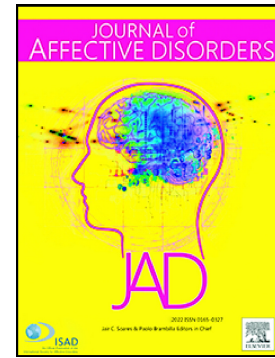


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Does personality dysfunction add incremental utility over general psychopathology when modeling previous suicide attempts in adolescent patients?

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Abstract

Background: Identifying patients at risk for a suicide attempt (SA) is critical in adolescents with mental disorders. The current study aimed to 1) examine whether personality dysfunction (PD) is associated with previous SA, 2) explore the incremental utility of PD over psychiatric disorders in modeling previous SA.

Methods: The sample comprised of n=498 adolescent patients (mean age=15.41 years, 79.12% females, inpatient 48.8%, outpatient 51.2%). SA in the past year, PD according to the alternative DSM-5 model for personality disorders, and psychiatric diagnoses were assessed using semi-structured interviews. Logistic regression and principal component analysis examining the associations and specific patterns of PD and SA in the past year were conducted. Hierarchical (stepwise) logistic regression was applied to investigate the incremental utility of PD over that of psychiatric diagnoses to identify individuals with SA in the past year.

Results: Including all facets of PD revealed a significant model with SA in the past year as outcome ($\chi^2(12)=106.65$, McFaddens Pseudo- $R^2=0.17$, $p<0.01$). Adding PD to the model explained a significant amount of variance in past SA over that of psychiatric diagnoses (Pseudo- $R^2=0.18$, Wald $\chi^2=43.05$, $p<0.01$).

Limitations: As we only studied past SA and due to the cross-sectional design, no conclusion regarding the prediction of future SA can be drawn.

Discussion: PD should routinely be assessed in adolescent patients since individuals with PD are more likely to have attempted suicide even when controlling for comorbid psychiatric disorders. PD may represent an important target for intervention in those with suicidal thoughts and behaviors.

Key words: alternative model of personality disorders, suicide attempt, adolescent, STIP5.1.

Introduction

Suicide remains among the most frequent causes of death in adolescents (World Health Organization, 2019). Not surprisingly the WHO has declared reducing suicide rates a top priority in public health (World Health Organization, 2021, 2019, 2014). Differentiating patients with suicidal ideation from

those who attempt suicide thus might pose an important milestone on this way but remains a major challenge in contemporary suicide research (Klonsky et al., 2018, 2017).

A recent meta-analysis by Franklin et al. (2017) covering evidence from the past 50 years found only minimal predictive ability for risk factors of suicidal thoughts or behaviors. To date, most studies identified the severity of psychopathology among the most predictive factors for suicide attempts (SA; Klonsky et al., 2017, 2018) whereas a past SA remains the most robust risk factor for suicide reattempts and completed suicides (World Health Organization, 2014; Yoshimasu et al., 2008). Notably, some studies also found personality traits such as impulsivity, intensity seeking, conscientiousness, extraversion, intellect / openness and neuroticism as predictive (Borroni et al., 2023; Mars et al., 2019a, 2019b), raising the question in which way personality and suicide risk are related.

The most recent theoretical and empirical developments in the context of personality and individual differences culminated in the development of the alternative model of personality disorders (AMPD) included in the DSM-5 (American Psychiatric Association, 2013). This model features two criteria, reflecting two distinguishable personality disorder scholarships (Krueger and Hobbs, 2020). Criterion A depicts the level of personality function taking the common core deficits (self- and interpersonal functioning) of all personality disorders into account and addressing the problem of high comorbidities among different personality disorders (Morey et al., 2022). Criterion B is conceptualized as a maladaptive form of the big five personality traits (negative affectivity, detachment, antagonism, disinhibition, and psychoticism) (Clark and Watson, 2022). The conceptual and empirical overlap of both criteria forms a key focus in contemporary AMPD literature, with some arguing for the importance of these distinguishable traditions and others for the need to simplify the complex AMPD (Krueger and Hobbs, 2020).

Because both DSM-5 and ICD-11 set the diagnostic threshold for a personality disorder in the severity of symptoms (criterion A) (Pires et al., 2023; Zimmermann et al., 2019), personality dysfunction (PD) has recently been conceptualized as the core of personality pathology (Morey et al., 2022; Sharp and Wall, 2021).

The DSM-5 AMPD offers an operationalization of PD with the Level of Personality Functioning Scale (LPFS). It assesses the level of impairment in the domains of self- and interpersonal functioning with two elements each (i.e., self-functioning: identity and self-direction, interpersonal functioning: empathy and intimacy). Each element contains three facets that are rated on a scale ranging from 0-4 (healthy to extreme impairment) differentiating 5 levels of severity in PD with level 2 being the threshold for clinical significant PD (Hutsebaut et al., 2017). The domains, elements, facets, and their definitions are depicted in table 1.

Please enter table 1 here

Several tools for the assessment of LPFS have been developed, with semi-structured interviews being the gold standard (Zimmermann et al., 2019). Some self-report measures have been validated for the use in adolescents (Fossati and Somma, 2021) but only one study has evaluated a clinical interview for the use in this age group (Weekers et al., 2021).

This restraint in research might have its origins in wide spread skepticism towards the diagnosis of personality disorders in adolescence (Elvins and Kaess, 2022). This is despite clear evidence showing reliability and validity of personality disorders throughout the life course (Newton-Howes et al., 2015; Videler et al., 2019), a high burden of disease, substantial morbidity and premature mortality (Chanen et al., 2022). What makes the assessment of personality disorders in young people even more clinically relevant is the growing body of research showing promising treatment outcomes in this population (Bo et al., 2021; Chanen et al., 2022, 2020; Weiner et al., 2018; Wong et al., 2020).

Based on the findings regarding the outcomes of personality disorders throughout the life course, some have started to investigate the associations between suicidal behavior and personality traits (Bi et al., 2017; Brezo et al., 2006; Flint et al., 2021) or personality disorders (Moselli et al., 2023; Pompili et al., 2005). So far, only few studies have explicitly addressed PD (according to the AMPD) in the context of suicide research (Borrioni et al., 2023) which are especially suitable for research in adolescent personality disorders (Sharp and Wall, 2021).

This might constitute a promising field for research as personality disorders seem to modify both the risk for suicide (Moselli et al., 2023; Schneider et al., 2008, 2006) and treatment response in suicide prevention (Balzen et al., 2022). Adolescence is regarded as a sensitive period in the development of personality disorders (Sharp et al., 2018) and thus marking a specifically vulnerable developmental period, with high rates of suicidal thoughts and behaviors (Liu et al., 2022). Using PD as a more sensitive and developmentally more suitable measure might merge these two important paths of research.

If indeed specific patterns in PD that put adolescents at risk for suicidal behavior might be identified, these results would further add to the importance of regularly assessing PD (Chanen et al., 2020).

This paper analyzed a cross-sectional clinical sample of adolescents to further explore the role of PD in the modeling of SA. The current study aimed 1) to examine whether PD, including a particular pattern, is associated with SA in the past year, 2) to explore the incremental utility of PD over that of psychiatric disorders in modeling SA in the past year.

Methods

Participants and procedures

We analyzed data from two consecutively recruited studies conducted between November 2018 and March 2022 at the University Hospital of Child and Adolescent Psychiatry and Psychotherapy Bern, Switzerland: (i) the Bernese Basic Documentation (BeBaDoc) sample that consists of adolescents from inpatient or day-care treatment, and (ii) a sample from the specialized outpatient service for adolescents with risk-taking and self-harm behavior (AtR!Sk). Inclusion criteria were 11-18 years of age in the BeBaDoc sample, and 12-17 years of age in the AtR!Sk-sample as well as sufficient fluency in German language. All patients treated in our clinic at the time of recruitment and who met these criteria were asked for participation in order to obtain a clinically representative sample. The only exclusion criteria were a lack of capacity to understand study details or provide informed consent. Neither any psychiatric nor somatic medical conditions were part of our exclusion criteria.

Recruitment and data assessment were conducted in routine clinical care by trained staff using semi-structured interviews. The study protocols were approved by the local ethics committee (BeBaDoc Ethics ID: 2018-01339; and AtR!Sk Ethics ID: 2018-00942). The study was conducted in accordance with the declaration of Helsinki. Informed consent was obtained from all participants and – according to Swiss law (Human Research Act) – for those under the age of 14 by caregivers (i.e., parent or legal guardian).

Measures

Demographic data was collected using a standardized set of interview questions to assess age, biological sex, living situation, school type, and if the participants were taking any medication.

The Self-Injurious Thoughts and Behavior Interview – German Version SITBI-G (Fischer et al., 2014) was used to assess the frequency of non-suicidal self-injury, suicidal thoughts and SA in the past year. It has been validated in a clinical sample of adolescents and showed good reliability and validity. Diagnoses according to DSM-5 / ICD-10 were assessed using the Mini-International Neuropsychiatric Interview MINI-KID (Sheehan et al., 1998) that has shown substantial to excellent reliability and validity in clinical and community samples of adolescents (Duncan et al., 2018; Sheehan et al., 2010). For the assessment of PD according to criterion A of the AMPD (LPFS) (see table 1), the Semi-Structured Interview for Personality Functioning DSM-5 (STIP5.1) (Hutsebaut et al., 2017) was used. A German version has been validated in a clinical sample of adults (Zetzl et al., 2019). To the best of our knowledge, it is the only semi-structured interview for PD that has been validated for the use in adolescents. It showed good interrater reliability and support for the construct validity in an adolescent clinical sample (Weekers et al., 2021).

For each domain, the mean of the two elements and for each element, the mean of the three facets as well as an overall mean for all facets and the number of participants scoring above the diagnostic threshold (in two or more of the four elements, the mean value of the three facets is ≥ 2) was calculated.

Statistical analysis

Analyses were conducted in two steps. In step one, a logistic regression analysis was performed to examine whether PD was associated with increased odds for a SA in the past year, and which facets of PD added significantly to the model (aim 1). Further, a principal component analysis (PCA) was conducted to explore the STiP5.1-data for underlying components that account for a maximum of variability in the data. Components were extracted using the Kaiser-criterion of eigenvalues ≥ 1 . Subsequently, two variables based on the two components of the PCA were calculated. As component 1 loaded on all 12 facets of the STiP5.1, a STiP sum score was computed adding all twelve values of the STiP5.1. For component 2, a negative correlation was found for all self-functioning facets of the STiP5.1 while the correlation was positive for all interpersonal facets. Thus, a variable out of the difference between the interpersonal and the self-functioning total scores (STiP difference) was computed. In step two, a hierarchical (stepwise) logistic regression was conducted with SA in the past year as outcome variable. The occurrence of psychiatric diagnoses as measured by the MINI-KID was entered as block 1 and the two variables derived from the PCA in block 2. Afterwards it was tested if adding block 2 significantly improved the model (aim 2). Note that adding the two variables is mathematically equivalent to adding the two components but making the results more interpretable.

All cases for whom full information on SA in the past year and full STiP5.1 data was available were included, resulting in a total sample of $n = 498$ of the original $n = 526$ (complete case analysis). Cases excluded did not differ from the analyzed sample regarding age, biological sex, total symptom severity and STiP5.1 total score. The cases with complete data had a higher number of fulfilled diagnoses according to the MINI-KID ($t=-2.54$, $df=524$, $p=0.01$) as compared to excluded cases.

Results

Participants

Our sample characteristics are summarized in table 2. The sample ($n=498$) consisted mostly of female participants with a mean age of 15.41 years ($SD=1.53$), high prevalence of clinical symptoms and an

almost even distribution of in- and outpatient treatment. For more detailed characteristics of our sample, see table 2.

Please enter table 2 here

Results from step 1: logistic regression analysis modeling suicide attempts by facets of personality dysfunction (aim 1)

The distributions of STiP5.1 facets, elements, domains, and total score show a pattern of positive skewness for most of the data (see figure 1 in the appendix). As depicted in table 2, the clusters of our binary outcome variable (at least one SA in the past year $n=161$ vs. no SA in the past year $n=337$) were clearly unequal. As logistic regression is not affected by unequal cluster sizes (Heo and Leon, 2005), we proceeded with our analysis as outlined above.

As there were intercorrelations on STiP5.1-facet levels, we took a stepwise approach in our analysis. Intercorrelations and histograms of STiP5.1 facets, elements, domains and total scores are displayed in the supplementary material. Models with STiP5.1 total scores, domains and elements revealed significant associations to SA in the past year (total score: $\chi^2(1)=69.20$, McFaddens Pseudo- $R^2=0.11$, $p<0.01$; domains: $\chi^2(2)=82.94$, McFaddens Pseudo- $R^2=0.13$, $p<0.01$; elements: $\chi^2(4)=89.64$, McFaddens Pseudo- $R^2=0.14$, $p<0.01$). For the total score, a significant *OR* was found ($OR=3.22$, 95% *CI* [2.39-4.35], $p<0.01$). For the domains, a significant *OR* was found for self-functioning ($OR=2.99$, 95% *CI* [2.17-4.11], $p<0.01$) but not for interpersonal functioning ($OR=1.01$, 95% *CI* [0.72-1.42], $p=0.94$). Within the elements, significant *ORs* were found within the self- (identity: $OR=2.33$, 95% *CI* [1.72-3.15], $p<0.01$; self-direction: $OR=1.34$, 95% *CI* [1.01-1.77], $p=0.04$) but not within the interpersonal elements (empathy: $OR=1.25$, 95% *CI* [0.90-1.75], $p=0.18$; intimacy: $OR=0.83$, 95% *CI* [0.60-1.13], $p=0.23$).

The model with all STiP5.1-facets significantly predicted SA in the past year ($\chi^2(12)=106.65$, McFaddens Pseudo- $R^2=0.17$, $p<0.01$). Of all twelve facets, three predicted SA in the past year significantly: emotions ($OR=1.67$, 95% *CI* [1.32-2.10], $p<0.01$), self-reflection ($OR=1.32$, 95% *CI* [1.05-1.65], $p=.02$), and connection ($OR=0.75$, 95% *CI* [0.57-0.98], $p=0.04$).

The PCA revealed two components with an eigenvalue ≥ 1 that accounted for 52.54% of variance. The first component loaded positive on all 12 STiP5.1-facets (STiP sum score). The second component loaded negative on the facets of self- and positive on the facets of interpersonal functioning (STiP difference). The full results of the PCA and the loadings on all 12 facets are shown in the supplementary material. Logistic regression yielded a significant model with SA in the past year as outcome and STiP sum score and STiP difference as predictors ($\chi^2(2)=82.94$, McFaddens Pseudo- $R^2=0.13$, $p<0.01$).

Results from step 2: hierarchical (stepwise) logistic regression adding personality dysfunction to a psychopathology-based model (aim 2)

The results of the hierarchic (stepwise) logistic regression are displayed in table 3.

Please enter table 3 here

Both blocks revealed significant models. Wald's χ^2 -test indicated a significant change in McFadden's Pseudo- R^2 (Wald's $\chi^2(2)=39.96$, $p<0.01$) and a drop in model fit indices that indicated better model fit for the model including block 2 (block 1: $AIC=575.88$ $BIC=605.36$; block 2: $AIC=535.60$ $BIC=572.50$) compared to the model with block 1 only. Results remained significant when we controlled for biological sex, age, and medication.

Discussion

In this study, we examined the association of PD according to the AMPD with SA in the past year in a large cross-sectional clinical sample of adolescents. Our results suggest that PD is increased in adolescents with past SA (aim 1). Our results are in line with previous research suggesting heightened risk for SA in individuals suffering from personality disorders (Paris, 2019; Pompili et al., 2005; Rogers and Joiner, 2016; Schneider et al., 2008, 2006; Wasserman and Wasserman, 2016) or particular personality traits (Bi et al., 2017; Brezo et al., 2006; Flint et al., 2021), e.g. hopelessness, extraversion, neuroticism. Most studies used adult populations and did not address levels of personality functioning as defined by the AMPD.

In our data, PD was best explained by two components: one reflecting the overall severity of PD (STiP sum score). The second one was the difference between interpersonal and self-functioning (STiP difference), yielding a comparison of PD in the two domains.

As expected, the overall severity of PD was associated with higher odds for a SA in the past year. This is in line with a large body of research showing that personality pathology is associated with increased risk for both suicide attempts and completed suicide (McClelland et al., 2023; Reichl and Kaess, 2021). Kampe et al. (2018) is the only study to the best of our knowledge that investigated PD according to the AMPD and its association to SA. In their clinical adult sample, the total score in PD was associated with a higher number of SA. The two studies differ in important aspects: we had a larger sample size (N=30 vs. N=498), studied a different age group (adults vs. adolescents), used dichotomous and not continuous outcomes (number of suicide attempts vs. SA at all), and used different interviews to assess the LoPF (SCID-AMPD vs. STiP5.1). Taken together, research from personality disorders, personality traits and the so far few studies in an AMPD framework, this adds evidence to the clinical usefulness and incremental utility of the new AMPD above categorical approaches to PD in the context of adolescent suicide research. More specifically and in line with Kampe et al. (2018), overall severity of PD in clinical samples of adults as well as adolescents seems to be associated with heightened risk for past SA.

Surprisingly, a more severe degree of PD in interpersonal functioning as compared to self-functioning was associated with lower odds for past SA. This may first seem contrary to past research, stressing the importance of interpersonal functioning as a protective factor for SA especially in adolescents (King & Merchant, 2008; Stewart et al., 2017). From a theoretical framework, adolescence has traditionally been regarded as a period in which individuals' main social contacts shift from family to peers (Berk, 2022). Thus in developmental psychopathology, integration in peer groups poses one of the most important developmental tasks in adolescence, closely linked to the search for identity (Havighurst, 1948; Rutter and Sroufe, 2000; Stewart et al., 2017). Consequently, King & Merchant (2008) stress the importance of social integration as protective and social isolation as risk factor in the context of

adolescent STB in their literature review. This is also in line with Joiner's Interpersonal Theory of Suicide (Joiner, 2007) stressing the importance of social constructs (thwarted belongingness, perceived burdensomeness) in the context of the transition from ideation to action (Stewart et al., 2017). Nonetheless, the results from our analysis showed lower odds for past SA when there was a bigger difference in interpersonal vs. self-functioning. In our clinical sample, a big difference in these two domains is most likely resulting from high impairment in interpersonal in light of a comparably mild impairment in self-functioning. This may indeed point to intact self-functioning as an important factor of resilience even in the context of severe interpersonal dysregulation. While severe interpersonal problems are important in the development of suicidal behavior, they only seem to increase risk in individuals who suffer from severe dysregulation of the self (e.g. high impulsivity and emotion dysregulation). Considering the interpersonal theory of suicide (Joiner, 2007; Stewart et al., 2017), one could argue that in particular the transition from suicidal ideation to suicide attempt is driven by factors of impaired self-functioning, which might well explain our findings.

Due to the preliminary nature of our results, it is yet unclear if this has implications for designing treatments. The results raise the question, if interventions in adolescents with PD should first focus on self-functioning to prevent SA, which is in contrast to current recommendations (McClelland et al., 2023) that have resulted from personality disorder research, concluding that Interventions that provide interpersonal support may reduce SA. Available and evidence based treatments so far entail both, elements focusing on self- and interpersonal functioning (e.g. dialectic-behavioral therapy, mentalization-based treatment, transference-focused psychotherapy) (Choi-Kain et al., 2016; Weiner et al., 2018). This still seems correct given that impairments in both domains generally increased the risk for past SA in our data. In addition, the theoretical rationale for most interventions includes a close relatedness of both concepts, especially in psychoanalytic treatments (self- and object representations) but also in cognitive-behavioral frameworks (skills for stress tolerance and emotion regulation and social skills) (Choi-Kain et al., 2016; Weiner et al., 2018).

Finally, features of PD improved the predictive model for SA in the past year over and above common mental disorders (aim 2). Taken together, this research adds to the evidence (Baertschi et al., 2018; Brezo et al., 2006; Flint et al., 2021; Mars et al., 2019a, 2019b; Paris, 2019) and theoretical considerations (Sharp et al., 2018; Wasserman and Wasserman, 2016), stressing the importance and incremental utility of PD in the detection of adolescent SA. Thus, we suggest that assessment of PD should be part of in-depth assessments for suicide risk, and future research is needed to investigate whether the PD, and in particular the AMPD, is also useful to predict future SA.

Limitations and strengths

To the best of our knowledge, this is the first study to investigate associations between PD as defined in criterion A of the AMPD and SA in the past year. The strengths of this research include a big clinical sample of adolescents, including in- and outpatients and high-quality assessment by clinical interviews.

The following limitations should be considered when interpreting our results. The largest limitation is that all results are based on cross sectional data, not enabling causal conclusions and not supporting the utility of PD to predict future SA. Thus, it might also be plausible, that a past SA resulted in significant interpersonal (e.g., stigma, burden of medical care) or self-related (e.g., shame) disruptions.

Future research including longitudinal data will need to investigate PD and its particular patterns as a predictor of future SA. Further, this study only evaluated one aspect of the AMPD (criterion A: level of personality functioning). However, criterion B (maladaptive personality traits) was not included in this analysis. Even though previous research indicates the suitability of the STiP5.1 (Weekers et al., 2021) in adolescent populations, some have argued that adding informant based reports on PD could considerably add to the understanding of personality pathology in adolescents (Goth et al., 2018). Analysis of the present study did not assess whether the participants were first or multiple times suicide attempters. Some research suggests that these groups differ regarding psychological and functional impairment (Defayette et al., 2020). Additionally, our clinical sample shows a clear gender imbalance with only 20.88% of participants being males. This resembles of what is known about low

rates of help-seeking behavior in male adolescents (Bosco et al., 2020) and high prevalence rates of SA in females as compared to completed suicides in males (i.e. the gender paradox of suicide) (Canetto and Sakinofsky, 1998; Schrijvers et al., 2012). Yet, it must be pointed out that the present results are based on a predominantly female sample. In addition, conclusions concerning detailed patterns of PD that contributed to our model must be considered carefully. Logistic regression analysis calculates ORs for every single predictor under the assumption that all other predictors are held constant. This assumption cannot be regarded as met due to the intercorrelations between facets, elements, and domains. Finally, as a statistical limitation, McFadden's Pseudo- R^2 in logistic regression does not allow to interpret the magnitude of variance accounted for by a certain variable (such as R^2 in linear regression) - in this case PD.

Implications and Conclusion

Even though this paper does not allow drawing causal conclusions, some implications for the prevention and treatment of PD in adolescence should be pointed out. We found an association between PD as defined in criterion A of the AMPD and previous SA. Additionally, a particular pattern of impairment in personality functioning (including high impairment in self as compared to low impairment in interpersonal functioning) may be associated with a particular risk for SA. This adds evidence to the clinical utility of this relatively new model and the STiP5.1. In the early identification and treatment of adolescents at risk for SA, PD should be assessed regularly. As we only studied past SA, no conclusion regarding the prediction of future SA can be drawn. Tapping the developmental pathways through which suicidal thoughts and behaviors as well as PD interact might best be addressed in longitudinal designs and thus improve the prediction of suicide attempts in scientific as well as in clinical contexts. If future SA in adolescents can be prevented by treating PD and more specifically, by primarily targeting self-functioning should be addressed in further research.

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Figure 1

Histograms of STIP5.1 facets, elements, domains, and total score

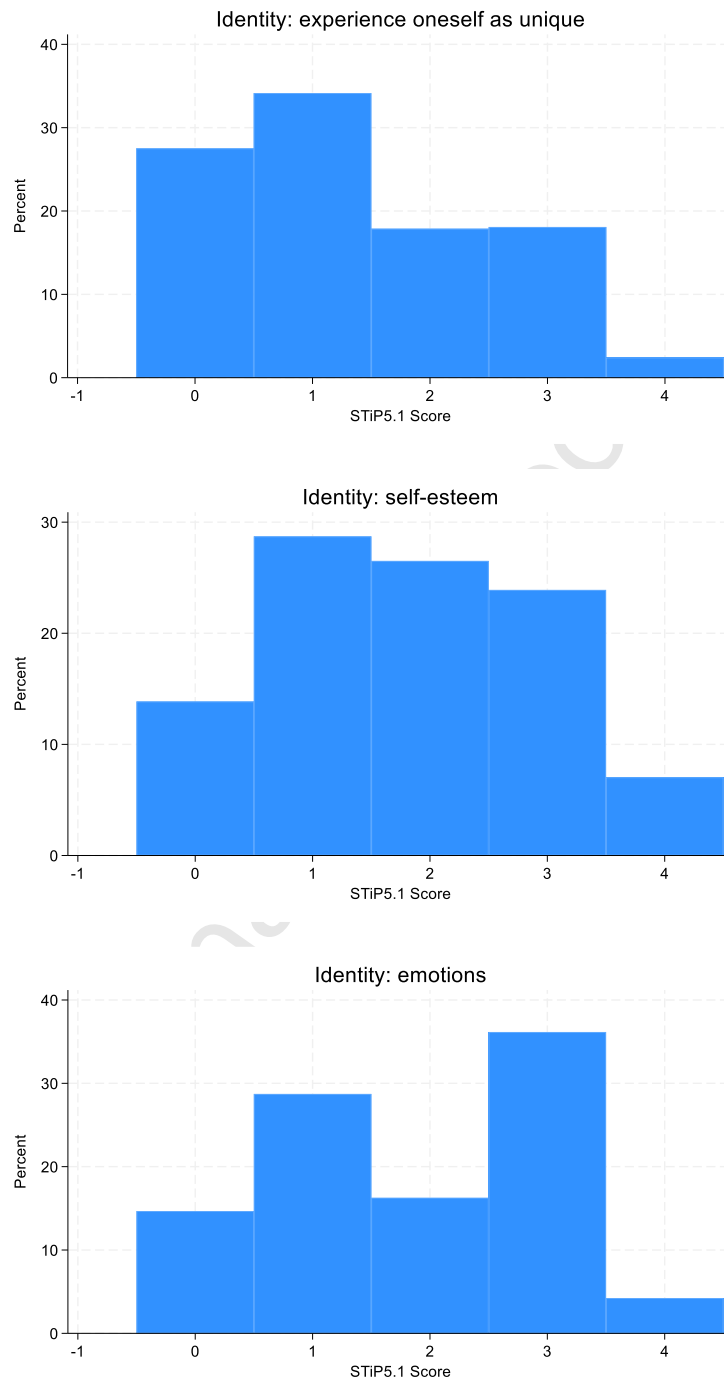


Figure 1

Histograms of STIP5.1 facets, elements, domains, and total score (continued)

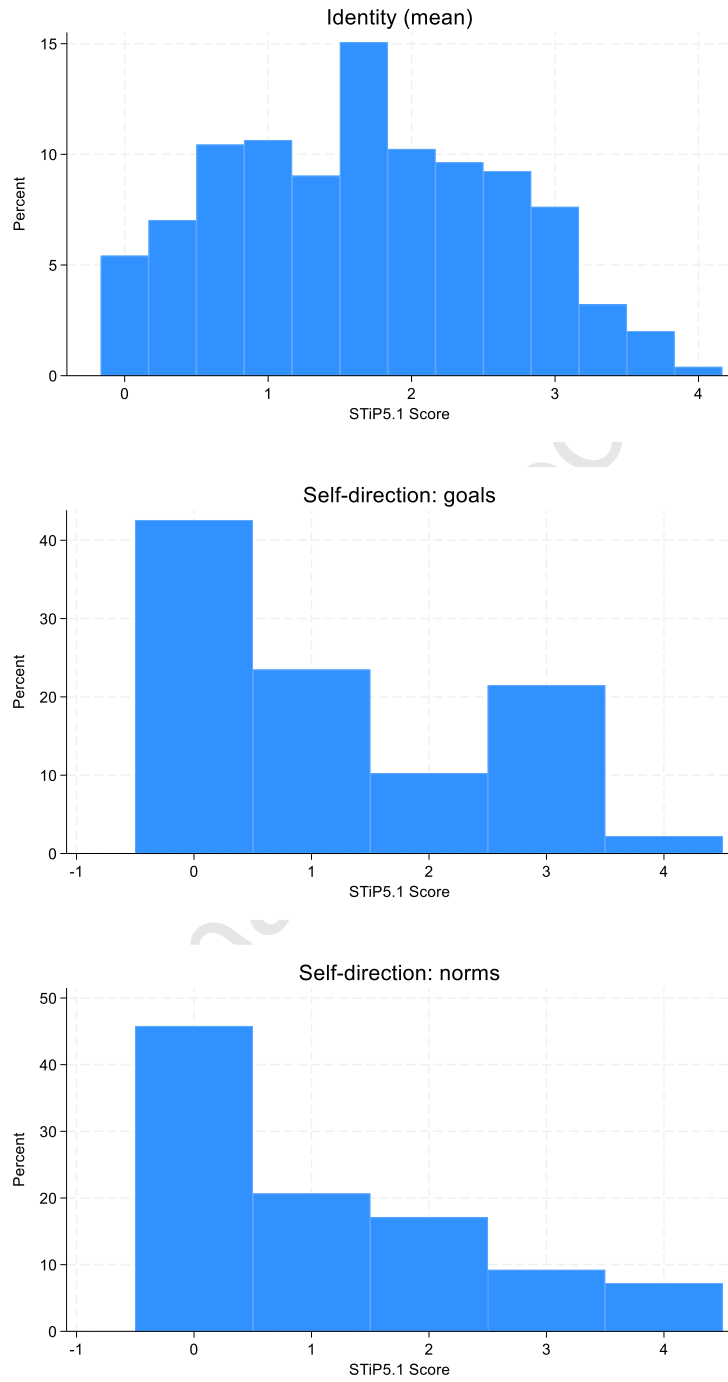


Figure 1

Histograms of STIP5.1 facets, elements, domains, and total score (continued)

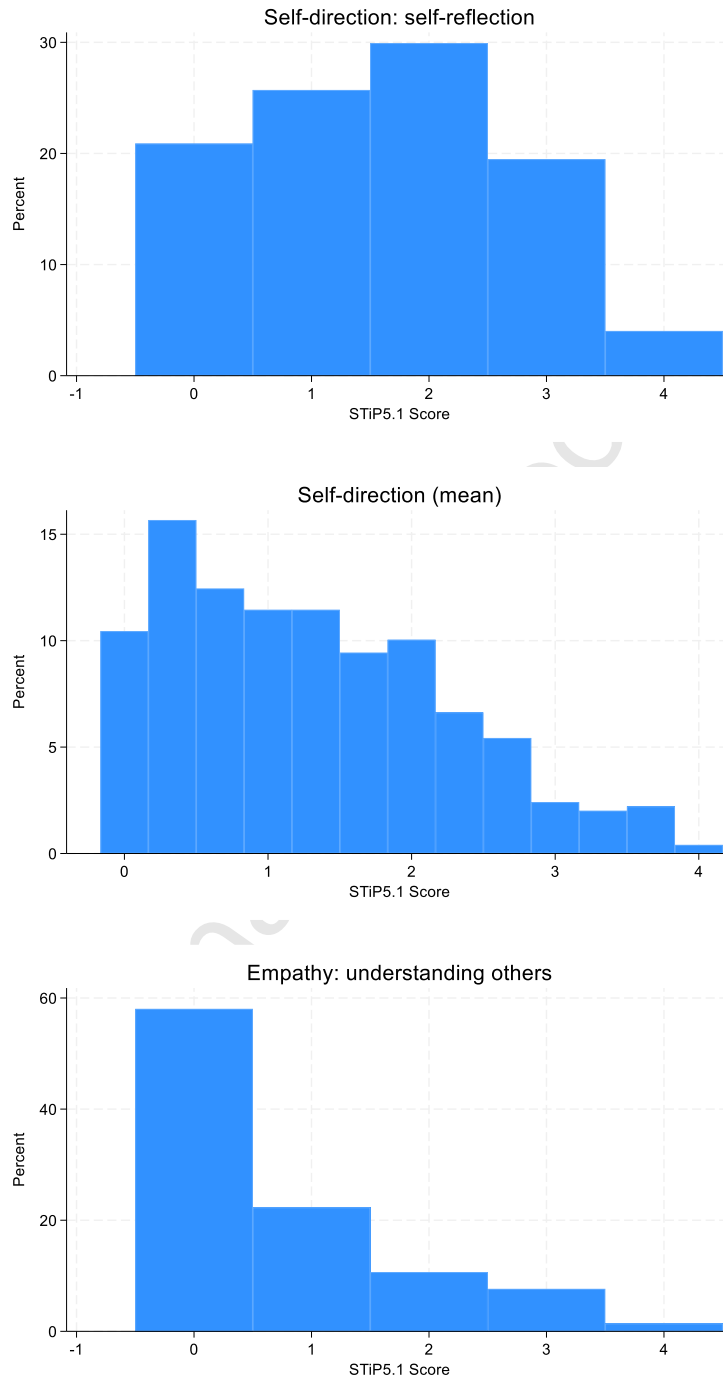


Figure 1

Histograms of STIP5.1 facets, elements, domains, and total score (continued)

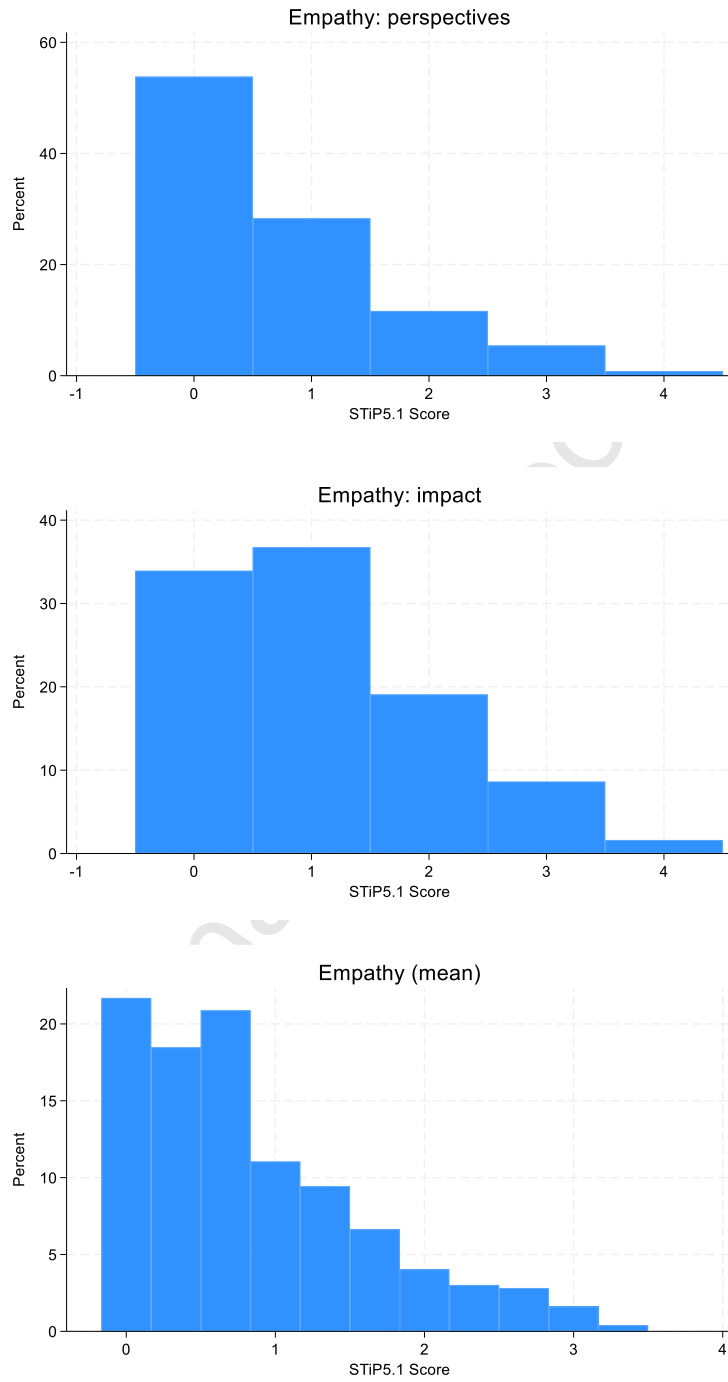


Figure 1

Histograms of STIP5.1 facets, elements, domains, and total score (continued)

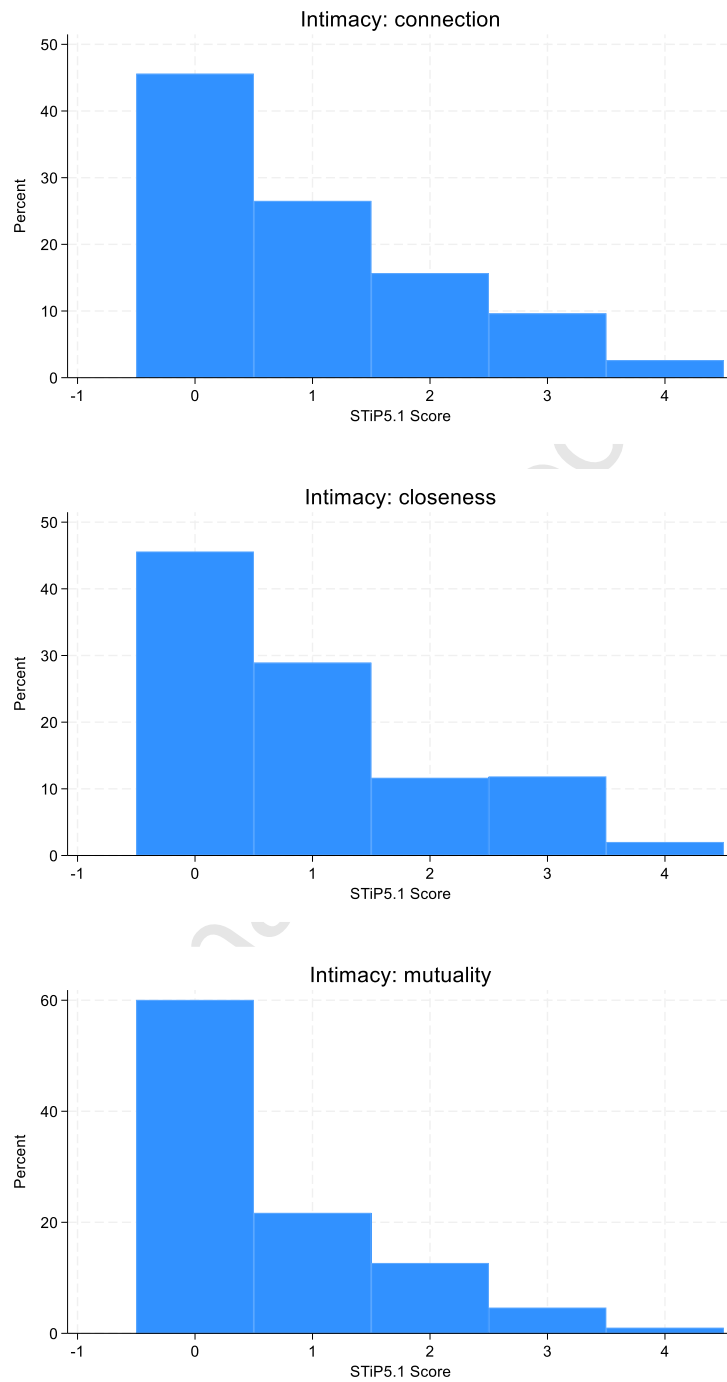


Figure 1

Histograms of STIP5.1 facets, elements, domains, and total score (continued)

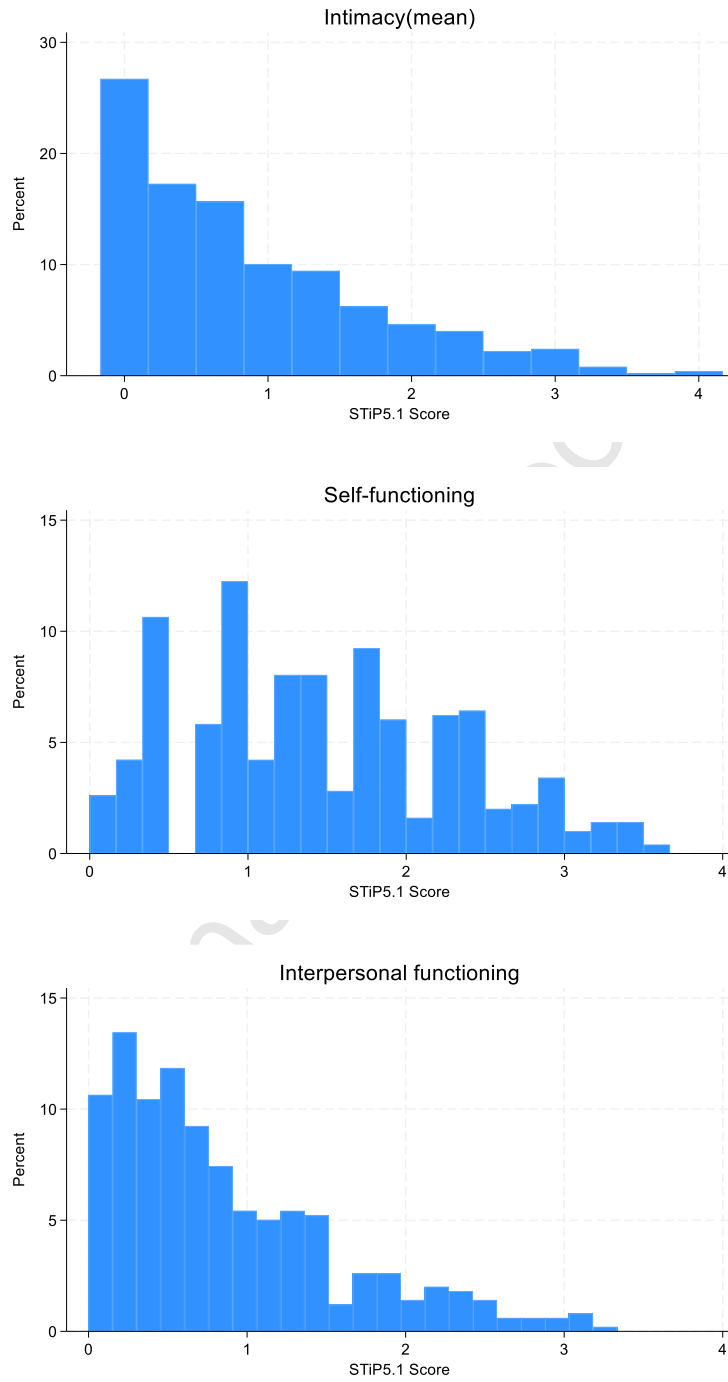


Figure 1

Histograms of STIP5.1 facets, elements, domains, and total score (continued)

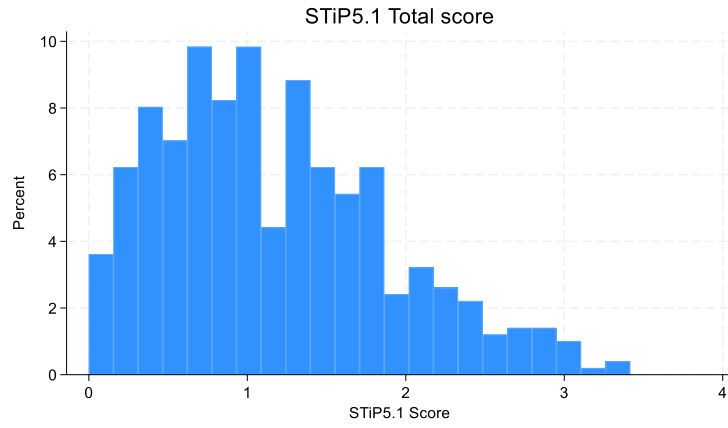


Table 1*STiP5.1 core domains, elements and facets*

Core domains	Elements	Facets
Self-functioning	Identity	<p>Experience of oneself as unique, with clear boundaries between self and others</p> <p>Self-Esteem Stability of self-esteem and accuracy of self-appraisal</p> <p>Emotions Capacity for, and ability to regulate, a range of emotional experience</p>
	Self-direction	<p>Goals Pursuit of coherent and meaningful short-term and life goals</p> <p>Norms Utilization of constructive and prosocial internal standards of behavior</p> <p>Self-reflection Ability to self-reflect productively</p>
Interpersonal functioning	Empathy	<p>Understanding others Comprehension and appreciation of others' experiences and motivations</p> <p>Perspectives Tolerance of differing perspectives</p> <p>Impact Understanding the effects of one's own behavior on others</p>
	Intimacy	<p>Connection Depth and duration of connection with others</p> <p>Closeness Desire and capacity for closeness</p> <p>Mutuality of regard reflected in interpersonal behavior</p>

Note. Core domains, elements, facets of the AMPD as measured by the STiP5.1. Names of each facet are written in bold.

Table 2*Sample characteristics*

Variable	N(%)	M(SD)
Demographics		
Gender		
Female	394 (79.12)	
Male	104 (20.88)	
Age (in years)		15.41(1.53)
Education		
Graduated from school	236 (47.39)	
Parents		
Living with mother	424 (85.31)	
Living with father	318 (65.03)	
Clinical characteristics		
Inpatient / day care	255 (51.29)	
Outpatient	243 (48.80)	
Medication (any)		
Antidepressants	282 (56.74)	
Antipsychotics	108 (21.69)	
Stimulants	61 (12.25)	
Anxiolytics / hypnotics	29 (5.82)	
Nutritional supplements	12 (2.41)	
Contraceptives	83 (16.67)	
Herbal medication	29 (5.82)	
Melatonin	52 (10.44)	
Other	13 (2.61)	
Other	48 (9.64)	
STiP Identity		1.67 (.96)
STiP Self-direction		1.30 (.96)
STiP Empathy		.83 (.77)
STiP Intimacy		.86 (.87)
STiP Self-functioning		1.48 (.86)
STiP Interpersonal functioning		.85 (.73)
STiP Total		1.17 (.72)

Variable	N(%)	M(SD)
STiP diagnostic threshold	135 (27.11)	
MINI-KID Number of psychiatric diagnosis		2.80 (2.26)
MINI-KID substance use disorders (ICD-10 F1)	151 (30.32)	
MINI-KID schizophrenia, delusional disorder (ICD-10 F2)	47 (9.44)	
MINI-KID affective disorders (ICD-10 F3)	323 (64.86)	
MINI-KID neurotic, stress-related, somatoform (ICD-10 F4)	327 (65.66)	
MINI-KID disorders associated with physical factors (ICD-10 F5)	73 (14.16)	
MINI-KID disorders with onset in childhood and adolescence (ICD-10 F9)	164 (32.93)	
SITBI suicidal thoughts lifetime (yes/no)	430 (86.35)	
SITBI nonsuicidal self-injury lifetime (yes/no)	411 (82.53)	
SITBI suicide attempt lifetime (yes/no)	187 (37.55)	
SITBI suicide attempt in the past year (yes/no)	161 (32.33)	

Note. Characteristics of the total sample n = 498. Note that the frequencies of medication do not add up to 100% as multiple medications were reported. The other medication category includes any medication that has been reported in fewer than 2% of the cases and includes (among others) Acne and Asthma medication, Antiallergics, Analgesics and others. Mini-KID ICD-10 F1-F9 depicts the categories and their codes in ICD-10. The categories are named in the table.

Table 3

Results of hierarchic (stepwise) logistic regression predicting suicide attempts in the past year by psychopathology (block 1) and personality dysfunction (block 2)

Predictors	OR	SE	P	Pseudo- R^2	Wald's χ^2 (p)
Block 1: psychopathology			<0.01*	0.10*	55.50(<0.01)
F1	2.25	0.49	<0.01*		
F2	1.81	0.60	0.08		
F3	2.28	0.56	<0.01*		
F4	1.52	0.36	0.08		
F5	1.22	0.34	0.48		
F9	1.62	0.36	0.03*		
Block 2: personality dysfunction			<0.01*	0.17*	39.96(<0.01)
STiP sum score	2.59	0.43	<0.01*		
STiP difference	0.64	0.10	<0.01*		

Note. OR= Odds ratio, SE= standard error, p=p-value, Pseudo- R^2 =McFadden's Pseudo- R^2 , Wald's χ^2 (p)=Wald's χ^2 -statistic and corresponding p-value for change in Pseudo- R^2 .

* $p < 0.05$.

Table 4*Intercorrelations of all STiP5.1-facets*

	Experience as unique	Self-esteem	Emotions	Goals	Norms	Self-refelction	Understanding others
Experience as unique	1.00						
Self-esteem	0.61	1.00					
Emotions	0.47	0.51	1.00				
Goals	0.46	0.42	0.35	1.00			
Norms	0.38	0.42	0.33	0.50	1.00		
Self-reflection	0.41	0.40	0.49	0.36	0.41	1.00	
Understanding others	0.27	0.23	0.25	0.27	0.28	0.31	1.00
Perspectives	0.34	0.22	0.29	0.29	0.33	0.31	0.41
Impact	0.33	0.31	0.33	0.33	0.31	0.35	0.46
Connection	0.46	0.39	0.34	0.43	0.34	0.28	0.36
Closeness	0.40	0.39	0.37	0.37	0.32	0.35	0.38
Mutuality	0.33	0.31	0.30	0.34	0.30	0.23	0.38

Note. Intercorrelations of all STiP5.1-facets. All correlations are significant ($p < 0.01$).

Table 4 - continued*Intercorrelations of all STiP5.1-facets*

	Perspectives	Impact	Connection	Closeness	Mutuality
Perspectives	1.00				
Impact	0.38	1.00			
Connection	0.39	0.41	1.00		
Closeness	0.36	0.41	0.66	1.00	
Mutuality	0.44	0.34	0.43	0.43	1.00

Note. Intercorrelations of all STiP5.1-facets. All correlations are significant ($p < 0.01$).

Table 5*Results of the principal component analysis on all STiP5.1-facets*

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	5.08	3.85	0.42	0.42
Comp2	1.23	0.35	0.10	0.53
Comp3	0.88	0.08	0.07	0.60
Comp4	0.79	0.09	0.07	0.67
Comp5	0.70	0.09	0.06	0.72
Comp6	0.61	0.05	0.05	0.77
Comp7	0.56	0.03	0.05	0.82
Comp8	0.53	0.04	0.04	0.87
Comp9	0.50	0.04	0.04	0.91
Comp10	0.46	0.10	0.04	0.95
Comp11	0.36	0.05	0.03	0.97
Comp12	0.31	.	0.03	1.00

Table 6

Loadings of the two components extracted from PCA on all twelve STiP5.1 facets and the percentage of variation left unexplained

STiP5.1 facet	Comp1	Comp2	Unexplained
Experience as unique	0.32	-0.29	0.40
Self-esteem	0.30	-0.40	0.35
Emotions	0.29	-0.31	0.47
Goals	0.29	-0.19	0.52
Norms	0.28	-0.20	0.56
Self-reflection	0.28	-0.24	0.54
Understanding others	0.26	0.42	0.46
Perspectives	0.27	0.34	0.50
Impact	0.28	0.26	0.52
Connection	0.32	0.19	0.45
Closeness	0.31	0.20	0.45
Mutuality	0.27	0.31	0.50

Highlights

- Personality dysfunction and past suicide attempts in adolescent patients were studied
- Personality dysfunction predicted past suicide attempts above psychiatric diagnosis
- Impaired self-functioning was associated with higher odds for past suicide attempts
- In teens at risk for suicide attempts personality dysfunction should be assessed
- Future studies should address implications for the prevention of suicide attempts

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