

Distinguishing prisoners who think about suicide from those who attempt suicide

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Original Article

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Abstract

Background. Many people who consider suicide do not translate these intentions into action. Although prisoners constitute a particularly high-risk group for suicide, little is known about the factors that distinguish those who think about suicide from those who attempt suicide.

Methods. Participants were 1326 adult offenders (1203 men) randomly selected from 15 Belgian prisons, representing 14% of the national prison population. Multivariate regression analysis compared prisoners who attempted suicide ($n = 277$) with those who thought about suicide but never made an attempt ($n = 312$) on a range of established risk factors.

Results. Among the 589 participants reporting a lifetime history of suicidal ideation (44% of the total sample), almost half (47%) had made a suicide attempt. Relative to those who only thought about suicide, participants who attempted suicide were more likely to be violent offenders (aOR 2.33, 95% CI 1.49–3.62) and have a history of non-suicidal self-injury (aOR 3.19, 95% CI 2.09–4.86). The presence of self-reported mental disorder diagnosis (aOR = 2.84, 95% CI 1.91–4.24) and illicit substance abuse (aOR = 2.01, 95% CI 1.24–3.28) also independently differentiated prisoners who attempted *v.* considered suicide.

Conclusion. This study provides preliminary evidence that behavioural and mental health factors are implicated in the transition from thoughts to acts of suicide in prisoners. Prospective studies are warranted to explore whether these risk factors predict progression from ideation to action over time.

Ranking among the leading causes of death worldwide, suicide takes a major toll on global public health (Naghavi, 2019). Beyond suicide mortality, a much larger number of individuals attempt or consider suicide (Nock *et al.*, 2008). Although extant research has identified a wide range of biological, psychological, clinical and social factors that act to increase suicide risk (O'Connor and Nock, 2014; Turecki and Brent, 2016; Cha *et al.*, 2018; Turecki *et al.*, 2019), our competence to accurately predict suicide is sadly no better now than it was half a century ago (Franklin *et al.*, 2017). One reason for this lack of progress may be our limited ability to delineate factors associated with *thoughts* of suicide (suicidal ideation) as distinct from those associated with suicidal *behaviour* (Klonsky and May, 2014; O'Connor and Portzky, 2018). Specifically, converging evidence suggests that many traditionally cited risk factors for suicide actually predict suicidal ideation, but not the transition from thoughts to acts of suicide (Klonsky *et al.*, 2016; Nock *et al.*, 2016). This ideation–attempt distinction reflects an important behavioural threshold, in that the vast majority (71%) of adults who consider suicide will not go on to make a suicide attempt in their lifetime (Nock *et al.*, 2008).

Accordingly, guided by an *ideation-to-action* framework, considerable research attention is now focused on identifying what factors may precipitate the transition from thought to enactment (O'Connor and Nock, 2014; Klonsky *et al.*, 2018; Turecki *et al.*, 2019). Reviews of the literature indicate that predictors of suicide attempt among those considering suicide include, among others, fearlessness about death, increased pain tolerance, non-suicidal self-injury (NSSI; the intentional destruction of one's own body tissue without suicidal intent), perpetration of interpersonal violence, exposure to others' suicidal behaviour and knowledge about and access to lethal means (May and Klonsky, 2016; Klonsky *et al.*, 2017; May and Victor, 2018). In addition, recent large-scale studies of community-based adolescents (O'Connor *et al.*, 2012; Taliaferro and Muehlenkamp, 2014; Mars *et al.*, 2019a; Kim *et al.*, 2015) and young adults (Dhingra *et al.*, 2015; Wetherall *et al.*, 2018) have shown that, relative to those who only think about suicide, individuals who also attempt suicide are more likely to report NSSI, exposure to self-harm in others, certain mental disorders, substance use, higher impulsivity and a greater number of negative life events.

Despite this growing recognition that factors associated with suicidal ideation are distinct from those that govern the transition from ideation to attempt in the general population, comparable research is limited in prisoners – a vulnerable population at an increased risk of suicide (Fazel *et al.*, 2017; Favril *et al.*, 2019). Prevalence rates of suicidal ideation in prisoners greatly

exceed those found among non-incarcerated adults (Jenkins *et al.*, 2005), which robustly predicts future suicidal behaviour in custody (Fazel *et al.*, 2008). As such, a common challenge faced by clinicians working with prisoners is to identify, out of the relatively large pool of those who experience suicidal ideation, who is at greatest risk for acting on such thoughts. Delineating factors which differentiate those who attempt suicide (attempt group) from those who experience suicidal ideation but do not go on to engage in suicidal behaviour (ideation group) is thus clinically important to improve risk assessment and identify potential targets for intervention in this high-risk population. To the best of our knowledge, however, only one prior study sought to examine which risk factors predict suicide attempt above and beyond their association with suicidal ideation (Larney *et al.*, 2012). This Australian study found that traumatic brain injury, depressive symptomatology and indicators of childhood trauma conferred an increased risk of suicide attempt among prisoners who reported suicidal ideation in bivariate analyses; however, none of these variables retained statistical significance once other covariates were controlled for (Larney *et al.*, 2012). Given the limited research in this specific area, the present study sought to advance knowledge of factors that differentiate those who have attempted suicide from those who have only considered suicide in a large sample of adult prisoners.

Methods

Sampling and procedure

Eligible study participants were all offenders (aged 18 years and over) physically residing in 15 out of 36 Belgian correctional facilities. Prisons were selected based on their geographical proximity – the Flanders region of Belgium, serving roughly half of the national prison population (Favril *et al.*, 2019). At each prison consecutively, an up-to-date census of all prisoners detained in the facility was obtained from the respective prison administration. During the study period (October 2015 to May 2016), a total of 3862 individuals (3636 men) were incarcerated in the 15 selected prisons, of whom 1550 (1414 men) were randomly selected by a computer to participate in the study. Since there were no *a priori* criteria for inclusion, the sample was reflective of the total population in each Belgian prison. The principal researcher (LF), a clinical psychologist who was independent of the prison system, personally approached all of the randomly selected prisoners. In the event of the researcher being unable to contact a particular prisoner at the time of recruitment (e.g. due to sudden release or transfer), the person was replaced by an inmate drawn from the reserve recruitment list (also randomly selected), who was subsequently contacted. In case of intellectual disability or severe mental illness (e.g. those who were actively psychotic at the time of recruitment) that prevented individuals from providing consent, a similar procedure was applied. Only when a selected inmate was contacted but refused to participate, a non-response was registered and was not substituted by another prisoner. Following written informed consent, paper-and-pencil surveys (available in Dutch, French and English) were completed either in small groups (± 10 people) or individually. The route of survey administration was tailored to the characteristics of each prison. To enhance privacy and assure confidentiality during data collection, prison staff was not present during either the group or individual administration of surveys. Ethical approval

for the study protocol was granted by the Ethics Committee of Ghent University, Faculty of Law and Criminology.

Measures

Demographic and criminological characteristics

The survey included details on gender (male/female), age (continuous), nationality (Belgian/other) and partnership status (dichotomized in single/divorced/widowed *v.* married/partner). The analysis included two criminological variables; current custodial status (remand/sentenced) and offence type. This latter variable was recoded into non-violent (e.g. drug offences, theft and fraud) *v.* violent (e.g. murder, manslaughter and rape) offences.

Lifetime history of suicidal ideation and attempts

Consistent with recent ideation-to-action studies in the general population (Wetherall *et al.*, 2018; Mars *et al.*, 2019a), our outcome measure was a lifetime history of suicidal ideation and attempts. Based on the *British National Psychiatric Morbidity Survey* among prisoners (Jenkins *et al.*, 2005), suicidal ideation was assessed with the question ‘Have you ever thought of taking your own life, even though you would not actually do it?’ (coded as no/yes). Regardless of the answer to the question about suicidal ideation, respondents were also asked whether they ever attempted suicide (coded as no/yes). Both items were used to categorize participants in three mutually exclusive groups: those without any suicidal history (*control group*), those who had thought about suicide but never made a suicide attempt (*ideation group*) and those who had experienced suicidal ideation and attempted suicide in the past (*attempt group*).

Clinical variables

A self-reported diagnosis of a mental disorder was assessed by asking participants ‘Have you ever been told by a mental health professional, such as a psychiatrist or psychologist, that you had one or more of the following mental disorders?’ followed by a comprehensive list of diagnostic labels. The conditions specified were depressive, bipolar, psychotic, anxiety, eating and personality disorders. The wording of the question and choice of a self-report measure of lifetime psychiatric diagnoses is consistent with previous prison research (Binswanger *et al.*, 2010; Stoliker, 2018). Substance use disorders were excluded from the current analysis. Participants were however asked about their substance abuse, defined as using illicit drugs on an almost daily basis in the 12 months prior to incarceration and/or during imprisonment (Larney *et al.*, 2012).

NSSI history and exposure to suicidal behaviour

A history of NSSI was dichotomously assessed by asking participants ‘Have you ever deliberately harmed yourself in any way, but not with the intention of killing yourself?’ without further prompts (Jenkins *et al.*, 2005; McManus *et al.*, 2019). A single item was included to inquire about a family history of suicidal behaviour, asking participants whether there was anyone in their family who ever attempted or died by suicide (no/yes).

Statistical analysis

A key difficulty in identifying risk factors for a suicide attempt is that it rarely occurs in the absence of suicidal thoughts (Larney *et al.*, 2012; May and Klonsky, 2016). By simply comparing prisoners who attempted suicide to those who did not, irrespective of

suicidal ideation, most studies have neglected to account for this shared variance with suicidal ideation (Jenkins *et al.*, 2005; Sarchiapone *et al.*, 2009; Sánchez *et al.*, 2018; Stoliker, 2018; Favril, 2019); a methodological design which allows predictors of ideation to masquerade as predictors of attempts (Klonsky *et al.*, 2016). Therefore, our analysis focuses on suicide attempts among the subsample of participants with suicidal ideation. As such, the independent contribution of risk factors for suicide attempt can be more rigorously established, as this potential confounding is accounted for by excluding non-suicidal participants (Batterham *et al.*, 2018).

Group differences between those who ideate and attempt suicide were investigated using independent-samples *t* tests for continuous variables and χ^2 tests for categorical variables. Next, all independent variables (regardless of whether they significantly distinguished between the ideation and attempt groups at the bivariate level) were entered into a multivariate logistic regression to determine their relative contributions. Crude (OR) and adjusted (aOR) odds ratios, and their 95% confidence intervals (CI) are reported as estimates of the likelihood that individuals with suicidal ideation also attempted suicide. Since there were minimal missing data ($n = 87$), cases with missing data were listwise deleted for all analyses (conducted in SPSS version 25). Those who were excluded did not significantly differ from the sample as a whole on demographic and criminological characteristics, and suicidal history. All tests were two-tailed, and *p* values < 0.05 were considered statistically significant.

Results

Participants

Across 15 Belgian prisons, 1326 adult offenders (1203 men) with complete data on outcome measures (suicidal ideation and attempt) were included in the study. The majority of all participants had the Belgian nationality (73.5%) and their mean age was 37.7 years (s.d. = 11.8; range 18–77). One in three (34.6%) was currently on remand, while the remaining 867 participants (65.4%) were sentenced. One-fourth (26.3%) of the participants were charged with, or convicted of, a violent index offence. The modal length of time in prison was 1–6 months (28.6%), and half (50.3%) of the sample had been incarcerated for more than one year at the time of assessment.

Prevalence rates

The estimated lifetime prevalence of suicidal ideation and suicide attempt among prisoners was 44.4% (95% CI 41.7–47.1) and 21.8% (95% CI 19.6–24.0), respectively (Table 1). Women were significantly more likely than men to report a lifetime history of suicidal ideation (57.7% *v.* 43.1%; OR 1.81, $p = 0.002$) and suicide attempt (36.6% *v.* 20.3%; OR 2.27, $p < 0.0001$). Of the overall sample of 1326 prisoners, 725 (54.7%) had no suicidal history, 312 (23.5%) reported suicidal ideation only, and 289 (21.8%) attempted suicide in their lifetime. Of those endorsing a suicide attempt, 12 participants (4.2%) did not report a history of suicidal ideation. After exclusion of these 12 cases (0.9% of the total sample), our findings show that 47% (95% CI 43.0–51.1) of all participants with suicidal ideation ($n = 589$) also report having made a suicide attempt; significantly more women than men (62.0% *v.* 45.0%; OR 1.99, $p = 0.007$).

Bivariate and multivariate analyses

We compared prisoners who reported suicidal ideation only (ideation group; $n = 312$) with those who reported both suicidal ideation and attempts (attempt group; $n = 277$). Descriptive statistics by group membership (ideation *v.* attempt) and bivariate differences between both groups are presented in Table 2. Relative to those in the ideation group, those who acted on their suicidal thoughts were significantly more likely to be female (OR 1.99, 95% CI 2.00–3.32; $p = 0.007$), Belgian nationals (OR 2.27, 95% CI 1.41–3.66; $p = 0.001$) and sentenced (OR 1.56, 95% CI 1.10–2.21; $p = 0.012$). Prisoners who report a suicide attempt were twice as likely to be incarcerated for a violence offence than those in the ideation group (OR 1.98, 95% CI 1.39–2.80; $p < 0.001$). Clinically, significantly more of those in the attempt group self-reported a mental disorder diagnosis (OR 3.85, 95% CI 2.71–5.47) and substance abuse (OR 2.12, 95% CI 1.48–3.05) compared to those in the ideation group (both $p < 0.0001$). Nearly half (45.8%) of participants in the attempt group reported a history of NSSI, contrasting the much lower rates of NSSI (18.3%) among those in the ideation group; a difference which was significant (OR 3.79, 95% CI 2.61–5.49; $p < 0.0001$). Last, those in the suicide attempt group more frequently endorsed a family history of suicidal behaviour, with 42.6% reporting such exposure, compared to 31.1% in the ideation group (OR 1.65, 95% CI 1.17–2.31; $p = 0.004$).

Results of the multivariate analysis are presented in Table 3. The full model containing all predictor variables was statistically significant [$\chi^2_{(10)} = 127.01$; $p < 0.0001$], indicating that the model was able to distinguish between the ideation ($n = 312$) and attempt ($n = 277$) groups. Although gender, criminal status and family history were all bivariate correlates of suicide attempt among those with suicidal ideation, none of these remained significant in the multivariate model (all $p \geq 0.081$). Controlling for all other variables in the model, the factors that independently distinguished those who attempted suicide from those in the ideation group were violent offending (aOR 2.33, 95% CI 1.49–3.62; $p < 0.001$), NSSI history (aOR 3.19, 95% CI 2.09–4.86; $p < 0.0001$), mental disorder diagnosis (aOR 2.84, 95% CI 1.91–4.24; $p < 0.0001$) and substance abuse (aOR 2.01, 95% CI 1.24–3.28; $p = 0.005$). Three of these four variables (substance abuse being the exception; $p = 0.005$) were associated with significantly increased odds of suicide attempts among those with suicidal ideation after correcting for multiple comparisons (i.e. $p < 0.005$ with Bonferroni correction).

Discussion

To the best of our knowledge, this study is only the second (Larney *et al.*, 2012) to specifically examine the extent to which suicide risk factors distinguish between prisoners who had attempted suicide and those who had only thought about suicide. There are four major findings from this study.

First, suicidal ideation and attempts are common among prisoners in Belgium. An estimated two out of five (44%) participants have experienced suicidal thoughts during their lifetime, while one-fifth (22%) report a suicide attempt over the lifespan. These prevalence rates largely align with prior estimates found among adult prisoners in England and Wales (Jenkins *et al.*, 2005), Italy (Sarchiapone *et al.*, 2009) and Australia (Larney *et al.*, 2012), which are highly elevated relative to those observed among non-incarcerated people in the surrounding community

Table 1. Lifetime prevalence of suicidal ideation and attempt, by gender

	All prisoners (%)	Women (%)	Men (%)	OR (95% CI)
In the total sample				
Suicidal ideation	44.4 (41.7–47.1)	57.7 (48.9–66.6)	43.1 (40.3–45.9)	1.81 (1.24–2.63)
Suicide attempt	21.8 (19.6–24.0)	36.6 (28.0–45.2)	20.3 (18.0–22.6)	2.27 (1.53–3.36)
Base (n)	1326	123	1203	
Among those with ideation				
Suicide attempt	47.0 (43.0–51.1)	62.0 (50.4–73.5)	45.0 (40.7–49.3)	1.99 (1.20–3.32)
Base (n)	589	71	518	

OR, odds ratio; CI, confidence interval.

(Nock *et al.*, 2008). Furthermore, among the 589 participants in our study with a lifetime history of suicidal ideation, 47% had ever attempted suicide. Similarly, in a random sample of 996 Australian prisoners, over half (58%) of the participants with suicidal ideation reported a lifetime suicide attempt (Larney *et al.*, 2012). This ratio of suicide attempts to suicidal ideation in prisoners is substantially higher than the 29% found among adults in the general population (Nock *et al.*, 2008). This is an important finding which requires further exploration to determine whether prisoners are faster to make the transition from thoughts to acts of suicide, and why. Collectively, our results illustrate the ubiquitous nature of suicidal thoughts and behaviour among incarcerated offenders, supporting the well-established finding that prisoners constitute a particularly high-risk group for suicide (Fazel *et al.*, 2017; Favril *et al.*, 2019).

Second, several factors in our analysis clearly discriminated between those who ideate and attempt suicide in a multivariate context. Notably, NSSI conferred a threefold increased risk of suicide attempt among prisoners with suicidal ideation, which adds to an extensive body of literature documenting that NSSI robustly predicts the progression from suicidal ideation to attempt among youth (Taliaferro and Muehlenkamp, 2014; Kiekens *et al.*, 2018; Georgiades *et al.*, 2019; Mars *et al.*, 2019b). Similarly, violent offenders in our study were found to be twice as likely to act on their suicidal thoughts compared with their non-violent peers. *Post hoc* analyses suggest that this association is largely attributable to homicidal crimes as a further breakdown by type of violent offences indicates that sexual offences did not meaningfully distinguish between those in the attempt and ideation groups. Little other research, however, has provided insight into the potential role that violent crime might play in the transition from ideation to action. One Italian study suggests that violent index offences (excluding sexual crimes) are associated with suicide attempts, but not with suicidal ideation, in 903 male prisoners (Sarchiapone *et al.*, 2009). Together, these findings are consistent with converging empirical evidence (O'Connor *et al.*, 2012; May and Klonsky, 2016; Wetherall *et al.*, 2018; Mars *et al.*, 2019a) and recent theoretical models (Van Orden *et al.*, 2010; Klonsky and May, 2015; O'Connor and Kirtley, 2018) that emphasize the role of a *suicide capability* in the progression from thoughts to acts of suicide. This capability to carry out a suicidal act is key in order for an individual to bridge the behavioural threshold from suicidal ideation to action, which is thought to be acquired through exposure to painful and provocative events (May and Victor, 2018). Our results align with this assumption, as the two factors that independently distinguished between

those who think about suicide and those who attempt suicide – NSSI and violent offending – appear to directly facilitate habituation to violence and pain, which in turn may serve to promote one's propensity to act on suicidal thoughts (Joiner *et al.*, 2012; Klonsky *et al.*, 2013; Stack, 2014; Swogger *et al.*, 2014; Rooney *et al.*, 2019). Moreover, aggression directed towards others (interpersonal violence) and oneself (NSSI) may share a common underlying vulnerability (O'Donnell *et al.*, 2015). In this regard, childhood maltreatment and impulse control deficiencies may be implicated in both (McMahon *et al.*, 2018), which are potential contributors to an increased capability for suicide.

Third, clinical factors that differentiated between prisoners who had attempted suicide (attempt group) and those who had thought about suicide without making an attempt (ideation group) are mental disorder diagnoses and substance abuse. In support of our findings, a recent population-based birth cohort study (Mars *et al.*, 2019a) indicates that the presence of a mental disorder and illicit drug use are two factors that meaningfully distinguish between those who ideate *v.* attempt suicide. The use of illicit substances may lower inhibition and impair decision-making, making it more likely that prisoners will act upon their suicidal thoughts (Saffer and Klonsky, 2018). With regard to mental disorders, both meta-analytical (May and Klonsky, 2016) and epidemiological (Borges *et al.*, 2010; Nock *et al.*, 2010; Batterham *et al.*, 2018; Millner *et al.*, 2019) evidence suggests that disorders characterized by anxiety (e.g. posttraumatic stress disorder) and poor impulse control (e.g. substance use disorders) best predict which individuals will progress from suicidal thoughts to attempts. In the current study, however, we did not examine individual mental disorders, limiting a more fine-grained analysis to determine their unique contributions. Nonetheless, it is clear that the presence of (certain) mental disorders plays a key role in governing the translation of suicidal thoughts into attempts. Since mental disorders are disproportionately prevalent in prisoners (Fazel *et al.*, 2016; Favril and Dirkzwager, 2019), and general population findings may therefore not be generalized to justice-involved individuals, future research should explore how specific mental disorders differentially relate to distinct stages of the suicidal process among prisoners. A study addressing this important question among a nationally representative sample of New Zealand prisoners is currently underway.

Fourth, contrary to mounting evidence that exposure to suicidal behaviour in others reliably distinguishes between youth with suicidal ideation and attempts (O'Connor *et al.*, 2012; Dhingra *et al.*, 2015; Mars *et al.*, 2019a), a family history of suicidal behaviour was not significantly associated with attempts

Table 2. Descriptive statistics and bivariate associations by group membership

	Ideation group (<i>n</i> = 312)	Attempt group (<i>n</i> = 277)	OR (95% CI)	<i>p</i> value
Female gender	27 (8.7)	44 (15.9)	1.99 (2.00–3.32)	0.007
Age, years	38.0 (11.9)	38.0 (10.5)	1.00 (0.99–1.01)	0.976
Belgian nationality	247 (79.7)	249 (89.9)	2.27 (1.41–3.66)	0.001
Partnership	123 (39.4)	94 (33.9)	0.79 (0.56–1.11)	0.168
Sentenced status	195 (62.5)	200 (72.2)	1.56 (1.10–2.21)	0.012
Violent offending	82 (26.9)	114 (42.1)	1.98 (1.39–2.80)	<0.001
Substance abuse	192 (61.5)	214 (77.3)	2.12 (1.48–3.05)	<0.0001
Mental disorder	134 (42.9)	206 (74.4)	3.85 (2.71–5.47)	<0.0001
Lifetime NSSI	57 (18.3)	127 (45.8)	3.79 (2.61–5.49)	<0.0001
Family history	97 (31.1)	118 (42.6)	1.65 (1.17–2.31)	0.004

Note. Data are presented as *n* (%) for categorical data and *M* (s.d.) for continuous data.

among prisoners with suicidal thoughts in this study once other factors were controlled for. Similarly, in a recent national study in Scotland, a family history of suicidal behaviour did not significantly differentiate those with a history of ideation from those who had attempted suicide, whereas exposure to a suicide attempt of a close friend did (Wetherall *et al.*, 2018). Given the relatively high frequency of familial exposure to suicidal behaviour in both (ideation and attempt) groups of prisoners, it is important not to dismiss the association between exposure and suicide risk entirely. Indeed, research should look beyond the crude frequencies of suicidal behaviour that one is exposed to, and shift its focus to different aspects of exposure (e.g. perceived impact and closeness to the decedent; Cerel *et al.*, 2017) which may explain why some prisoners who experience suicidal ideation are propelled towards suicide, whereas others are not.

Moreover, exposure to suicidal behaviour by fellow prisoners has been linked to increased levels of suicidal ideation, attempts and psychiatric morbidity in incarcerated men (Favril *et al.*, 2017; Hales *et al.*, 2015). Likewise, a large epidemiological study based on 2004–2009 administrative data in English and Welsh prisons found evidence of clustering in time and location of prisoners self-harming, suggesting a possible contagion effect within closed settings such as prisons (Hawton *et al.*, 2014). Relatedly, another prison-specific factor potentially implicated in the progression from ideation to action includes single-cell accommodation (Fazel *et al.*, 2008; Favril *et al.*, 2019). Occupying a single cell may confer increased risk due to the isolated environment within which prisoners are placed, in that they have the time and privacy to attempt suicide (Humber *et al.*, 2013). This may increase the likelihood that suicidal thoughts will be acted on, just as access to lethal means can be regarded as an environmental factor facilitating the transition from thoughts to acts of suicide, rather than being directly causative. Understanding the impact of these modifiable aspects of the prison environment on behavioural enactment in prisoners with suicidal ideation represents an important avenue of future research to better predict risk and target interventions.

Strengths and limitations

This study is one of the few to delineate factors associated with suicide attempts among prisoners with suicidal ideation, thereby

helping us to better understand the transition from ideation to action in an understudied population at high risk for suicide. A noteworthy strength of the study is its large sample (*n* = 1326), representing 13.5% of the average daily prisoner population in Belgium (*N* = 9835), which was broadly representative of the annual census data during the study period (Favril and Dirkzwager, 2019). Six methodological limitations should however be borne in mind when interpreting the results of this study.

First, the use of cross-sectional data prohibits inferences about causality and did not afford opportunities to test the temporal assumptions that were proposed. Since measures of suicidal history were assessed on a lifetime basis (Larney *et al.*, 2012; May and Klonsky, 2016), the lack of precise temporal ordering may limit our interpretation of the nature of these associations. Second, data were based on retrospective self-report and thus may be subject to social desirability and biased recall. For example, participants in our study may have underreported sensitive information (e.g. psychiatric morbidity and suicidal history) due to stigma or fear of negative consequences, despite the anonymous nature of the survey. To the extent that this was the case, prevalence rates may be lower bound estimates. Third, a single-item assessment for both suicidal ideation and attempts was used. Although commonly adopted in prison research (Jenkins *et al.*, 2005; Larney *et al.*, 2012) and similar ideation-to-action studies (Wetherall *et al.*, 2018; Mars *et al.*, 2019a), such an approach may bias results towards an overestimation of prevalence rates due to misclassification (Millner *et al.*, 2015). In doing so, we were unable to establish the intensity or severity of suicide-related outcomes – both the suicide attempt and ideation-only group therefore reflect a heterogeneous composition of suicidal individuals. Future studies should assess the characteristics of suicidal thinking (e.g. recency of ideation onset, active *v.* passive ideation, frequency and uncontrollability of these thoughts, severity of ideation at its worst point and presence of a suicide plan) as these features have been shown to predict the transition to suicide attempt (Nock *et al.*, 2008, 2018; Miranda *et al.*, 2014). In a similar vein, most predictor variables in the analyses were dichotomous clinical variables, as opposed to more fine-grained continuous scales, limiting the ability to detect between-group differences. Fourth, we were also limited in the number of risk factors (potentially linked to a capability for suicide) that we could assess. Future research should

Table 3. Multivariate regression for suicide attempt among those with suicidal ideation

	B	s.e.	Wald	aOR (95% CI)	p value
Female gender	0.507	0.291	3.040	1.66 (0.94–2.94)	0.081
Age	0.014	0.010	2.136	1.02 (1.00–1.03)	0.144
Belgian nationality	0.264	0.291	0.823	1.30 (0.74–2.30)	0.364
Partnership	–0.036	0.203	0.031	0.97 (0.65–1.44)	0.860
Sentenced status	0.126	0.207	0.368	1.13 (0.76–1.70)	0.544
Violent offending	0.844	0.226	13.969	2.33 (1.49–3.62)	<0.001
Substance abuse	0.699	0.249	7.877	2.01 (1.24–3.28)	0.005
Mental disorder	1.045	0.204	26.156	2.84 (1.91–4.24)	<0.0001
Lifetime NSSI	1.159	0.215	28.979	3.19 (2.09–4.86)	<0.0001
Family history	0.252	0.199	1.600	1.29 (0.87–1.90)	0.206

Note. aOR, adjusted odds ratios (adjusted for all other factors in the multivariate model) and their 95% confidence intervals (CI).

investigate the extent to which impulsivity, aggression, childhood maltreatment, and traumatic brain injury—all highly prevalent in offender populations—are implicated in behavioural enactment among prisoners. Fifth, our data examined the presence of non-fatal suicidal outcomes, but not suicide. Because differences exist between fatal and non-fatal suicidal behaviours (Boren *et al.*, 2018), the current findings may not be generalizable to prisoners who have died by suicide (Favril *et al.*, 2019). Finally, we cannot comment on the extent to which incarceration impacts upon the risk of future suicidal behaviour while incarcerated (or beyond). An important recommendation for further research, therefore, relates to the timing of suicidal outcomes. Rather than focusing on prisoners' *lifetime* histories, future studies should examine suicide attempts *in prison* as an outcome variable, whilst controlling for recent suicidal ideation. This would allow for the elucidation of custody-specific stressors and modifiable aspects of the prison regime that may play a role in the progression from thoughts to acts of suicide while incarcerated (Marzano *et al.*, 2016; Favril *et al.*, 2017).

Each of these limitations restricts the inferences that can be drawn from this study and represents the areas for improvement in future research. These methodological caveats notwithstanding, our results make a solid contribution to the literature as it provides a rare exploration of the ideation-to-action framework among prisoners, which has several implications for both clinical practice and suicide theory.

Clinical and research implications

Given that half of the prisoners who experience suicidal thoughts at some point attempt suicide, the high rate of suicidal ideation among prisoners requires prevention strategies targeting the early stages of the suicidal process. From a clinical point of view, identifying which prisoners are at greatest risk for acting on their suicidal thoughts, and providing them with timely and effective interventions, is imperative in order to ameliorate the risk of subsequent suicidal behaviour.

Our results underscore the need for identifying and treating prisoners' mental disorders, substance abuse and NSSI in the prevention of suicide (Jenkins *et al.*, 2005; Fazel *et al.*, 2016; Marzano *et al.*, 2016), as they are presumably implicated in the progression from ideation to action. In order to identify such high-risk groups

who might benefit from targeted interventions, screening instruments should therefore, amongst others, incorporate questions about these clinical variables (Marzano *et al.*, 2016; Brown *et al.*, 2017; Gould *et al.*, 2018). Although of interest, however, reliance on such factors may be of limited practical use for identifying suicidal prisoners prone to behavioural enactment, owing to their overall high prevalence in mainstream prisoner populations (Fazel *et al.*, 2016; Favril and Dirkwager, 2019). Therefore, guided by specific constructs from the *Research Domain Criteria* (Glenn *et al.*, 2018), future research should focus on novel volitional factors implicated in the transition from ideation to action, and test the predictive validity of screening instruments incorporating such factors.

This study also has several implications on a theoretical level. Not only do our findings add to the growing literature supporting an ideation-to-action framework (Klonsky *et al.*, 2018), they also expand its applicability to an understudied and high-risk population – prisoners – in which factors related to behavioural enactment (e.g. violent offending) may hold particular relevance. However, since the current study was largely exploratory in nature, and the included predictors were in no way exhaustive, future research should test *a priori* hypotheses that make specific predictions about why certain prisoners come to think about suicide and subsequently progress from ideation to action, whereas others do not. This would be a significant advance in the field as it moves beyond describing characteristics of suicidal outcomes to formulating inferential and theory-driven hypotheses about factors that are associated with the development of suicidal ideation relative to those increasing the likelihood that suicidal thoughts are acted upon (O'Connor *et al.*, 2012; Wetherall *et al.*, 2018).

Conclusion

Almost half of the prisoners who experience suicidal ideation also attempt suicide. Pending replication, our results suggest that factors facilitating the transition from ideation to action include violent offending, prior NSSI, mental disorders and substance abuse. In view of the clinical importance of being able to make predictions about behavioural enactment among prisoners considering suicide, prospective studies should build on these findings and further delineate risk (and protective) factors that enable (or impede) progression from thoughts to acts of suicide over time.

In sum, advancing our understanding of longitudinal predictors and mechanisms through which people come to think about suicide and subsequently cross the behavioural threshold towards attempting suicide could inform the development of interventions aimed at reducing the likelihood of individuals acting on their suicidal thoughts – in prisons and elsewhere.

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Ethical standards. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

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