintentional injuries, duration of unemployment, and duration of welfare benefits). We used ordinary least squares regression models to estimate coefficients for continuously-distributed outcomes (physical functioning, inflammation, aging, loneliness, and life satisfaction).

Our first set of models examined associations between youth suicide attempt and each adult outcome, controlling for gender. We then repeated the analyses adding controls for depression, anxiety and CD, to test whether suicide attempt predicted later outcomes above and beyond attempters' previous psychiatric morbidity. Lastly, we used interaction terms to test whether there were sex differences in outcomes associated with youth suicide attempt. All statistical analyses were conducted using Stata 12.0.

In Tables 1-3, Column 3 presents bivariate associations between suicide attempt and each outcome. Column 4 presents the multivariate associations between suicide attempt and each outcome, controlling for history of depression, anxiety, and CD (these covariates' regression coefficients predicting outcomes are presented in Columns 5-7).

RESULTS

Poor mental health

Approaching midlife, young suicide attempters had more mental health problems than non-attempters (Table 1). They were two times more likely to have persistent episodes of major depression, and had persistent problems with substance dependence. They also required more mental health-related services: they were more likely to seek help for psychiatric

problems, to take psychiatric medications, and to have been hospitalized for a psychiatric condition. Suicidal behavior also remained common: more than 20 percent of young suicide attempters reported additional suicide attempts between ages 26 and 38, a three-fold difference compared to non-attempters; young attempters were also nearly three times more likely to engage in subsequent nonsuicidal self-injury.

Poor physical health

Young suicide attempters were in significantly worse physical health as they approached midlife (Table 2). They were more likely to rate their overall health at age 38 years as poor or fair, and reported a greater number of daily functional limitations as measured by the SF-36 physical health scale.

These subjective reports of poorer health were corroborated by clinical indicators. Young suicide attempters were two times more likely than non-attempters to meet criteria for the metabolic syndrome. Furthermore, their levels of systemic inflammation, measured across multiple inflammatory biomarkers, were significantly higher. They also sustained more unintentional injuries during the follow-up period.

There were signs that suicide attempters were aging at a faster rate than nonattempters. Their covariate-adjusted average “heart age,” calculated using a composite index of the Framingham cardiovascular disease risk score, was 42.0 years – four years older than both their chronological age and the mean heart age of non-attempters. They also looked older than non-attempters.

Harm towards others

Approaching midlife, young suicide attempters were significantly more likely than non-attempters to commit violence against others (Table 3). They were two times more likely to report being abusive in their intimate relationships and to be convicted for a violent crime – even when excluding those whose convictions were solely for domestic assault.

Social Services removed a child from the home of thirteen study members (1.38%) for protection from abuse or neglect. Five of these study-member parents had attempted suicide in their youth. After controlling for covariates, this association was attenuated and became marginally significant, most likely because of this outcome’s very low base rate.

Need for support/Quality of life

Young suicide attempters were in need of greater support during adulthood (Table 3). This is reflected in life-histories characterized by greater unemployment and dependence on welfare benefits. If they became unemployed, suicide attempters reported being unemployed for approximately 6 months longer than non-attempters during the follow up period. If they used government welfare benefits, suicide attempters were likely to rely on these benefits for a significantly longer period of time (adjusted for covariates, mean durations of welfare receipt were 68.2 months vs. 29.1 months). In their personal lives, young suicide attempters were two times more likely to be physically victimized by their romantic partners, and approaching midlife, they reported suffering from loneliness and were less satisfied with their lives.

Gender Differences

Out of all the analyses we conducted, two outcomes for young suicide attempters – physical functioning (SF-36) and metabolic syndrome – appeared to differ by gender. Both observed associations were significantly stronger among female attempters. However, these gender interactions could be due to chance and should await replication.

Control for Socioeconomic Background

Lastly, we conducted a sensitivity analysis adding a covariate for study members' family social class to all models reported in Tables 1-3. Point estimates for some outcomes were very slightly attenuated, but statistical inference was unaltered in all cases (i.e., no statistically significant findings were lost and no new significant findings were gained).

COMMENT

The results of this study provide evidence that young suicide attempters, approaching midlife, are at substantially increased risk for a wide array of negative health and social outcomes. Young suicide attempters have higher rates of multiple serious mental health problems, as indicated by diagnosed disorder, treatment seeking, hospitalization, and additional suicidal behavior. Moreover, while still in their 30s, young attempters already have more physical health problems than their peers – evidenced in their higher rates of metabolic disorder, systemic inflammation, and early signs of aging. They are also more likely to engage in violence, experience long-term unemployment and welfare dependence, and report high levels of loneliness and dissatisfaction with their lives. Notably, these associations persist even after controlling for suicide attempters' history of psychiatric disorder.

This poor prognosis represents not only a toll on suicide attempters and their families, but also a significant economic burden on healthcare, welfare, and criminal justice systems. Young suicide attempters account for a far higher proportion of the study outcomes than their absolute numbers would predict. Although they made up just under nine percent of our cohort, by midlife they comprised 15 percent of those with metabolic syndrome, 22 percent of those with persistent psychiatric disorders, and 35 percent of those who were convicted for violent crime (Figure 1).

Methodological advantages of this study include its use of a representative birth cohort with good retention, a follow-up period of more than 13 years, and statistical controls for psychiatric diagnoses among young suicide attempters. The analysis was also strengthened by our inclusion of all self-reported suicide attempts, rather than just attempts that received medical attention, and a comprehensive set of outcome variables that allowed us to characterize young suicide attempters across multiple domains of functioning as they entered midlife.

This study had several limitations. First, we did not have detailed information on the circumstances of or method used for every attempt (overdose on pills, attempted hanging, etc.). It is therefore possible that not all the suicide attempts reported by study members would be considered medically serious attempts. However, previous studies have found that a minority of suicide attempts among young people receive medical attention, and that studies using only hospitalized samples both underestimate the rate of suicide attempts and potentially provide biased estimates of effect, because medically treated cases are a non-random sample of all suicide attempters.³⁴ We found that 8.8% of the cohort had made a suicide attempt by age 24, which is consistent with evidence from another 1970s New Zealand birth cohort which reported that 5.4% of participants had attempted suicide by age 18.¹⁹ Second, the outcomes we examined were right-censored at age 38, the most recent Dunedin study assessment; future research should investigate whether these associations persist into older adulthood.

Third, our findings are specific to a cohort of individuals born in Dunedin, New Zealand, in the early 1970s. However, during the years when this cohort grew from adolescents to young adults, New Zealand witnessed circumstances that resemble those encountered by

young people today (see eFigure 1). From the 1940s to 1986, the unemployment rate in New Zealand remained below five percent, and young people could expect an easy transition from education into paid work.³⁵ Between 1986-1993 – when members of the cohort were reaching adolescence, leaving high school and entering the labor force – the country experienced economic upheaval (deregulation, struggle to enter new international markets, and a share-market crash), which resulted in extremely high unemployment rates. Among all 15- to 24-year-olds in 1993, unemployment was 18 percent,^{36,37} similar to current levels in the U.S. and Europe.³⁸ Simultaneously, between 1986-1993, suicide rates among 15- to 24-year-olds increased 50 percent, and continued to rise to a high of 27 per 100,000 in 1996, after which they began to decline.³⁹ Given the economic and suicidal-behavior context of our cohort's experiences, the findings we report may be particularly relevant and timely for clinicians today, who are treating a rising number of suicide attempt patients.

Our analysis does not assume that suicide attempts are a *cause* of later poor health and social functioning. Rather, we tested the “signal value” of suicide attempts for clinicians as a predictor of risk for poor outcomes, over and above psychiatric disorder. The results of this study, however, raise interesting questions about what causal pathways may link young people's suicide attempts to later poor outcomes. First, suicide attempt may simply be a proxy measure for greater severity of mental illness. A second possibility relates to the high rates of mental-health care-seeking and psychiatric medication-usage we observed in young suicide attempters. Suicide attempt could result in attempters becoming engaged with the mental healthcare system and later receiving more treatment.¹⁹ Third, we observed that young attempters were more likely to engage in further suicidal behavior (NSSI and suicide attempts) as adults. This could be explained by the interpersonal theory of suicide, which predicts that risk for future suicidal behavior is elevated through repeated practice and exposure to self-harm, through which the individual habituates to the physical pain and fear involved.^{40,41} Fourth, we also observed poor physical health among attempters (net of social class background). This may be explained by suicide attempters' lifestyles and their high rates of persistent psychiatric disorder, which involve ongoing self-neglect. Fifth, suicide attempters had elevated levels of loneliness and dissatisfaction with life. This could be explained if they were subjected to stigma as a result of their attempts, leading to long-lasting social isolation and mistreatment.^{42,43}

These potential explanations are not mutually exclusive, and each of the explanations almost certainly applies to a different outcome (e.g., mental health care-seeking versus physical health versus quality of life). Future research in larger samples should work to identify the pathways through which suicide attempt conveys increased risk, and to determine any factors that confer differential risk or promote resilience to poor outcomes among suicide attempters.

Our results suggest that young suicide attempters may warrant long-term follow up and supportive care in the years after their attempt(s). A large national study of adolescents in the United States reported that most suicidal adolescents in fact receive some sort of mental-health services prior to the onset of their suicidal behavior, highlighting the difficulty of preventing attempts.³¹ However, evidence from randomized interventions and observational studies suggests that supportive care programs among previous attempters can prevent later suicide deaths.^{44,45} Although our finding that suicide attempters had worse mental health and more subsequent attempts was expected, our study also underscores the necessity of attending to a broader range of outcomes in this at-risk population. Young suicide attempters' higher levels of metabolic syndrome and inflammation will likely increase their susceptibility to cardiovascular disease and other illnesses across the lifespan.^{46,47} Furthermore, although only a minority engaged in harmful behavior toward others, at the population level this places families and others at risk.^{18,21,22} High rates of suicidal behavior

are likely to persist with the ongoing global recession. In an era of economic stress and scarce financial resources, young suicide attempters may be an important target for intervention and secondary prevention services.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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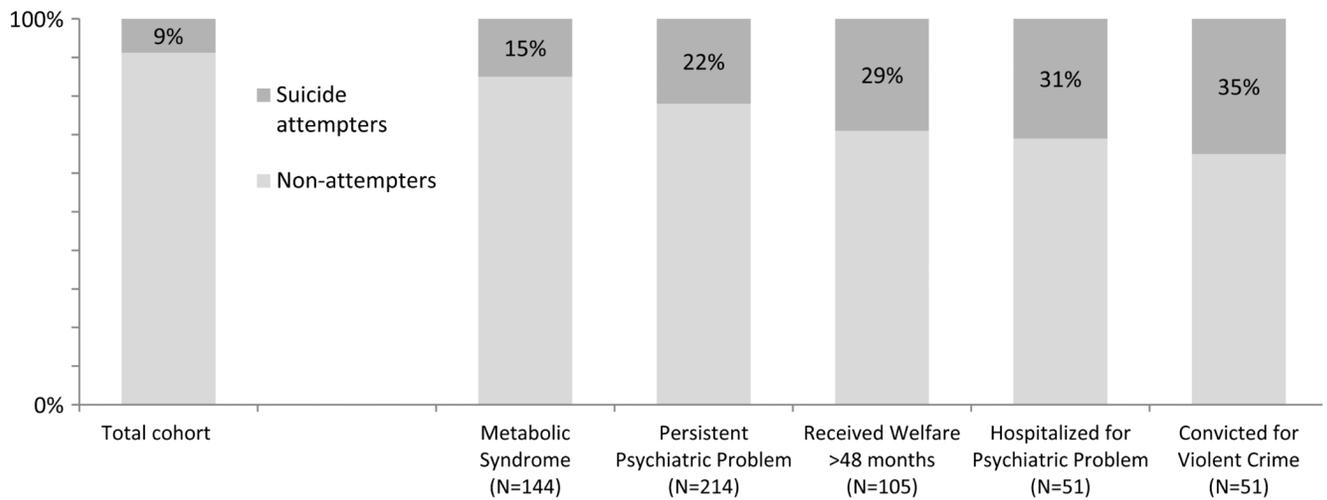


Figure 1.

More than their share: Selected outcomes in midlife, for young suicide attempters and non-attempters. Left bar shows the proportion of the entire Dunedin cohort that made a suicide attempt up through age 24 years. Right bars show, of the cohort members with each outcome, what proportion were young suicide attempters. Note: “Persistent psychiatric problem” indicates 2+ diagnoses with depression, generalized anxiety disorder, or substance dependence between ages 26 and 38. All other outcomes are as described in eTable 1.

Table 1
Mental health: Psychiatric diagnoses, utilization of services, and suicidal behavior between ages 26 and 38

	N (%)	Model 1: Bivariate RR [95% CI] ^d				Model 2: Multivariate RR [95% CI], controlling for history of depression, anxiety, and conduct disorder ^{ab}			
		Suicide Attempt	History of Depression	History of Anxiety	History of CD	Suicide Attempt	History of Depression	History of Anxiety	History of CD
Persistent Major Depression, 26-38									
Non-attempters	110 (12.6)	1.0			1.0				
Suicide attempters	26 (30.2)	2.3 [1.6, 3.3]	2.6 [1.8, 3.6]	1.8 [1.3, 2.5]	2.0 [1.4, 2.9]	2.6 [1.8, 3.6]	1.8 [1.3, 2.5]	0.9 [0.6, 1.3]	
Persistent GAD, 26-38									
Non-attempters	48 (5.5)	1.0			1.0				
Suicide attempters	10 (11.6)	2.2 [1.1, 4.1]	2.2 [1.3, 3.6]	2.1 [1.3, 3.5]	1.8 [0.9, 3.5]	2.2 [1.3, 3.6]	2.1 [1.3, 3.5]	0.9 [0.5, 1.6]	
Persistent Substance Dependence, 26-38									
Non-attempters	81 (8.8)	1.0			1.0				
Suicide attempters	26 (30.2)	3.9 [2.7, 5.6]	1.6 [1.1, 2.4]	1.0 [0.7, 1.5]	2.6 [1.7, 3.8]	1.6 [1.1, 2.4]	1.0 [0.7, 1.5]	2.4 [1.6, 3.6]	
Help Sought for a Mental Health Problem, 26-38									
Non-attempters	361 (41.4)	1.0			1.0				
Suicide attempters	56 (65.1)	1.5 [1.3, 1.8]	1.6 [1.4, 1.9]	1.2 [1.0, 1.4]	1.3 [1.1, 1.6]	1.6 [1.4, 1.9]	1.2 [1.0, 1.4]	1.2 [1.1, 1.5]	
Any Psychiatric Medication Usage, 26-38									
Non-attempters	214 (24.6)	1.0			1.0				
Suicide attempters	41 (47.7)	1.8 [1.4, 2.4]	2.1 [1.7, 2.6]	1.3 [1.0, 1.6]	1.6 [1.2, 2.1]	2.1 [1.7, 2.6]	1.3 [1.0, 1.6]	1.2 [0.9, 1.5]	
Hospitalized for a Psychiatric Condition, 26-38									
Non-attempters	35 (3.9)	1.0			1.0				
Suicide attempters	16 (18.6)	5.1 [2.9, 8.8]	1.8 [1.0, 3.3]	2.0 [1.1, 3.5]	2.9 [1.6, 5.1]	1.8 [1.0, 3.3]	2.0 [1.1, 3.5]	2.7 [1.5, 4.9]	
Attempted Suicide, 26-38									
Non-attempters	38 (4.1)	1.0			1.0				
Suicide attempters	19 (22.1)	5.5 [3.3, 9.3]	1.6 [0.9, 2.8]	2.3 [1.4, 3.9]	3.2 [1.8, 5.7]	1.6 [0.9, 2.8]	2.3 [1.4, 3.9]	2.6 [1.5, 4.5]	
Non-suicidal self-injury, 32-38									
Non-attempters	26 (3.0)	1.0			1.0				
Suicide attempters	9 (10.7)	3.4 [1.6, 7.0]	1.6 [0.8, 3.2]	1.4 [0.7, 2.9]	2.8 [1.2, 6.4]	1.6 [0.8, 3.2]	1.4 [0.7, 2.9]	1.5 [0.6, 3.3]	

Statistically significant ($p < 0.05$) associations indicated in bold text (for suicide attempt exposure only). Abbreviations: RR, risk ratio; CD, conduct disorder.

^a All regression models additionally controlled for gender.

^b Estimates in Model 2 are derived from the following basic multivariate model: $g(Y) = B_1 + B_2(\text{suicide attempt}) + B_3(\text{gender}) + B_4(\text{depr}) + B_5(\text{anx}) + B_6(\text{CD})$

Table 2
Physical health: Physical functioning, metabolic syndrome, inflammation, injuries, and signs of aging at age 38

	N (%) or Mean (SD)	Model 1: Bivariate		Model 2: Multivariate B or RR [95% CI], controlling for history of depression, anxiety, and conduct disorder ^{a,b}			
		\$B or * RR [95% CI] ^d	Suicide Attempt	Suicide Attempt	History of Depression	History of Anxiety	History of CD
Poor or Fair Self-Rated Health, 38							
Non-attempters	54 (6.2%)	1.0 *	1.0 *				
Suicide attempters	14 (16.5%)	2.9 [1.7, 5.0]	2.5 [1.3, 4.5]	1.1 [0.6, 1.8]	1.1 [0.6, 2.1]	1.7 [1.0, 2.9]	
Physical Functioning Scale (SF-36), 38							
Non-attempters	93.5 (13.7)	90.0 [§]	91.8 [§]				
Suicide attempters	87.7 (17.5)	-5.5 [-8.7, -2.4]	-4.8 [-7.8, -1.8]	-4.1 [-5.9, -2.2]	-0.6 [-2.7, 1.5]	-1.9 [-4.0, 0.2]	
Metabolic Syndrome (3+ markers), 38							
Non-attempters	122 (14.9%)	1.0 *	1.0 *				
Suicide attempters	22 (26.5%)	2.0 [1.3, 2.9]	1.9 [1.3, 2.9]	1.1 [0.8, 1.5]	1.1 [0.8, 1.7]	1.0 [0.7, 1.5]	
Inflammation Factor Score, 38							
Non-attempters	-0.03 (0.9)	0.5 [§]	0.4 [§]				
Suicide attempters	0.3 (0.9)	0.3 [0.1, 0.5]	0.24 [0.04, 0.5]	0.02 [-0.1, 0.2]	0.12 [-0.03, 0.3]	0.01 [-0.1, 0.2]	
Unintentional Injuries, 26-38 ^c							
Non-attempters	5.7 (5.2)	1.0 *	1.0 *				
Suicide attempters	8.9(8.1)	1.5 [1.2, 1.9]	1.3 [1.1, 1.7]	1.1 [0.9, 1.2]	1.2 [1.0, 1.4]	1.3 [1.1, 1.5]	
Framingham "Heart Age" Score, 38							
Non-attempters	38.2 (7.8)	28.3 [§]	28.1 [§]				
Suicide attempters	42.0 (9.8)	4.7 [3.1, 6.4]	4.2 [2.5, 5.8]	0.3 [-0.8, 1.3]	0.8 [-0.3, 2.0]	1.6 [0.5, 2.8]	
Perceived Age Range, 38							
Non-attempters	5.3 (1.0)	5.1 [§]	5.1 [§]				
Suicide attempters	5.8 (1.1)	0.5 [0.3, 0.7]	0.4 [0.2, 0.6]	-0.1 [-0.2, 0.1]	0.2 [0.01, 0.3]	0.3 [0.1, 0.4]	

Statistically significant ($p < 0.05$) associations indicated in bold text (for suicide attempt exposure only). Abbreviations: RR, risk ratio; CD, conduct disorder.

^a All regression models additionally controlled for gender.

^b Estimates in Model 2 are derived from the following basic multivariate model: $g(Y) = B_1 + B_2(\text{suicide attempt}) + B_3(\text{gender}) + B_4(\text{depr}) + B_5(\text{anx}) + B_6(\text{CD})$

^cModel was analyzed using zero-inflated negative binomial regression. RR corresponds to incident rate ratio for unintentional injury count; mean (SD) estimates exclude study members with zero injuries. Model additionally controlled for time spent in New Zealand during ages 26-38, as only NZ residents are eligible to receive injury insurance benefits.

Table 3
Harm towards others, and need for support/quality of life, between ages 26 and 38

	N (%) or Mean (SD)	Model 1:	Model 2: Multivariate B or RR [95% CI], controlling for history of depression, anxiety, and conduct disorder ^{a,b}			
		Bivariate [§] B or * RR [95% CI] ^a	Suicide Attempt	History of Depression	History of Anxiety	History of CD
Harm towards others: Violent partner physical abuse, and child protective services						
Convicted for Violent Crime, 26-38 ^b						
Non-attempters	34 (3.9%)	1.0 *	1.0 *			
Suicide attempters	17 (19.8%)	4.9 [2.8, 8.3]	2.5 [1.4, 4.4]	1.5 [0.9, 2.8]	0.9 [0.5, 1.7]	5.0 [2.5, 9.7]
Persistent Perpetration: Partner Abuse, 26-38						
Non-attempters	64 (7.0%)	1.0 *	1.0 *			
Suicide attempters	16 (18.6%)	2.5 [1.5, 4.2]	2.0 [1.2, 3.5]	1.4 [0.9, 2.1]	0.8 [0.5, 1.3]	1.9 [0.5, 1.3]
Had Child Removed by Social Services, 26-38						
Non-attempters	8 (0.9%)	1.0 *	1.0 *			
Suicide attempters	5 (5.9%)	6.3 [2.0, 20.0]	2.9 [0.9, 9.5]	2.4 [0.8, 7.9]	1.5 [0.5, 4.6]	8.2 [2.2, 29.9]
Need for support/Quality of life: Unemployment ;, welfare receipt, victimization from intimate partner abuse, loneliness, and life satisfaction						
Duration of Unemployment, Months, 26-38 ^{c,d}						
Non-attempters	6.9 (11.2)	1.0 *	1.0 *			
Suicide attempters	12.8 (19.2)	2.5 [1.3, 4.8]	2.4 [1.1, 4.9]	2.0 [1.2, 3.4]	0.9 [0.5, 1.5]	1.5 [1.0, 2.5]
Duration of Welfare Benefits, Months, 26-38 ^{c,d}						
Non-attempters	31.1 (42.2)	1.0 *	1.0 *			
Suicide attempters	69.3 (55.4)	2.2 [1.6, 2.9]	1.9 [1.4, 2.6]	1.0 [0.8, 1.4]	1.3 [0.9, 1.8]	1.6 [1.3, 2.1]
Persistent Victimization: Partner Abuse, 26-38						
Non-attempters	87 (9.5%)	1.0 *	1.0 *			
Suicide attempters	19 (22.1%)	2.6 [1.7, 4.0]	2.1 [1.3, 3.3]	1.4 [0.9, 2.0]	0.9 [0.6, 1.4]	1.7 [1.1, 2.5]
Loneliness, 38						
Non-attempters	1.5 (2.1)	1.7 [§]	1.3 [§]			

	Model 1: Bivariate β or * RR [95% CI] ^a		Model 2: Multivariate β or RR [95% CI], controlling for history of depression, anxiety, and conduct disorder ^{a,b}			
	N (%) or Mean (SD)	Suicide Attempt	Suicide Attempt	History of Depression	History of Anxiety	History of CD
Harm towards others: Violent convictions, intimate partner physical abuse, and child protective services						
Suicide attempters	2.5 (2.6)	1.0 [0.5, 1.5]	0.8 [0.3, 1.3]	0.6 [0.3, 0.9]	0.4 [0.02, 0.7]	0.2 [-0.1, 0.6]
Life Satisfaction, 38						
Non-attempters	13.9 (3.9)	15.1 [§]	15.8 [§]			
Suicide attempters	11.1 (4.5)	-2.9 [-3.8, -2.0]	-2.4 [-3.3, -1.5]	-1.1 [-1.6, -.5]	-0.6 [-1.3, 0.0]	-0.9 [-1.3, -0.3]

Statistically significant ($p < 0.05$) associations indicated in bold text (for suicide attempt exposure only). Abbreviations: RR, risk ratio; CD, conduct disorder.

dModels used negative binomial regression (unemployment) or zero-inflated NB regression (welfare benefits). RRs correspond to incident rate ratios for count of months unemployed or on welfare benefits; mean (SD) estimates exclude individuals with zero months of unemployment or welfare benefits.

^a All regression models controlled for gender.

^b Estimates in Model 2 are derived from the following basic multivariate model: $g(Y) = B_1 + B_2(\text{suicide attempt}) + B_3(\text{gender}) + B_4(\text{depr}) + B_5(\text{anx}) + B_6(\text{CD})$

^c Model additionally controlled for time spent in New Zealand or Australia during ages 26-38.