

PAPER

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Suicidality in Male Prisoners: Influence of Childhood Adversity Mediated by Dimensions of Personality*

ABSTRACT: This study aims to study the influence of childhood adversity on suicidal behavior in male prisoners. Including a random sample of 899 male prisoners (French National Mental Health Prison Survey, 2003), this paper studied suicidal ideations and suicide attempts using MINI criteria, and personality using Temperament and Character Inventory. Risk factors of suicidality were examined, and structural equations studied the influence of childhood trauma on suicidality, mediated by personality dimensions. The prisoners reported high levels of childhood adversity. More than a third reported recent suicidal ideations. Childhood adversity and dimensions of personality were associated with suicidality. Structural equations showed that childhood adversity was positively associated with suicidality, mediated by poor dimensions of character (affective stability, self-cooperativeness, and self-transcendence). In conclusion, these results confirm the importance of screening and treatment of childhood trauma among male prisoners. They suggest the importance to study dimensions of personality and tailor treatment to specific needs.

KEYWORDS: forensic science, suicide attempt, suicidal ideations, personality, childhood adversity, structural equation

Over 8.75 million people are held in penal institutions worldwide (1). Some studies have described an increase in suicides in prison even where numbers of prisoners are decreasing (2,3). Inmates have higher suicide rates than the general population. This has been observed in the United States and in England and Wales, rates being respectively eight and five times higher than in the general population (4). In France, the suicide rate in prison remains high despite many government recommendations in recent years (5,6).

Suicide in prison has become an international health prevention goal (7). This complex public health issue is a national priority in many countries. Detecting the prisoners at highest risk is part of suicide prevention strategies in prison. Many studies sought to identify risk factors for suicide among prisoners, to detect those at highest risk (8–12). A recent systematic review highlights demographic, criminological, and clinical risk factors for completed suicide in prisoners, the main ones being recent suicidal ideation, history of suicide attempts, having current psychiatric diagnosis, or history of alcohol abuse (4).

Most of the existing literature about suicidality or suicide in prison confirms the link with childhood trauma and the link with personality disorders. The few studies that have examined the influence of childhood adversity on suicidality in the particular context of prison have shown a positive association (13,14). In the general

population too, a powerful relationship has been shown between adverse childhood experience and suicidal risk throughout life (15–17). It is also found among drug addicts and patients with mental health disorders (18–21).

The studies that have examined the influence of personality disorders on suicidality in the particular context of prison have shown a positive association. A recent review on mental disorders in prison indicates that 65% of male detainees had a personality disorder (22). All agree that personality disorder is a risk factor for suicidal ideations and suicide attempts (23,24). For example, high *Negative Emotionality* and low *Constraint* scores (equivalent to the contrary of *Novelty seeking* in the Multidimensional Personality Questionnaire) were found to account for the relationship between anti-social behavior and suicidal behavior (25). Some studies have highlighted that personality disorders characterized by impulsiveness, self-harm, aggressive conduct, and identity problems were strongly predictive of suicidal behavior (26–30).

There is a lack of empirical studies in the custody setting on how adverse life events and personality may be associated with increased risk of suicidal behavior. Only one recent study among female prisoners has examined the combined contribution of childhood abuse and personality to suicidal behavior. Verona et al. concluded that the personality traits of high *Negative Emotionality* and low *Behavioral Constraint* mediate the effect of physical abuse in childhood on suicide attempts (31,32). High *Negative Emotionality* could correspond to low *Cooperativeness*.

In a context other than custody, Molnar et al. concluded to the existence of a strong link between childhood sexual abuse and suicidal behavior, mediated by psychopathology (33). A study conducted among disadvantaged African-American women concluded that a cognitive manifestation of depression and hopelessness partially mediates the relationship between childhood adversity and suicide attempt in adulthood (34).

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This literature review led us to the hypothesis of a combined contribution of adverse childhood experiences and personality in the development of suicidality in male prisoners. Instigated by the French Ministries of Health and Justice in 2002, the National Study on Mental Health in French Prisons aimed primarily to determine prevalence estimates for mental disorders in French prisons (35). We used this study to examine suicidality among detainees. First, risk factors for suicidal ideation and risk factors for suicide attempts were explored to ensure that the same risk factors as in literature were found. Second, the aim was to study in male prisoners the influence of childhood adversity on suicidal behavior, as mediated by dimensions of personality.

Methods

Settings

The present study is based on data from the French National Mental Health Prison Survey asked by the French ministries of Health and Justice in 2002. This cross-sectional survey was conducted in France from September 2003 to July 2004, and selected 900 male prisoners from 21 prisons.

Subjects

Prisoners were chosen using a two-stage stratified random.

Prison Selection—A first random sample selected 23 prisons among the 188 French prisons existing at the time of the study. The three types of French prisons represented prisons for remand prisoners and short sentences, prisons for longer sentences, and high security units for very long sentences. Two prisons for women were randomly chosen and the other 21 prisons were only for men.

Prisoner Selection—Among the randomly chosen prisons, a second random sample selected prisoners: 900 male and 100 female detainees. The present study considered only the 900 men prisoners.

Data Collection

The French National Mental Health Prison Survey was initially conducted to determine prevalence of mental health disorders in French prisons and used the following methodology. Each prisoner was interviewed for 2 h by two clinicians (one psychiatrist and one psychologist). Diagnoses were recorded according to a semi-structured procedure validated previously (36): one clinician used a structured clinical interview generating DSM IV diagnosis (MINI plus version 5.0) (37); the other clinician completed the procedure with an open clinical interview (35). Then, the clinical version of Cloninger's Temperament and Character Inventory (TCI) validated in French was used (38,39). Personal, familial, and criminological data were also collected.

Our study did not consider diagnoses but only suicidality, personality dimensions assessed by TCI and finally personal, familial, and criminological data. Contrary to the diagnoses, all the information we used was recorded by only one of the two clinicians.

Suicidality—Recent suicidal behavior was assessed on MINI criteria using a specific section of five questions. Recent suicidal ideations and recent suicide attempts were assessed. "Recent" meant in the month before the interview. Four questions explored recent

suicidal ideations. "In the past month, have you: (i) Thought it would be better if you were dead or wished you were dead? (ii) Wanted to harm yourself? (iii) Thought about suicide? and (iv) Prepared the way you could kill yourself?" These four items were scored to obtain a validated quantitative variable: the suicidal ideations score (range 0–4), higher scores indicating more suicidal ideations. One question explored recent suicide attempts, assessed by a binary variable: "In the past month, have you made a suicide attempt?"

Personality—Dimensions of personality were evaluated using the clinical version of Cloninger's TCI. Cloninger hypothesized a biosocial personality model based on the assumption that personality is composed of inheritable genetic factors (Temperament: *Harm avoidance*, *Novelty seeking*, *Reward dependence*) and of environmental and socio-cultural factors (Character: *Self-directedness*, *Cooperativeness*, *Self-transcendence*, and *Affective stability*). *Harm avoidance* is characterized by worry about potential punishment, *Novelty seeking* by excitement toward novel stimuli, and *Reward dependence* by dependency on social approval. *Self-directedness* refers to self-acceptance and maturity, *Cooperativeness* to social acceptance and identification with other people, and *Self-transcendence* to spiritual acceptance and identification with a wider world (40,41).

Childhood Adversity—Different variables relating to childhood experiences were collected in this study. As in a previous paper based on the data of the same survey, three variables were taken into consideration (42): "ill treatment" ("Did you suffer physical, psychological or sexual abuse in childhood?"), "placement" ("Before you were 18, were you placed in a host family?"), "separated" ("In your childhood, were you separated for at least 6 months from one of your parents?").

Statistical Analysis

First, bivariate, and multivariate analyses were conducted to determine suicide risk factor and to examine the relationships between childhood adversity, personality, and suicidality. Second, the association between childhood adversity and suicidality mediated by dimensions of personality was studied by structural equation models.

Determination of Suicide Risk Factors—The association between suicidality and potential risk factors was analyzed in bivariate manner using Pearson's chi-square, *t*-tests, and Pearson's correlation where appropriate. Then, a stepwise univariate logistic regression and a stepwise univariate linear regression were used to identify independent suicidality risk factors and their relative impact on suicidal behavior. In the multivariate analyses, adverse childhood was studied as a binary variable, "Traumatic event in childhood," corresponding to one or more of the adverse childhood experiences described earlier ("ill treatment," "placement," "separated").

Association Between Childhood Adversity and Suicidality Mediated by Dimensions of Personality—Structural equation models (SEM) were used to study the hypothesis that the association between childhood adversity and suicidality in male offenders could be mediated by dimensions of personality. SEM, also called simultaneous equation models, are multi-equation regression models and correspond to a generalization of linear regression models. The response variable in a regression equation may appear as a

predictor in another equation. Variables in a structural model may influence one another reciprocally, either directly or through other intermediary variables. SEM allows for the incorporation of both observed and unobserved (latent) variables (43). Parameters estimated correspond to the change in standard deviation units of a dependent variable, when an independent variable changes by one standard deviation, the other variables remaining constant (44).

Our hypothesis was tested in two models, each incorporating all outset hypothesis parameters. The direct and indirect effects of childhood adversity on the development of suicidality mediated by dimensions of personality were estimated. In the first model, suicidality in prisoners was assessed by recent suicidal ideations, and in the second model, suicidality was assessed by recent suicide attempts. Childhood trauma was studied as an underlying latent variable indexed with the three indicator variables described earlier: "ill treatment," "placement," and "separated." Childhood trauma defined in this way was used and validated in a previous paper which showed that the residuals of the variables "separated" and "ill treatment" were correlated (42).

Model fit and quality were evaluated. To be considered a good fit, models require a nonsignificant maximum likelihood goodness-of-fit, a RMSEA (root mean square error approximation) under 0.05 (45), and a NFI (Normed Fit Index) over 0.95 (46).

Statistical analyses were performed with SAS version 9.1 (Statistical Analysis System Institute, Cary, NC). For all analyses, *p*-values were two-tailed and differences considered significant at *p* < 0.05. We used SAS Proc CALIS procedure for SEM.

Missing Data—The following variables had more than 2% missing data: crime committed, work assignment in prison, sentence length, and TCI variables (11.12% missing data). The reason for missing data on TCI variables relates to the limited time available for the interviews, depending on the local constraints of each prison.

Ethics—Complete study information was provided for inmates, and the written informed consent of each prisoner enrolled in the study was obtained. The protocol was approved by a Hospital Ethics Committee and by the French Commission on Individual Freedom and Data Storage.

Results

Population Characteristics

Tables 1 and 2 display the characteristics of the population study. Ages of prisoners ranged from 19 to 84 years, with a median of 37 years. Before incarceration, 89.6% were in individual housing

TABLE 1—Demographic and imprisonment status: characteristics of the population study (n = 899). Risk factors of suicide attempts and risk factors of suicidal ideations (bivariate analysis)

Demographic Status	Total	Suicide Attempt			Suicidality Score*
	% (n)	Yes (n = 43, %)	No (n = 856, %)	<i>p</i>	<i>p</i>
<i>Age</i>					
19–29	29.2 (262)	41.9	28.2	0.16	0.0007
30–39	27.1 (243)	32.6	26.9		
40–49	23.2 (208)	16.3	24.0		
50–59	12.3 (110)	7.0	12.4		
60 and more	8.2 (73)	2.3	8.6		
<i>Marital status</i>					
Married	36.6 (328)	32.6	37.2	0.42	0.83
Separated or widowed	21.2 (190)	14.0	21.9		
Single	42.2 (378)	53.5	40.9		
<i>Education</i>					
University	7.1 (63)	2.3	7.6	0.63	0.12
French high-school diploma (Baccalauréat)	9.8 (88)	4.7	10.3		
Lower secondary school diploma	36.5 (326)	44.2	36.1		
No school diploma	46.6 (417)	48.9	46.1		
<i>Type of housing before incarceration</i>					
Individual	89.6 (801)	83.3	90.0	0.08	0.25
Other (hotel, accommodation center, other)	6.7 (60)	7.2	6.7		
Homeless	3.7 (33)	9.5	3.3		
<i>Employment >2 years before incarceration</i>	63.1 (513)	44.4	65.0	0.01	0.004
<i>Disabled adult allowance</i>	7.0 (56)	15.4	6.5	0.04	0.002
<i>Imprisonment status</i>					
Family history of imprisonment	30.2 (266)	48.8	29.0	0.007	0.01
<i>Status in custody</i>					
Sentenced offenders	71.0 (636)	76.7	70.9	0.46	0.20
Detained on remand	26.5 (237)	23.2	26.3		
Both	2.6 (23)	0	2.8		
<i>Crime against people</i>	59.2 (532)	53.5	59.7	0.42	0.37
<i>Length of sentence</i>					
<1 month	0.2 (1)	0.0	0.2	0.005	0.003
1–6 months	4.4 (29)	3.0	4.6		
6 months–1 year	11.9 (78)	21.2	10.7		
1–5 years	34.6 (227)	54.6	33.3		
>5 years	49.0 (322)	21.2	51.2		
<i>Working activity in prison</i>	50.5 (440)	31.7	51.5	0.01	0.31
<i>Disciplinary measure</i>	22.9 (204)	41.9	22.1	0.002	0.09
<i>Previous incarceration</i>	48.9 (437)	72.1	47.6	0.002	0.001

*In the month before the interview.

Numbers in bold indicate risk factors significant for both suicide attempts and suicidal ideations.

TABLE 2—Suicidality, adverse childhood and personality: characteristics of the population study (n = 899) and suicidality risk factors (bivariate analysis).

Suicidality	Total	Suicide Attempt*			Suicidality Score*
	% (n)	Yes (n = 43, %)	No (n = 856, %)	p	p
Previous suicide attempt	26.9 (236)	81.4	24.2	0.0001	0.0001
Recent suicide attempt	4.9 (43)	—	—	—	0.0001
Recent suicidality score				0.009	—
0	71.4 (608)	2.3	75.0		—
1	8.5 (72)	2.3	8.8		—
2	5.3 (45)	13.9	4.8		—
3	6.9 (59)	25.6	6.0		—
4	7.9 (67)	55.8	5.3		—
<i>Adverse childhood events</i>					
Placement	22.1 (197)	41.9	20.9	0.001	0.0003
Separation from one parent > 6 months	44.1 (391)	60.5	43.2	0.03	0.007
Ill-treatment	28.5 (254)	58.1	27.0	0.0001	0.0001
	Mean (SD)	Mean (SD)	Mean (SD)	p	p
<i>Character inventory</i>					
Self-directedness	8.7 (1.17)	7.8 (1.39)	8.8 (1.13)	0.0001	0.0001
Cooperativeness	8.8 (1.22)	8.3 (1.35)	8.9 (1.20)	0.006	0.0007
Transcendence	8.3 (1.51)	7.3 (1.73)	8.4 (1.48)	0.0001	0.0001
Affective stability	8.5 (1.37)	6.8 (1.60)	8.4 (1.32)	0.0001	0.0001
<i>Temperament inventory</i>					
Novelty seeking	10.1 (2.79)	11.5 (2.56)	10.0 (2.75)	0.002	0.0001
Harm avoidance	9.5 (3.09)	11.5 (3.55)	9.4 (3.03)	0.0003	0.0001
Reward dependence	10.7 (2.71)	11.3 (2.72)	10.6 (2.71)	0.17	0.02
	% (n)	Yes (%)	No (%)	p	p
<i>Character inventory</i>					
Low self-directedness†	19.7 (160)	55.3	17.5	0.0001	0.0001
Low cooperativeness	17.8 (144)	39.5	16.6	0.0003	0.0001
Low transcendence	37.2 (297)	73.7	35.4	0.0001	0.0001
Low affective stability	30.3 (244)	71.1	28.0	0.0001	0.0001
<i>Temperament inventory</i>					
Novelty seeking					
Low†	38.3 (304)	31.4	38.7	0.04	0.0001
Moderate	22.9 (182)	11.4	24.0		
High	38.7 (307)	57.1	37.3		
Harm avoidance					
Low	46.4 (367)	22.9	47.3	0.0001	0.0001
Moderate	23.4 (185)	8.6	24.5		
High	30.1 (238)	68.6	28.0		
Reward dependence					
Low	27.3 (214)	29.4	27.5	0.45	0.27
Moderate	29.7 (233)	20.6	30.5		
High	43.0 (337)	50.0	42.0		

*In the month before the interview.

†Low: score ≤ 7, Moderate: 8 ≤ score ≤ 10, High: score > 11.

and 63.1% had had employment for 2 years. Almost half of the inmates had a previous incarceration. Half had a working activity in prison, and just under a quarter reported a history of disciplinary measures.

Suicidality—More than a quarter reported a history of lifetime suicide attempt. For the month before the interview, 4.9% reported attempted suicide (n = 43). The suicidal ideation score was 3 for 6.9% (n = 59) and 4 for 7.9% of the prisoners (n = 67), while 71.4% had a suicidality score of zero. Suicide attempts and suicidal ideation during the last month were strongly correlated (p < 0.0001), and 81.5% of detainees reporting a recent suicide attempt had a suicidal ideation score of 3 or more.

Childhood Adversity—The prisoners reported high levels of childhood adversity. 28.5% of them reported having been ill-treated (“Did you suffer physical, psychological or sexual abuse in childhood?”), 22.1% reported having placed (“Before you were 18,

were you placed in a host family?”), and 44.1% reported having been separated from one parent more than 6 months during childhood (“In your childhood, were you separated for at least 6 months from one of your parents?”).

Personality (Character and Temperament)—Regarding character, 19.7% of prisoners had low scores for *Self-directedness*, 17.8% had low scores for *Cooperativeness*, 37.2% had low scores for *Transcendence*, and 30.3% had low scores for *Affective stability*. Regarding temperament, 38.7% of detainees showed high scores for *Novelty seeking*, 30.1% for *Harm avoidance*, and 43.0% for *Reward dependence*.

Risk Factors for Suicidality

Tables 1 and 2 display the risk factors for suicidality. It suggested that protective factors against suicidality were “employment for more than 2 years before incarceration” and “working activity

in prison.” Conversely, high suicidal ideations scores and recent suicide attempt were both more frequent if the following factors were present: a sentence of <5 years, a disabled adult allowance, previous incarceration, disciplinary measures in prison, and previous suicide attempt. Both were also more frequent if prisoners had suffered abuse in childhood.

Concerning character variables, low scores for *Self-directedness*, for *Cooperativeness*, for *Transcendence*, and for *Affective stability* were associated with an increased risk of suicidality. Regarding temperament variables, high scores for *Novelty seeking* and *Harm avoidance* were associated with an increased risk of suicidality. The multivariate analysis highlighted independent associations between suicidality and the following risk actors. Prisoners with recent suicide attempt were more likely to have had disciplinary measure (OR = 2.01), traumatic event in childhood (OR = 2.14), and previous suicide attempt (OR = 9.86). Suicidal ideations were positively associated with previous incarceration, traumatic event in childhood, and disciplinary measures (Tables 3 and 4).

Role of Childhood Adversity in Suicidality Mediated by Personality Dimensions (Structural Models)

For suicidal ideations, there was a significant indirect influence of childhood adversity through poor *Affective stability* (0.29). For recent suicide attempt, there was a significant indirect influence of childhood adversity through poor *Affective stability* (0.28), poor *Self-transcendence* (0.24) and through poor *Self-cooperativeness* (0.267). The role of childhood adversity in suicidality appeared not to be mediated by temperament factors (Figs 1 and 2).

In the two models, there was an indirect influence of childhood adversity on suicidality in prisoners through personality profiles. Nevertheless, we did not show any direct effect meaning that there is no influence of childhood adversity on suicidality independently of personality profiles. The influence of childhood adversity on suicidality is dependent on personality profiles.

Both models possessed satisfactory fit: Goodness-of-fit test non-significant, RMSEA value smaller than 0.05, and NFI value higher than 0.95. The high coefficients (from 0.41 to 0.69) associated with the latent variable “childhood adversity” showed its consistency.

Discussion

Results

Besides the fact that our study shows the same risk factors for suicidality in prison as those reported in the literature, it highlights important points: First, this study shows a high prevalence of suicidal behavior in prison. Over a quarter reported suicidal ideations and 5% reported a suicide attempt in the month before the study. Data show also a high prevalence of adverse childhood experiences among inmates. Second, results show an association between childhood adversity and suicidality in prisoners and also indicate an

association between suicidality and personality of detainees. Finally, the pathway analysis shows that our assumption is verified: there is an influence of childhood adversity on the development of suicidal behavior in custodial context, mediated by dimensions of character. The influence of childhood adversity on suicidality is dependent on personality profiles. In the first model, having suffered childhood adversity appears to reduce *Self-cooperativeness*, *Affective stability*, and *Self-transcendence*, which influence the development of suicidal ideations. In the second model, childhood adversity influences low *Affective stability*, which influences the risk of suicide attempt. The pathway analysis highlights the link between suicidal ideations in prison and childhood adversity, mediated by poor *Self-cooperativeness*, *Affective stability*, and *Self-transcendence*, and that suicide attempts are associated with adverse childhood experience, mediated by poor *Affective stability*.

In contrast, no influence of the temperament variables was highlighted in either model. This was expected, as temperament is thought to be a constant in the composition of a subject’s personality (38).

Comparison with Other Studies

The few studies that have examined the influence of childhood adversity on suicidality in the particular context of prison have shown a positive association, as in the present study (13,14). The review by Fazel on completed suicide in prison reveals no association between personality and suicide, but this observation involves only one study (4). This highlights the fact that further research is needed on the difference between suicidal behavior and completed suicide.

A few studies have focused on suicidal behavior and personality in custodial setting, but none used the TCI.

Our findings match general population results, where low *Self-directedness* and low *Cooperativeness* have been identified as increasing the risk of attempted and completed suicide (47,48). The TCI temperament dimensions are not systematically associated with suicide risk. Higher scores for *Harm avoidance* and *Novelty seeking* have been shown in depressed patients with a history of suicide attempt, which was not shown in another study (49–51). Different studies using other personality dimensions show a relationship between suicidality and personality (52–54).

In all cases, caution is required when studying dimensions of personality. A recent study evaluated a sample of suicide attempters; they showed lower *Self-directedness* and *Self-cooperativeness* scores and higher *Harm avoidance* scores than for healthy controls. Then suicide attempters were compared with nonsuicidal mood disorder patients, and no difference was found between these two groups. This illustrates that psychopathology is a very important aspect in determining a personality profile for suicide attempters (55).

Limitations of the Study

Suicide risk was assessed in a declarative way that can induce some bias (a prisoner could claim a suicide attempt to gain the

TABLE 3—Association between recent suicide attempt and risk factors (univariate logistic regression analysis).

Risk Factor	Suicide Attempt in the Past Month	
	Odds Ratio	p-Value
Disciplinary measure	2.01	0.03
Traumatic event in childhood	2.14	0.02
History of suicide attempt	9.86	9.60 E-12

TABLE 4—Association between suicidal ideations and risk factors (univariate linear regression analysis).

Risk Factor	Suicidal Ideations Score	
	Linear Regression Coefficient	p-Value
Previous incarceration	0.22	0.005
Traumatic event in childhood	0.23	0.01
History of suicide attempt	1.07	2.20E-16

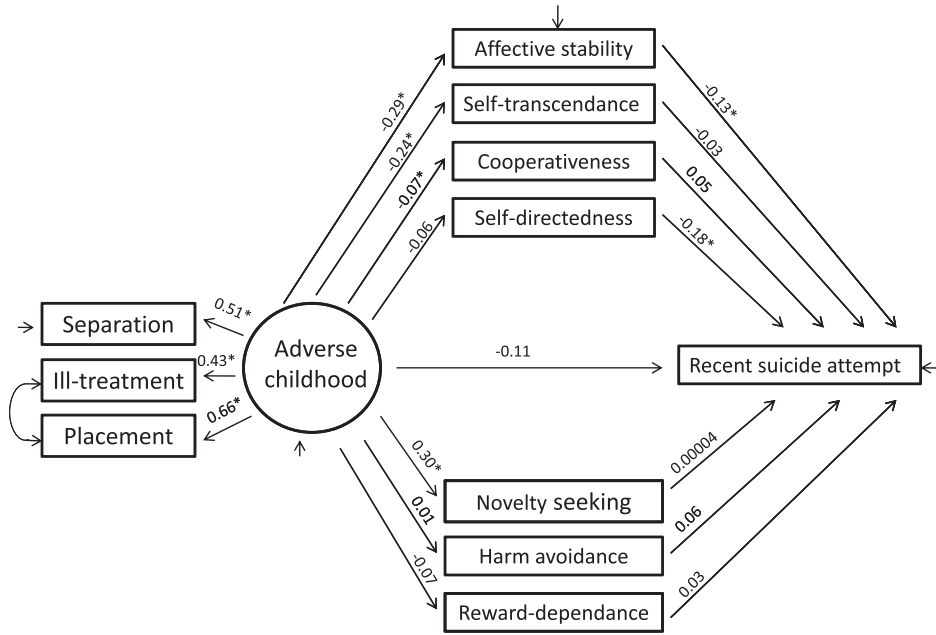


FIG. 1—Pathways to recent suicide attempt in a cohort of French male prisoners (n = 899). Rectangles represent observed variables, and circles represent unobserved latent variables. Numbers on single-head arrows are standardized coefficients. *p < 0.05.

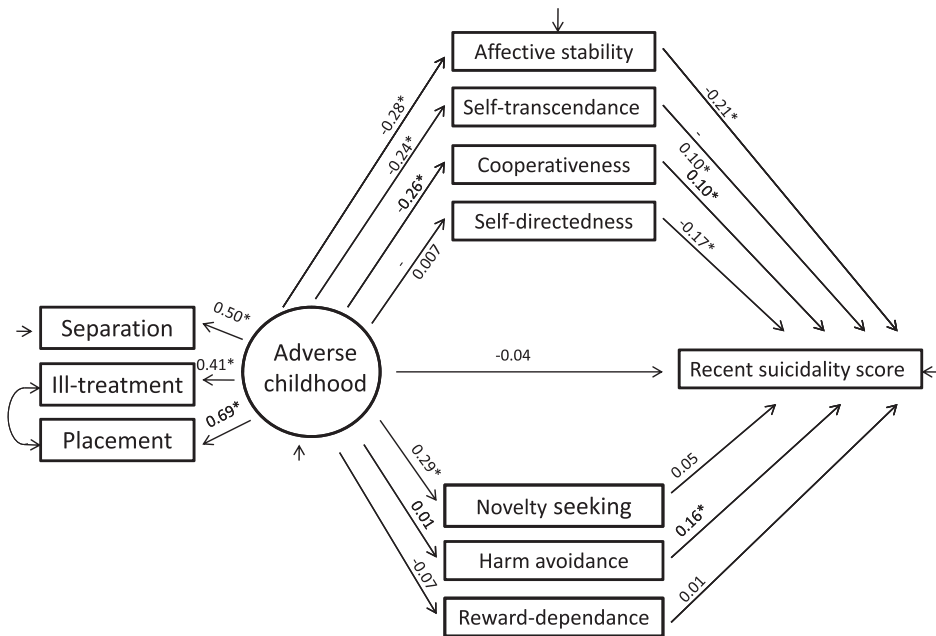


FIG. 2—Pathways to recent suicidality score in a cohort of French male prisoners (n = 899). Rectangles represent observed variables, and circles represent unobserved latent variables. Numbers on single-head arrows are standardized coefficients. Recent suicidality score corresponds to the suicidal ideations score as described in Methods. *p < 0.05.

benefits of patient status). The retrospective collection of adverse childhood experience can lead to an underestimation of these experiences (56). Our investigation of suicide risk factors used a cross-sectional and not a longitudinal design. However, a prospective study is impractical in custodial setting. We did not study completed suicide, but suicidal behavior, which is nevertheless identified as a risk factor for completed suicide in prison and in psychiatric outpatients (57–59). Finally, personality evaluation using the TCI has been disputed, but this tool remains

valuable for research purpose (42). A study on the prevalence of personality characteristics in prison suggests the utility of SCL-90 and NEO-PI-R scales for screening detainees for DSM-IV disorders (60). It would be useful to compare the different scales.

Finally, negative results should be considered cautiously because they could reflect a lack of statistical power, especially for the models involving suicide attempt as the main dependant variable.

Conclusions

Adverse childhood experience appears to influence suicidality in male prisoners, mediated by dimensions of character. These results confirm the importance of screening and treatment of childhood trauma to lower suicidality among male prisoners. They suggest the importance in this context to study dimensions of personality and then tailor treatment to specific needs. Further analysis is warranted to improve knowledge about the association between adverse childhood experiences, personality, and suicidality, taking psychopathology into account.

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