



Perseverative Thinking about Suicide Questionnaire (PTSQ): Validation of a new measure to assess suicide-specific rumination

Inken Höller^{a,*}, Tobias Teismann^b, Thomas Forkmann^a

^a Department of Clinical Psychology, University of Duisburg-Essen, Germany

^b Mental Health Research and Treatment Center, Faculty of Psychology, Ruhr University Bochum, Germany

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ABSTRACT

Background: Suicide-specific rumination has been shown to be associated with lifetime suicide attempts as well as suicide intent and might be an important risk factor for the transition from suicidal ideation to suicidal behavior. Based on this background, the wording of the items of an often-used self-report measure assessing core characteristics of rumination was adapted to assess specifically suicide-specific rumination.

Methods: The entire study sample comprised $N = 1689$ participants from the German healthcare sector. A total of 721 participants with a history of suicidal ideation (68% female; $M_{\text{age}} = 30.63$, $SD_{\text{age}} = 8.41$, range: 18–81 years) who had completed five measures assessing suicide-specific rumination, suicidal ideation, depression, hopelessness, and resilience were included for the present examination. Factorial validity (Exploratory [EFA] to determine the appropriate number of factors and confirmatory factor analyses [CFA] after randomly splitting of the sample to validate the EFA solution), construct validity, and reliability were evaluated.

Results: The EFA revealed a one-factor solution consisting of four items, which could be confirmed within a CFA (RMSR = 0.006; RMSEA = 0.039; CFI = 0.999; TLI = 0.998). Internal consistency was excellent with Cronbachs $\alpha = 0.93$. Construct validity was given with moderate to high positive correlations with suicidal ideation (0.76), depression (0.55), and hopelessness (0.38) and negative correlation with resilience (-0.31). Participants with recent suicidal ideation and/or lifetime suicide attempt reported significantly more suicide-specific rumination than those with only lifetime suicidal ideation.

Conclusion: A new 4-item measure for suicide-specific rumination was developed and could be shown to be a reliable and valid instrument in a large German sample. Results emphasize the potential importance of suicide-specific rumination for the understanding of trajectories of suicidal ideation and suicide risk assessments.

1. Introduction

Rumination or repetitive negative thinking (RNT) is defined as a style of thinking about one's problems or negative experiences with three key characteristics: the thinking is repetitive, it is at least partly intrusive, and it is difficult to disengage from [1]. Two additional features of RNT are that individuals perceive it as unproductive and it captures mental capacity [1]. Rumination has been identified as a critical factor in the development and maintenance of various mental disorders [2,3]: First of all, rumination was found to predict the future onset of a major depressive episode [4–6] as well as depressive relapse [7]. Furthermore, it has been shown to be a risk factor for the development of posttraumatic-stress disorder [8], the maintenance of social anxiety disorder [9] and the exacerbation of Borderline Personality

Disorder symptoms [10,11]. Additionally, rumination is correlated with a variety of maladaptive cognitive styles (including negative inferential styles, dysfunctional attitudes, hopelessness, pessimism and self-criticism) and has been shown to interfere with problem-solving, instrumental activity and close interpersonal relationships [12]. Based on this background, it is not surprising that rumination is also associated with suicidal ideation and a lifetime history of suicide attempts [13]. In a recent meta-analysis, Rogers and Joiner [14] identified 23 studies on the association between rumination and suicidal ideation as well as suicide attempts. They differentiated between global rumination and different subtypes of rumination: brooding and reflection. While brooding means to persevere on negative consequences, reflection goes one step further whereby the individual tries to understand the reasons for the negative thoughts and the associated stress. Taken together, the

* Corresponding author at: Department of Clinical Psychology, University of Duisburg, Universitätsstraße 2, 45141 Essen, Germany.

E-mail address: inken.hoeller@uni-due.de (I. Höller).

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results indicated that global rumination, brooding, and reflection were each associated with suicidal ideation, whereas only global rumination and brooding were associated with suicide attempts. Effect sizes ranged from moderate to large and were typically stronger in the prediction of suicidal ideation, as opposed to suicide attempts. Among various features of rumination (frequency, duration, controllability, content), low perceived controllability has been shown to be uniquely associated with suicidal ideation, suicide plans and suicide attempts [15]. As such, a lack of perceived cognitive control seems to be particularly relevant to the onset of suicidal ideation and suicidal behavior [16]. Complementing these findings, Galynker [17] identified a state of extreme rumination (*ruminative flooding*) as a warning sign of imminent suicidal behavior.

Just recently Rogers and colleagues [18–20] have started to study the effect of suicide-specific rumination (i.e. rumination about death and/or suicide), as opposed to more global types of rumination. They found suicide-specific rumination to be associated with lifetime suicide attempts over and above a large array of known risk factors, including suicidal ideation, global rumination, depression and anxiety [18]. Furthermore, they could show that the association between suicide-specific rumination and lifetime suicide attempts is mediated by an acute suicidal state, called acute suicidal affective disturbance (ASAD) [19] and that suicide-specific rumination is prospectively associated with suicide intent (as assessed with the item “How would you rate your current intent to make a suicide attempt in the near future?”) – even after controlling for current suicide intent and various other risk factors [20]. It may therefore be that suicide-specific rumination is a particularly significant risk factor that facilitates the transition from suicidal ideation to suicidal behavior.

In their studies on suicide-specific rumination Rogers and colleagues [18–21] used a 5-item or an 8-item version of the Suicide Rumination Scale (SRS). This scale assesses the tendency to ruminate or fixate on one's suicidal thoughts, intention and plans. However, Teismann, Forkmann, Michalak et al. [22] recently pointed out that some items of the SRS may confound general preparation behavior (“When I have thoughts of suicide, I think about how I want to kill myself”; “... I wonder what the fastest and easiest way to die is”) or so called flash-forwards (“When I have thoughts of suicide, I imagine the process of how I want to kill myself”), with generic features of RNT (“When I have thoughts of suicide, I have trouble getting the suicidal thoughts out of my mind”). Based on this background, Teismann, Forkmann, Michalak et al. [22] adapted the Perseverative Thinking Questionnaire (PTQ) [1], an often used self-report measure assessing core characteristics of RNT (repetitiveness, intrusiveness, difficulties with disengagement, perceived unproductiveness), to create the Perseverative Thinking about Suicide Questionnaire (PTSQ), a nine item instrument designed to assess suicide-specific rumination. In the adaption process, the word “thoughts” from the original PTQ was replaced by the term “suicidal thoughts” in the PTSQ: For example, the PTQ-item “The same thoughts keep going through my mind again and again” became the PTSQ-item “The same thoughts about suicide keep going through my mind again and again”. Items from the PTQ that were not adjustable in the described manner (i.e., “I think about many problems without solving any of them”) were not included in the PTSQ. The PTSQ was not designed to assess specific subdimensions of rumination. In a preliminary online study ($N = 257$) suicide-specific rumination, as measured with the PTSQ, differentiated lifetime suicide attempters from lifetime suicide ideators, predicted suicide attempt status (above age, gender, suicidal ideation, global rumination) and fully mediated the association between suicidal ideation and lifetime suicide attempts [22]. However, this study lacked a comprehensive investigation of the psychometric properties and factor structure of the PTSQ. Therefore, we aimed to examine the factor structure, reliability and construct validity of the Perseverative Thinking about Suicide Questionnaire (PTSQ) in a large sample of participants reporting lifetime suicidal ideation. This investigation was part of a larger cross-sectional study assessing psychological burden and suicidal ideation in German Health Care workers [23].

2. Methods and materials

2.1. Sample

The online sample originally comprised $N = 1689$ participants working in the German health care sector. Out of those participants, $n = 721$ participants reported lifetime suicidal ideation and were included in the present analyses. Participants were 18–81 years of age ($M = 30.63$, $SD = 8.41$), $n = 695$ (96.4%) were female. Four hundred and ninety (68%) participants reported to be single, 199 (27.6%) were married, and 32 (4.4%) divorced. Two hundred and ninety two (40.5%) participants reported experiencing a mental health problem in the past; 214 (29.7%) participants reported currently experiencing a mental health problem, and 101 (14.0%) reported to currently undergo therapeutic treatment and/or receive psychiatric medication. The most common self-reported diagnoses according to the International Classification of Diseases (ICD-10) [24] were affective disorders ($n = 125$, 59.0%) and anxiety, dissociative, stress-related, somatoform and other nonpsychotic mental disorders ($n = 66$; 9.2%). Three hundred fifteen (43.7%) participants reported recent suicidal ideation within the past four weeks, three (0.4%) participants reported a suicide attempt within the past four weeks, and 178 (24.7%) participants reported at least one lifetime suicide attempt.

2.2. Procedure

Participants were recruited between February 2021 and April 2021 through advertisement over social media (e.g. Instagram, Facebook) and by contacting several hospitals in Germany. Participants were asked to fill out an anonymous online survey using the SoSci-server (www.sosci-survey.de) with data storage in Germany. Prior to their participation, they were informed about the purpose of the study, the voluntary nature of participation, data storage and security, and gave informed consent prior to participating. We provided information about helplines and contact information for psychotherapy institutions in case that participants felt burdened through the questionnaire or required psychotherapeutic help. The study was approved by the responsible Ethic Committee of the Institute of Psychology, University of Duisburg-Essen, Germany and was in accordance with the Declaration of Helsinki [25]. Participants were eligible for the study if they were at least 18 years old, had sufficient knowledge of the German language, and were working in the German healthcare system. For this specific examination, an additional inclusion criterion was the reporting of lifetime suicidal ideation.

2.3. Measures

Participants filled in a comprehensive set of self-report questionnaires (for further information see [23]), only those relevant for the aims of this study are reported here:

2.3.1. Perseverative Thinking about Suicide Questionnaire (PTSQ) [22]

The PTSQ has been developed based on the PTQ by Ehring and Zetsche [1] and consists of nine items assessing suicide-specific rumination (e.g. “Thoughts about suicide intrude into my mind”), which are to be answered on a 5-point Likert scale ranging from “0 = never” to “4 = almost always”. One additional item asks for lifetime suicidal ideation, as reasonable answers to the items on suicide-specific rumination are only possible if suicidal ideation has been experienced at least once in the lifetime. Internal consistency in the present sample will be reported in the result section.

2.3.2. Suicide ideation and behavior scale (SSEV) [26]

The SSEV assesses suicidal ideation and behavior during the past four weeks with six items (e.g., “During the past four weeks, I wished to be dead”), which are to be answered on a 6-point Likert scale ranging from “0 = never” to “5 = every day multiple times” resulting in a total sum

score ranging from 0 to 30 with higher scores indicating more severe/more frequent suicidal ideation and behavior. Additionally, a seventh item asks for a recent suicide attempt and an eighth item for a lifetime suicide attempt with a dichotomous answer format (yes/no) as well as the number of past suicide attempts. Teismann, Forkmann, Glaesmer et al. [26] reported good validity and good to excellent internal consistency for the German version of the SSEV (Cronbach's $\alpha = 0.77\text{--}0.92$). Internal consistency was excellent in the present sample (Cronbach's $\alpha = 0.89$).

2.3.3. Beck hopelessness scale (BHS) [27] German version: Beck-Hoffnungslosigkeits-Skala [28]

The BHS assesses hopelessness with 20 true-false items (e.g., "I might as well give up, because there is nothing I can do to improve the situation") resulting in a sum score from 0 to 20 with higher scores indicating higher levels of hopelessness. Kliem, Lohmann [29] reported good validity and good internal consistency for the German version of the BHS (Cronbach's $\alpha = 0.87$). Internal consistency was excellent in the present sample (Cronbach's $\alpha = 0.90$).

2.3.4. Rasch-based depression screening (DESC) [30]

The DESC assesses depressive symptoms during the past two weeks with ten items (e.g., "How often during the last two weeks did you feel sad?"), which are to be answered on a 5-point Likert scale ranging from "0 = never" to "4 = always" resulting in a total sum score ranging from 0 to 40 with higher scores indicating greater depression. Forkmann and Boecker [31] reported good validity and excellent internal consistency (Cronbach's $\alpha = 0.92\text{--}0.93$). Internal consistency was excellent in the present sample (Cronbach's $\alpha = 0.94$).

2.3.5. Resilience scale (RS-13) [32] German version: Resilienzskala [33]

The RS-13 assesses resilience not referring to a specific time frame with 13 items (e.g. "When I'm in a difficult situation, I can usually find my way out of it"), which are to be answered on a 7-point Likert scale ranging from "1 = No, I don't agree" to "7 = yes, I totally agree", resulting in a total sum score ranging from 13 to 91 with higher scores indicating higher resilience. In prior research, internal consistency was excellent with Cronbach's $\alpha = 0.90$ [33]. Internal consistency was also excellent in the present sample (Cronbach's $\alpha = 0.92$). In this examination, resilience served as a measure for discriminant validity.

The response rate was 100% ($N = 721$) for the PTSQ, SSEV, BHS, and the DESC. Four participants did not fill out the RS-13 ($N = 717$).

2.4. Statistical analyses

All analyses were conducted using SPSS 25 and R 3.6.1. The sample was randomly divided into two halves. Descriptive statistics of all measures for each sample were calculated. Differences in samples regarding age, gender, and their scores in the measures were examined with independent *t*-tests. Additionally, effect sizes Cohen's *d* were calculated. An effect is considered to be large if Cohen's *d* is ≥ 0.80 [34]. Descriptive statistics (*M*, *SD*, Min, Max, skew, kurtosis) of the nine initial items of the PTSQ were calculated based on the first half ($n = 361$) of the sample (sample 1). Parallel analysis was used to determine the appropriate number of factors for subsequent exploratory factor analysis (EFA). Because data on the PTSQ items was not normally distributed, we used ordinary least squared/Minres factoring for EFA (Oblimin rotation), as it is known to provide results similar to maximum likelihood without assuming a multivariate normal distribution [35].

Then, the EFA factor solution was validated based on the second half of the sample ($n = 360$; sample 2) using confirmatory factor analysis (CFA) with maximum likelihood estimation using lavaan version 0.5–23 [36]. Global and local fit indices were used to evaluate the fit of the model. The model fit was determined by calculating χ^2 whereby a good model fit is indicated when χ^2 is not significant. Since the χ^2 test is sensitive to a large sample further measures were used. The comparative

fit index (CFI) and the Tucker-Lewis Index (TLI) indicate a good fit when > 0.95 [37,38]. CFI and TLI are incremental fit indices that measure the improvement of fit of the target model in comparison to the restricted baseline model [38]. The root mean square error of approximation (RMSEA) indicates a good fit when < 0.05 [39] and the Standardized Root Mean Square Residual (SRMR) when < 0.09 [38]. Both RMSEA and SRMR are measures of absolute fit indicating to what extent the a priori model reproduces the sample data [38]. Additionally, factor loadings above 0.30 were considered as reasonable item loadings [40].

For all further steps of analyses, data of the total sample ($N = 721$) was used. To examine reliability, internal consistency with Cronbach's α was calculated. Scores ≥ 0.70 were considered as good values [41]. Additionally, corrected item-total correlations (for construct homogeneity) and Cronbach's α of the scale, if an item was deleted were calculated. For construct validity, Pearson correlations among all measures were calculated whereby correlations ≥ 0.30 were considered as moderate and correlations ≥ 0.50 were considered as strong correlations (Cohen, 1988). Independent *t*-tests were calculated to examine differences between participants 1) with recent suicidal ideation ($n = 315$) versus without recent suicidal ideation ($n = 406$) and 2) with lifetime suicide attempt ($n = 178$) versus without lifetime suicide attempt ($n = 543$) assessed with the SSEV. All participants reported lifetime suicidal ideation assessed with the PTSQ ($N = 721$).

3. Results

3.1. Descriptive results

Descriptive values of all measures used in this study for each sample are depicted in Table 1. There were no differences in the measures ($p > .05$) except for depression ($t(719) = 2.09$, $p = .037$, $d = 0.16$). Participants in sample 1 reported significantly higher scores in the DESC than those in sample 2.

Descriptive statistics for all nine items of the initial PTSQ, based on the first half of the sample ($n = 361$), are shown in Table 2.

3.2. Parallel analysis and exploratory factor analysis

Parallel analysis based on sample 1 suggested a three-factor solution. Thus, an EFA with three factors based on the first half of the sample was performed. Results can be found in Table 2 (RMSR = 0.01, RMSEA = 0.047 [90% CI: 0.00; 0.077], TLI = 0.99, $\chi^2 = 21.01$, $p < .05$). Factors were highly correlated (F1 and F2 $r = 0.69$, F1 and F3 $r = 0.83$, F2 and F3 $r = 0.74$). Factor three containing items 5 and 8 consisted of only two items and was thus omitted following suggestions of Raubenheimer [42]. The resulting two factor EFA showed reasonable fit (RMSR = 0.01, RMSEA = 0.052 [90% CI: 0.006; 0.089], TLI = 0.991, $\chi^2 = 15.72$, $p < .05$). However, items 2 and 3 showed a double loading on both factors. Thus, in the next step, item 2 was eliminated first. After elimination of item 2, the respective factor contained only two items, so that the entire factor was also omitted. A third EFA was run with only one factor containing four items ("I can't stop dwelling about suicide"; "I get stuck on thoughts about suicide and can't move on"; "I keep thinking about suicide all the time"; "I feel driven to continue dwelling about suicide"). The one factor EFA showed very good fit (RMSR = 0.01, RMSEA = 0.00 [90% CI: 0.00; 0.099], TLI = 1.00, $\chi^2 = 1.66$, $p = .44$).

3.3. Confirmatory factor analysis

The final one factor EFA solution was then validated with a CFA based on the second half of the sample ($n = 360$). The CFA showed good fit of the unidimensional model (RMSR = 0.006, RMSEA = 0.039 [90% CI: 0.00; 0.119], CFI = 0.999, TLI = 0.998) with high factor loadings for all items (see Table 2).

Table 1
Descriptive values of all scales for each sample and group comparisons.

Gender	Sample 1				Sample 2				Fisher's exact Test		
	354 (95.6%) female				350 (97.2%) female				1.75	0.57	
Measure	<i>M</i>	<i>SD</i>	Min.	Max.	<i>M</i>	<i>SD</i>	Min.	Max.	<i>t</i> (df)	<i>p</i>	<i>d</i>
Age	30.63	8.17	18	81	30.63	8.65	18	65	0.00 (717)	0.999	0.00
PTSQ	5.21	2.36	4	19	5.18	2.51	4	17	0.12 (719)	0.905	0.01
SSEV	1.66	3.21	0	25	1.62	3.19	0	24	0.16 (719)	0.876	0.01
BHS	8.57	5.49	0	20	7.93	5.12	0	20	1.61 (715,68)	0.107	0.12
DESC	15.15	8.57	0	40	13.79	8.79	0	38	2.09 (719)	0.037*	0.16
RS-13	61.22	13.94	20	91	60.94	14.70	13	91	0.26 (715)	0.797	0.02

Note. Sample 1: *N* = 361; Sample 2: *N* = 360; PTSQ = Perseverative Thinking about Suicide Questionnaire; SSEV = Suicide Ideation and Behavior Scale; DESC = Rasch-based Depressionsscreening; BHS = Beck Hopelessness Scale; RS-13 = Resilience Scale; * $p \leq .05$.

3.4. Reliability

Means, standard deviations, corrected item-total correlations and Cronbach's α if the item was deleted are shown in Table 3. Cronbach's α would be substantially reduced when deleting one of the four items. Cronbach's α of the total scale including all four items showed excellent internal consistency (Cronbach's $\alpha = 0.93$). The corrected item-total correlations for the PTSQ - ranging between 0.81 and 0.86 ($M_{\text{item-total correlations}} = 0.84$) - can be considered as high values.

3.5. Construct validity

3.5.1. Correlations

There were moderate to strong positive correlation ($r = 0.38$ to $r = 0.76$) between the PTSQ and related constructs such as suicidal ideation, hopelessness, and depression. The strongest correlation was with suicidal ideation. There was a moderate negative correlation with resilience (see Table 4).

3.5.2. Group comparisons

t-tests revealed that participants with recent suicidal ideation in the past four weeks ($M = 6.39$, $SD = 3.13$) reported significantly more suicide-specific rumination than participants without recent suicidal ideation ($M = 4.26$, $SD = 0.97$), $t(360.91) = 11.65$, $p \leq .001$, $d = 0.88$). Participants with lifetime suicide attempt ($M = 6.23$, $SD = 3.26$) reported significantly more suicide-specific rumination than participants without a lifetime suicide attempt but lifetime suicidal ideation ($M = 4.86$, $SD = 1.98$), $t(221.51) = 5.29$, $p \leq .001$, $d = 0.46$).

4. Discussion

It has been shown that suicidal ideation and behavior are associated with rumination [13,14,17]. Yet only recently, results of investigations on suicide-specific rumination have been published [18–20], emphasizing that suicide-specific rumination is more of a risk factor for suicidal ideation and behavior than non-specific rumination. Even though the detection of such risk factors is of high importance in suicide risk assessment, there has only been one measure so far assessing suicide-specific rumination, the SRS [18,19]. However, the items of the SRS partly also capture preparation behavior and so called flash-forwards [22], which complicates the identification of the suicide-specific ruminative thought itself. Thus, Teismann, Forkmann, Michalak et al. [22] developed the Perseverative Thinking about Suicide Questionnaire (PTSQ), thereby trying to present a measure that does not overlap with other processes involved in the development of suicide intent. In a first investigation based on an online sample, the nine-item version of the PTSQ has been shown to be able to differentiate between participants with lifetime suicide attempt and lifetime suicidal ideation [22]. The current study presents results of the first comprehensive psychometric analysis of this new measure. We found a one-factorial solution with four items, showing good reliability and construct validity.

4.1. Factor structure

Results of the EFA based on one half of the entire sample revealed strong support for a one-factorial four-factor solution. Parallel analysis initially suggested a three-factor model. However, as two factors consisted of only two items (for one factor, after removal of a cross-loading factor), the model collapsed to a one-factor solution with very good fit. This was confirmed by an independent CFA based on the second half of the entire sample.

4.2. Reliability and validity

Reliability in terms of internal consistency was excellent. Correlations of the PTSQ with suicidal ideation, hopelessness, depression and resilience were as expected. The largest correlation was found with recent suicidal ideation, complementing findings of the meta-analysis by Rogers and Joiner [14]. There was a medium correlation with hopelessness in line with findings of associations between hopelessness and suicidal ideation [43] as well as rumination [12]. The large correlation of the PTSQ with depression was not surprising given that rumination itself is a predictor for a major depressive episode and depressive relapse [4–7] and suicidal ideation itself is also related to depression [43]. As expected, there was a medium negative correlation with resilience, which adds on to findings of a study with $N = 1417$ adolescents showing that suicide risk behavior was affected by rumination and that this association was moderated by resilience [44].

In line with findings of Teismann, Forkmann, Michalak et al. [22] and Rogers and Joiner [18], the PTSQ could differentiate between participants with lifetime suicide attempt and participants with lifetime suicidal ideation. The PTSQ could also differentiate between participants with recent suicidal ideation within the past four weeks and those with only lifetime suicidal ideation, emphasizing suicide-specific rumination as being closer related to acute suicidal experiences than to suicidal ideation in the past. This is in line with Galynker [17], who postulates severe acute rumination (“ruminative flooding”) to be a component of the “suicidal crisis syndrome”, and found it to be related to imminent suicide risk, and also with the conceptualization of the acute suicidal affective disturbance (ASAD), as described by Rogers and Joiner [19].

4.3. Clinical implications and future perspectives

Results of the current study highlight the role of suicide-specific rumination and emphasize the usefulness of such a measure in suicide risk assessment. The four-item PTSQ is a very short and economic instrument for the assessment of suicide-specific rumination in research and clinical practice, that does not put unnecessary strain on already burdened participants by asking them to fill in lengthy questionnaires. Second, the brevity of the PTSQ makes it also a useful instrument for repeated assessments. It has been shown that rumination is not a stable construct [45,46], but rather fluctuates over time even within hours [47]. The same has been shown for suicidal ideation [48,49]. Thus,

Table 2
Descriptive statistics for all nine initial items as well as factor loadings of EFA and CFA models.

Item Nr.	Item wording	Min.	Max.	M	SD	Skewness	SE	Curtosis	SE	Shapiro-Wilk	p	EFA three factors*			EFA two factors*		EFA one factor*	CFA one factor [#]
												Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 1	Factor 1
1	Suizidgedanken gehen mir immer und immer wieder durch den Kopf. [The same thoughts about suicide keep going through my mind again and again.]	1	5	1.91	0.85	1.01	0.13	1.27	0.26	0.81	<0.001***		0.76	0.05	0.02	0.83		
2	Suizidgedanken drängen sich mir auf. [Thoughts about suicide intrude into my mind.]	1	5	1.58	0.85	1.62	0.13	2.47	0.26	0.70	<0.001***	0.28	0.52	0.14	0.30	0.61		
3	Ich kann nicht aufhören, über Suizid nachzudenken. [I can't stop dwelling about suicide.]	1	5	1.35	0.72	2.50	0.13	6.96	0.26	0.55	<0.001***	0.51	0.46	-0.11	0.49	0.38	0.81	0.87
4	Meine Suizidgedanken wiederholen sich. [My thoughts about suicide repeat themselves.]	1	5	1.66	0.87	1.30	0.13	1.22	0.26	0.74	<0.001***	-0.80	0.87	0.08	-0.05	0.95		
5	Suizidgedanken tauchen auf, ohne dass ich dies will. [Thoughts about suicide come to my mind without me wanting them to.]	1	5	1.71	0.92	1.35	0.13	1.62	0.26	0.75	<0.001***	0.06	-0,02	0.88				
6	Ich hänge an Suizidgedanken fest und kann mich nicht davon lösen. [I get stuck on thoughts about suicide and can't move on.]	1	5	1.33	0.69	2.43	0.13	6.08	0.26	0.53	<0.001***	0.79	-0,01	0.15	0.83	0.07	0.89	0.92
7	Ich denke die ganze Zeit über Suizid nach. [I keep thinking about suicide all the time.]	1	4	1.22	0.56	2.91	0.13	8.88	0.26	0.45	<0.001***	0.84	0.02	-0,04	0.86	-0.04	0.84	0.89
8	Suizidgedanken treten ganz plötzlich auf. [Thoughts about suicide just pop into my mind.]	1	5	1.83	0.99	1.19	0.13	0.87	0.26	0.78	<0.001***	-0,01	0.19	0.71				
9	Ich fühle mich gezwungen, immer weiter über Suizid nachzudenken. [I feel driven to continue dwelling about suicide.]	1	5	1.30	0.65	2.34	0.13	6.07	0.26	0.53	<0.001***	0.86	0.00	0.05	0.92	-0.02	0.90	0.89

Note: *: based on the first random half of the sample (N = 361); #: based on the second random half of the sample (N = 360).

Table 3
Inter-item correlations¹ and descriptives for the four PTSQ items.

	2	3	4	M	SD	Corrected item-total correlation	α , if item deleted
1 Ich kann nicht aufhören, über Suizid nachzudenken. [I can't stop dwelling about suicide.]	0.75	0.72	0.76	1.34	0.70	0.81	0.91
2 Ich hänge an Suizidgedanken fest und kann mich nicht davon lösen. [I get stuck on thoughts about suicide and can't move on.]		0.79	0.81	1.32	0.70	0.86	0.90
3 Ich denke die ganze Zeit über Suizid nach. [I keep thinking about suicide all the time.]			0.77	1.22	0.58	0.83	0.91
4 Ich fühle mich gezwungen, immer weiter über Suizid nachzudenken. [I feel driven to continue dwelling about suicide.]				1.31	0.70	0.85	0.90

Note. N = 721; PTSQ = Perseverative Thinking about Suicide Questionnaire, α = Cronbach's alpha,
¹ inter-item correlations are depicted in column 2 and 3.

Table 4
Pearson correlations among questionnaires.

	2	3	4	5
1. PTSQ	0.76**	0.38**	0.55**	-0.31**
2. SSEV		0.39**	0.58**	-0.36**
3. BHS			0.69**	-0.53
4. DESC				-0.49**
5. RS-13				

Note. N = 721; PTSQ = Perseverative Thinking about Suicide Questionnaire; SSEV = Suicide Ideation and Behavior Scale; DESC = Rasch-based Depressionsscreening; BHS = Beck Hopelessness Scale; RS-13 = Resilience Scale** all correlations were significant at a level of $p \leq .01$.

suicide-specific rumination will most likely also underly considerable variability across time. This emphasizes the importance for assessing suicide risk factors including suicide-specific rumination in suicide risk assessment not only once but repeatedly during the treatment course. It has been called for putting more emphasis on proximal rather than distal risk factors for suicidal ideation and behavior [50] and recently developed conceptualizations such as ASAD [19], which has been characterized by a rapid and drastic increase in suicide intent, or the suicidal crisis syndrome [17] take these considerations into account. One possibility for assessing such fluctuating risk factors is smartphone-based ecological momentary assessment (EMA), which offers the assessment of risk factors within short time intervals of minutes to hours [51]. For EMA, the assessment of each risk factor needs to be as short as possible. The brevity of the PTSQ seems to be ideal to include the PTSQ in EMA in clinical practice.

For future studies, it would be especially interesting to examine suicide-specific rumination in an EMA setting within clinical samples. This would also allow to further investigate the prediction power of the PTSQ within short time intervals.

4.4. Strengths and limitations

A strength of the study was the large sample, which offered the possibility to cross-validate the factor structure of the PTSQ in two randomly halves of the sample. Another strength was that a relatively large number of participants also reported recent suicidal ideation, even though this was not a clinical sample. The results of the current study should be interpreted with consideration of the following limitations. First, no direct comparison between the PTSQ and the Suicide Rumination Scale (SRS) [18] was made. Therefore, no conclusions with respect to the relationship between the two measures can be drawn; furthermore, it is not possible to determine pros and cons of using one or the other measure in assessing suicide-specific rumination. Second, the sample consisted of participants working in the German Health Care System and mostly women took part in the survey. It has been shown that there are gender differences in depression [52] (women are more likely to experience depression than men) but also and most importantly in suicidal behavior with more women than men attempting suicide and

more men than women actually dying by suicide [53]. Therefore, results should only be interpreted with caution. Ernst et al. [54] found that men and women did not differ in their levels of suicidal ideation but other factors seemed to be more important such as age or living alone. However, inferences to clinical samples or the general population should be drawn only carefully as the predominance of women in this sample limits the value of our findings. It appears to be important to replicate the current findings in a clinical sample.

5. Conclusion

The present study investigated the psychometric characteristics of the newly developed PTSQ. Results were very good in terms of validity and reliability for a one-factorial four-item version of the instrument. The PTSQ was confirmed as being an excellent measure for suicide-specific rumination. The PTSQ was able to differentiate between participants with varying degrees of acuteness of suicidal ideation and/or behavior (lifetime suicidal ideation/attempt, recent suicidal ideation/attempt). Since the four-item PTSQ is a very short instrument it may also serve as a measure for repeated assessments in clinical practice. Its further application in suicide research is promising. Research with prospective data and in a more evenly distributed sample of men and women is needed.

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Declaration of Competing Interest

The authors have no conflict of interests to declare.

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References

- [1] Ehring T, Zetsche U, Weidacker K, Wahl K, Schonfeld S, Ehlers A. The perseverative thinking questionnaire (PTQ): validation of a content-independent measure of repetitive negative thinking. *J Behav Ther Exp Psy* 2011;42:225–32.
- [2] Ehring T, Watkins ER. Repetitive negative thinking as a transdiagnostic process. *Int J Cogn Ther* 2008;1:192–205.
- [3] Teismann T, Ehring T. *Pathologisches Grübeln: Hogrefe Verlag*. 2019.
- [4] Nolen-Hoeksema S, Stice E, Wade E, Bohon C. Reciprocal relations between rumination and bulimic, substance abuse, and depressive symptoms in female adolescents. *J Abnorm Psychol* 2007;118:198–207.
- [5] Wilkinson PO, Croudace TJ, Goodyer IM. Rumination, anxiety, depressive symptoms and subsequent depression in adolescents at risk for psychopathology: a longitudinal cohort study. *BMC Psychiatry* 2013;250.
- [6] Spinhoven P, van Hemert AM, Penninx BW. Repetitive negative thinking as a predictor of depression and anxiety: a longitudinal cohort study. *J Affect Disord* 2018;241:216–25.

- [7] Michalak J, Hölz A, Teismann T. Rumination as a predictor of relapse in mindfulness-based cognitive therapy for depression. *Psychol Psychother-T* 2011; 84:230–6.
- [8] Spinhoven P, Penninx BW, Krempeuou A, van Hemert AM, Elzinga B. Trait rumination predicts onset of post-traumatic stress disorder through trauma-related cognitive appraisals: a 4-year longitudinal study. *Behav Res Ther* 2015;71:101–9.
- [9] Penney ES, Abbott MJ. Anticipatory and post-event rumination in social anxiety disorder: a review of the theoretical and empirical literature. *Behav Chang* 2014; 31:79–101.
- [10] Selby EA, Anestis MD, Bender TW, Joiner Jr TE. An exploration of the emotional cascade model in borderline personality disorder. *J Abnorm Psychol*. 2009;118: 375–87.
- [11] Selby EA, Joiner Jr TE. Emotional cascades as prospective predictors of dysregulated behaviors in borderline personality disorder. *Personal Disord* 2013;4: 168–74.
- [12] Nolen-Hoeksema S, Wisco BE, Lyubomirsky S. Rethinking rumination. *Perspect Psychol Sci* 2008;3:400–24.
- [13] Law KC, Tucker RP. Repetitive negative thinking and suicide: a burgeoning literature with need for further exploration. *Curr Opin Psychol* 2018;22:68–72.
- [14] Rogers ML, Joiner TE. Rumination, suicidal ideation, and suicide attempts: a meta-analytic review. *Rev Gen Psychol* 2017;21:132–42.
- [15] Rogers ML, Gorday JY, Joiner TE. Examination of characteristics of ruminative thinking as unique predictors of suicide-related outcomes. *J Psychiatr Res* 2021; 139:1–7.
- [16] Nock MK, Millner AJ, Joiner TE, Gutierrez PM, Han G, Hwang I, et al. Risk factors for the transition from suicide ideation to suicide attempt: results from the army study to assess risk and resilience in servicemembers (Army STARRS). *J Abnorm Psychol* 2018;127:139.
- [17] Galyenker I. The suicidal crisis: Clinical guide to the assessment of imminent suicide risk. Oxford: Oxford University Press; 2017.
- [18] Rogers ML, Joiner TE. Suicide-specific rumination relates to lifetime suicide attempts above and beyond a variety of other suicide risk factors. *J Psychiatr Res* 2018;98:78–86.
- [19] Rogers ML, Joiner TE. Lifetime acute suicidal affective disturbance symptoms account for the link between suicide-specific rumination and lifetime past suicide attempts. *J Affect Disord* 2018;235:428–33.
- [20] Rogers ML, Gallyer AJ, Joiner TE. The relationship between suicide-specific rumination and suicidal intent above and beyond suicidal ideation and other suicide risk factors: a multilevel modeling approach. *J Psychiatr Res* 2021;137: 506–13.
- [21] Rogers ML, Law KC, Houtsma C, Tucker RP, Anestis MD, Joiner TE. Development and initial validation of a scale assessing suicide-specific rumination: the suicide rumination scale. *Assessment*. 2021 Jul;22. Epub ahead of print, 34291666.
- [22] Teismann T, Forkmann T, Michalak J, Brailovskaia J. Repetitive negative thinking about suicide: associations with lifetime suicide attempts. *Clin Psychol Europe* 2021;3(3):1–14.
- [23] Höller, I., & Forkmann, T. (accepted). Ambivalent heroism? – cross-sectional examination of psychological burden and suicidal ideation in German nurses during the Covid-19 pandemic. *Nurs Open*. (In press).
- [24] Dilling H, Mombour M, Schmidt M, Schulte-Markwort E. WHO: ICD-10 Kapitel V (F) Diagnostische Kriterien für Forschung und Praxis. 6. Auflage. Göttingen: Hogrefe; 2016.
- [25] World Medical Association. World Medical Association Declaration of Helsinki. Ethical principles for medical research involving human subjects. *Bull World Health Organ* 2001;79:373.
- [26] Teismann T, Forkmann T, Glaesmer H, Juckel G, Cwik JC. Skala Suizidales Erleben und Verhalten (SSEV). *Diagnostica*. 2021;67:115–25.
- [27] Beck AT, Weissman A, Lester D, Trexler L. The measurement of pessimism: the hopelessness scale. *J Consult Clin Psychol* 1974;42:861.
- [28] Kliem S, Brähler E. Beck-Hoffnungslosigkeits-Skala. Göttingen: Hogrefe; 2016.
- [29] Kliem S, Lohmann A, Mölle T, Brähler E. Psychometric properties and measurement invariance of the Beck hopelessness scale (BHS): results from a German representative population sample. *BMC Psychiatry* 2018;18:1–11.
- [30] Forkmann T, Boecker M, Norra C, Eberle N, Kircher T, Schauerer P, et al. Development of an item bank for the assessment of depression in persons with mental illnesses and physical diseases using Rasch analysis. *RehabilPsychol*. 2009; 54:186–97.
- [31] Forkmann T, Boecker M, Wirtz M, Glaesmer H, Brähler E, Norra C, et al. Validation of the rasch-based depression screening in a large scale German general population sample. 2010.
- [32] Wagnild GM, Young HM. Development and psychometric evaluation of the resilience scale. *J Nurs Meas* 1993;1:165–17847.
- [33] Leppert K, Koch B, Brähler E, Strauß B. Die Resilienskala (RS)–Überprüfung der Langform RS-25 und einer Kurzform RS-13. *Klin Diagn Eval* 2008;1:226–43.
- [34] Cohen J. Statistical power analysis for the Behavioral sciences. 2 ed. Hillsdale: Lawrence Erlbaum Associates; 1988.
- [35] Osborne JW. Best practices in exploratory factor analysis. Scotts Valley, CA: CreateSpace Independent Publishing; 2014.
- [36] Rosseel Y, Oberski D, Byrnes J, Vanbrabant L, Savalei V, Merkle E, et al. Lavaan: Latent variable analysis. 2014.
- [37] Bentler PM. Comparative fit indexes in structural models. *PsycholBull*. 1990;107: 238–46.
- [38] Li Hu, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Struct Equ Modeling* 1999;6:1–55.
- [39] MacCallum RC, Browne MW, Sugawara HM. Power analysis and determination of sample size for covariance structure modeling. *Psychol Methods* 1996;1:130.
- [40] Velicer WF, Peacock AC, Jackson DN. A comparison of component and factor patterns: a Monte Carlo approach. *Multivar Behav Res* 1982;17:371–88.
- [41] Nunally JC, Bernstein I. Psychometric theory. Ed. NY: McGraw-Hill; 1978.
- [42] Raubenheimer J. An item selection procedure to maximize scale reliability and validity. *SA J Indust Psychol* 2004;30:59–64.
- [43] Ribeiro JD, Huang X, Fox KR, Franklin JC. Depression and hopelessness as risk factors for suicide ideation, attempts and death: meta-analysis of longitudinal studies. *Brit J Psych* 2018;212:279–86.
- [44] Thanoi W, Phanchaenworakul K, Thompson EA, Panitrat R, Nityasuddhi D. Thai adolescent suicide risk behaviors: testing a model of negative life events, rumination, emotional distress, resilience and social support. *Pac Rim Int J Nurs Res* 2010;14:187–202.
- [45] Moberly NJ, Watkins ER. Ruminative self-focus, negative life events, and negative affect. *Behav Res Ther* 2008;46:1034–9.
- [46] Takano K, Tanno Y. Diurnal variation in rumination. *Emotion*. 2011;11:1046.
- [47] Connolly SL, Alloy LB. Rumination interacts with life stress to predict depressive symptoms: an ecological momentary assessment study. *Behav Res Ther* 2017;97: 86–95.
- [48] Hallensleben N, Spangenberg L, Forkmann T, Rath D, Hegerl U, Kersting A, et al. Investigating the dynamics of suicidal ideation. *Crisis*. 2017;39:1–5.
- [49] Kleiman EM, Turner BJ, Fedor S, Beale EE, Huffman JC, Nock MK. Examination of real-time fluctuations in suicidal ideation and its risk factors: results from two ecological momentary assessment studies. *J Abnorm Psychol*. 2017;126(6):726–38.
- [50] Franklin JC, Ribeiro JD, Fox KR, Bentley KH, Kleiman EM, Huang X, et al. Risk factors for suicidal thoughts and behaviors: a meta-analysis of 50 years of research. *Psychol Bull* 2017;143:187–232.
- [51] Trull TJ, Ebner-Priemer U. The role of ambulatory assessment in psychological science. *Curr Dir Psychol Sci* 2014;23:466–70.
- [52] Nolen-Hoeksema S, Hilt LM. Gender differences in depression. *Current directions in psychological science*. 2009.
- [53] Piscopo K, Lipari RN, Cooney J, et al. Suicidal thoughts and behavior among adults: Results from the 2015 National Survey on drug use and health (NSDUH data review). Rockville, Md: Substance Abuse and Mental Health Service Association; September 2016 (<https://www.samhsa.gov/data/sites/default/files/NSDUH-DR-FFR3-2015/NSDUH-DR-FFR3-2015.pdf>).
- [54] Ernst M, Klein EM, Beutel ME, Brähler E. Gender-specific associations of loneliness and suicidal ideation in a representative population sample: Young, lonely men are particularly at risk. *J Affect Disord* 2021;294:63–70.

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