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Psychometric evaluation of the Tolerance for Mental Pain Scale in United States adults

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ABSTRACT

The purpose of the present study was to analyze the factor structure of the Tolerance for Mental Pain Scale (TMPS) in a sample of United States adults and examine its associations with suicidal behavior and intensity of psychological pain. Data were collected through an online general population survey (N = 225), and statistical analysis consisted of factor analysis and descriptive statistics of the data. Confirmatory factor analysis did not indicate a good fit with the originally proposed three-factor model. Subsequent exploratory factor analysis showed a good fit for a two-factor solution while enabling reduction of the scale to ten items, which we refer to as TMPS-10. The TMPS-10 scores were significantly lower for respondents with a lifetime history of attempted suicide and significantly inversely associated with the intensity of psychological pain. We recommend using the TMPS-10 to assess tolerance for mental pain for research purposes. With half the number of items of the original scale, the TMPS-10 has a lower response burden and minimizes the risk of over-inflating internal consistency due to redundant items.

1. Introduction

Over the past 25 years, research of psychological pain has focused heavily on pain intensity and far less on tolerance for psychological pain. Tolerance for psychological pain refers to the ability to endure psychological pain and is central to many suicide theories (Baumeister, 1990; Leenaars, 1996; Maltsberger, 2004; Shneidman, 1993). From a clinical and suicide risk management perspective, assessing whether clients can endure the pain is perhaps even more important than assessing the intensity of their psychological pain. In fact, Maltsberger (2004) recommended always asking a potentially suicidal client whether their pain has become intolerable, as this cannot always be gauged externally. Shneidman and Orbach, pioneers in the area of psychological pain and suicide, considered a lowered threshold for tolerating or enduring psychological pain as a prerequisite for a suicidal outcome (Orbach et al., 2003a; Shneidman, 1993). According to Orbach (1994), tolerance for psychological pain is not constant and persistent psychological pain can undermine an individual's ability to endure it.

To facilitate assessment of tolerance for psychological pain, the 20-item Tolerance for Mental Pain Scale ([TMPS], Orbach et al., 2004) was developed and is, as far as we know, the only questionnaire available to assess tolerance for psychological pain. The TMPS was developed to measure three facets of tolerance for psychological pain that reflected existing theoretical perspectives in the literature. First, one can understand tolerance for pain in a proactive way that is manifested in one's ability to put the pain aside, make active attempts to stop or reduce the pain, and not let it interrupt one's routines and daily activities. Examples of TMPS items that reflect this facet of tolerance for psychological pain are "I *don't* think about the pain all the time" and "I feel that my pain *doesn't* interrupt everything I do". Italics are used to indicate reverse wording compared to the actual item in the scale. Second, one can understand tolerance of pain as passive acceptance of the pain, accompanied by optimistic beliefs about the pain passing (item examples: "I believe that my pain will go away" and "Although it's tough to bear the pain, I know that it will go away"). Third, one can understand tolerance of pain as containment of pain that can help a person live with the pain, without actively attempting to change it (item examples: "The pain is *not* too much to take" and "I *don't* feel that I must get rid of the pain immediately"). Orbach et al. (2004) labeled

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these three facets of the TMPS "Surfeit of the pain", "Belief in the ability to cope with the pain", and "Containing the pain". The TMPS was developed and tested in Israeli adolescents and young adults, including high school students and psychiatric inpatients. The scale was available from Dr. Orbach[1] upon request (see supplemental file).

Becker et al. (2018) provided initial support for the TMPS's factor structure in a sample of Israeli adolescents and reported that Cronbach α, a measure of internal consistency, for the three factors ranged from 0.72 to 0.84. As internal consistency values below 0.70 are considered questionable or unacceptable for research (Cicchetti, 1994; Nunnally and Bernstein, 1994), the lower bound of 0.72 is of some concern. Other than Becker et al. (2018), only a handful of studies have reported results obtained with the TMPS. A study in a general population sample of Greek adults reported that tolerance for psychological pain was inversely associated with suicide risk and that tolerance for psychological pain, in particular the factor "Containing the pain", had a unique contribution to suicide risk (Soumani et al., 2011). However, the reported internal reliability consistency for the factors "Belief in the ability to cope with the pain" and "Containing the pain" was only slightly above the threshold for acceptable reliability (Cronbach alpha of 0.76 and 0.72, respectively). The correlation between tolerance for psychological pain and intensity of psychological pain, as assessed on the Orbach & Mikulincer Mental Pain questionnaire ([OMMP], Orbach et al., 2003b), was moderate ($r = -0.42$). Another study reported lower tolerance for psychological pain in young inpatients who had attempted suicide compared to a nonclinical control group (Levinger et al., 2015). However, at odds with Soumani et al. (2011) findings, tolerance for psychological pain did not have a significant unique contribution to suicide ideation. Levinger et al. (2015) reported a lower bound Cronbach α of 0.78, but did not specify for which factor. A third study, in young Israeli soldiers, found that soldiers with low tolerance for psychological pain reported significantly stronger suicide ideation than soldiers with high tolerance for psychological pain, despite equally high levels of psychological pain (Shelef et al., 2015). They reported a strong correlation between tolerance for psychological pain and intensity of psychological pain ($r = -0.55$), as assessed with the OMMP. Unfortunately, Shelef et al. did not report Cronbach alphas for individual TMPS factors. A fourth study using the TMPS in United States (U.S.) adults, showed that adults with a history of suicide attempt scored significantly lower on tolerance for psychological pain than adults with no history of suicide attempt. It also indicated that the factor "Belief in the ability to cope with the pain" had a unique contribution to suicide ideation, after controlling for age and intensity of psychological pain (Meerwijk and Weiss, 2018). They reported a Cronbach α of 0.61 for the factor "Containing the pain" and a strong inverse correlation between "Surfeit of the pain" and intensity of psychological pain ($r = -0.85$, $p < .0001$) as assessed on the Psychache scale (Holden et al., 2001).

In sum, support for the factor structure of the TMPS has not been shown when used with adults, and low internal consistency, especially for the factor "Containing the pain", calls reliability of that factor into question. These observations prompted this psychometric analysis of the TMPS and description of possible scale variation with age and gender in a sample of U.S. adults. We did not have a priori hypotheses regarding the association of tolerance for psychological pain with age or gender.

2. Methods

2.1. Participants

The sample included adult Facebook users in the United States, who responded to advertisements that invited them to complete an anonymous online survey. A similar approach was used successfully to collect data on suicidal behavior in an Australian online sample (Batterham et al., 2015). Ad texts focused on the link between psychological pain and suicide, the prevalence of suicide and suicide attempts, or that someone close may be experiencing unbearable pain. Another ad indicated that people of any race/ethnicity could participate, regardless of whether they were experiencing psychological pain. In addition, all ads showed a map of the U.S. and an indication that this was a national survey. Inclusion criteria were being at least 18 years old, U.S. resident, and ability to read and understand English. Of 708 individuals who visited the survey website, 389 (55%) provided consent to participate. Among those who consented, 133 (34%) individuals did not submit their responses. Statistical analyses were conducted on 225 respondents with complete TMPS data. The Institutional Review Board at the University of California, San Francisco, approved the study (IRB# 16-18686).

Table 1 shows sociodemographic and clinical characteristics of respondents. Compared to the 2010 U.S. census records (U.S. Census Bureau, 2016), our sample was younger and more often female. Regarding race, our sample was less often of white or Asian descent and more often of Black/African American, American Indian/Alaska Native, Native Hawaiian and other Pacific Islander, or of mixed descent. In our sample, 24% had a lifetime history of suicide attempt and 7% had attempted suicide during the past year. Respondents who had attempted suicide were significantly more likely to have experienced psychological pain during the past week, but they did not differ in when their worst psychological pain was experienced. Respondents who had attempted suicide were significantly more likely to have been diagnosed with a mental illness. There was neither a significant difference in age between respondents who had or had not attempted suicide, nor a significant difference in distribution of male and female respondents.

2.2. Measures

2.2.1. Tolerance for psychological pain

Tolerance for psychological pain was assessed with the TMPS. The TMPS consists of 20 self-rated statements about the experience of psychological pain (see supplemental file). Respondents endorse items on a 5-point scale ranging from 1 ("Not true") to 5 ("Very true"). Factor scores ("Surfeit of the pain", "Belief in the ability to cope with the pain", "Containing the pain") are obtained by averaging individual item scores, while accounting for reverse items. Higher scores indicate higher tolerance for psychological pain. Good to excellent internal reliability has been reported for the factor "Surfeit of the pain", with values ranging from 0.84 to 0.91 (Becker et al., 2018; Meerwijk and Weiss, 2018). Internal reliability of the other two factors ranged from unacceptable to fair, as mentioned earlier.

2.2.2. Psychological pain intensity

Intensity of psychological pain was assessed on the Psychache scale (PS), which describes psychological pain as "a hurting feeling inside, often described as pain you feel in your heart or mind. It indicates how much you hurt emotionally or mentally" (Holden et al., 2001). The PS has 13 items with higher scores reflecting greater psychological pain. Nine items are scored on a 5-point frequency scale ranging from never to always, corresponding to a value of 1–5. Four items, reflecting pain intensity, are scored on a 5-point symmetrical scale ranging from strongly disagree to strongly agree, also corresponding to a value of 1–5. The total score is obtained by summing the item scores, resulting in a total score between 13 and 65. The Psychache scale has been validated in diverse populations, including university students, homeless men, outpatients with depression, and male prison inmates (Li et al., 2014; Mills et al., 2005; Patterson and Holden, 2012; Troister and Holden, 2012; Xie et al., 2014). We found excellent internal consistency for our sample, with Cronbach $\alpha = 0.95$.

[1] Dr. I. Orbach passed away in 2010.

Table 1
Characteristics of respondents with and without lifetime suicide attempt.

	Did you ever attempt suicide intending to die? No (n = 170)	Yes (n = 55)	Total (N = 225)[a]	
Mean age in years (*SD*)	33.3 (15.7)	29.5 (14.5)	32.4 (15.5)	T = 1.65
Gender				χ^2 = 0.04
Male	69	23	92	
Female	96	30	126	
Race				χ^2 = 2.89[b]
American Indian/ Alaska Native	5	2	7	
Asian	4	0	4	
Native Hawaiian/ other PI	2	0	2	
Black/African American	25	6	31	
White	101	37	138	
Mixed	13	5	18	
Hispanic/Latino Ethnicity				χ^2 = 3.82
No	118	46	164	
Yes	50	9	59	
English as first language				χ^2 = 3.54
No	30	4	34	
Yes	139	51	190	
Diagnosed with mental illness				χ^2 = 35.5***
No	152	29	181	
Yes	18	26	44	
Experienced psychological pain				χ^2 = 20.2[b]***
Past week	99	49	148	
Past month	14	4	18	
Past year	27	1	28	
Longer ago	30	1	31	
Worst psychological pain				χ^2 = 1.78
Past week	20	10	29	
Past month	28	7	34	
Past year	46	16	60	
Longer ago	73	22	92	
Attempted suicide				
Past week	n/a	1	n/a	
Past month	n/a	4	n/a	
Past year	n/a	11	n/a	
Longer ago	n/a	39	n/a	

Note. PI: Pacific Islander.
**p < .01, ***p < .001.
[a] Counts do not always add up to N due to missing data.
[b] Test included cells with expected counts less than 5.

2.2.3. Suicide attempt

The online survey included questions about suicide attempt history that followed demographic questions and questions about psychological pain. The first question was "Did you ever attempt suicide with the intent to die?" This question was taken as an index of lifetime suicide attempt. A second question was about when respondents attempted suicide, with response options "during the past week", "during the past month", "during the past year", and "More than a year ago."

2.3. Data analysis

As the TMPS was originally based on a three-factor model, we started with confirmatory factor analysis to test our data against this model. Our data did not fit the proposed three-factor solution (details below), thus we progressed to exploratory factor analysis. We tested the models' χ^2 for goodness of fit and report the Root Mean Squared Error of the Approximation (RMSEA), Standardized Root Mean Squared Residual (SRMR), and the Tucker–Lewis Index (TLI). All analyses were done in R version 3.4.0. Confirmatory factor analysis was conducted using the Lavaan package version 0.5-23.1097. Exploratory factor analysis was done with functions available in base R (fa, princomp). A scree plot and the Kaiser–Guttman criterion (Eigen values > 1) were used to determine the number of factors. We tested orthogonal factor rotations (Varimax) as well as oblique rotations (Oblimin). We aimed for simple structure, which means that items have a strong loading on one factor and only small loadings on other factors (Pettersson and Turkheimer, 2010). We considered factor loadings >0.40 as meaningful. Simple structure is also identified based on mean item complexity, where a value of 1.0 indicates that an item loads on a single factor only.

Concurrent validity was examined through correlations of the newly identified factors with participants' intensity of psychological pain on the Psychache scale. Discriminant validity was examined by *t*-tests that compared factor means of respondents who had or had not attempted suicide. A binary index of suicide attempts was used to achieve maximum discrimination between these two groups in comparing their TMPS scores. Pearson correlations were used to examine scale and factor associations with age and gender.

3. Results

3.1. Confirmatory factor analysis

Analysis of internal consistency of the TMPS indicated one item with an inverse item-scale correlation (item 6: "I cope with the pain even though it's difficult to bear"). Additional analysis showed a significant quadratic association between the item and scale score, which prompted us to drop it from further analyses. The three-factor model, as described by Orbach et al. (see supplemental file), did not fit our data well ($\chi^2(149) = 524.9$, $p < .001$, RMSEA = 0.11, SRMR = 0.13). Cronbach α for each of the three factors was 0.93, 0.82, and 0.61, indicating, excellent, good, and unacceptable internal consistency for the factors "Surfeit of the pain", "Belief in the ability to cope with the pain", and "Containing the pain", respectively.

3.2. Exploratory factor analysis

Given the result of confirmatory factor analysis, we proceeded with exploratory factor analysis. As the scree plot (see supplemental file) suggested a two-factor model and the Kaiser–Guttman criterion suggested a 3-factor model, we evaluated both two and three-factor models. The two-factor model with orthogonal rotation accounted for 55% of the total variance ($\chi^2 = 362.4$, $p < .001$, RMSEA = 0.09, SRMR = 0.05, TLI = 0.89). Table 2 shows the factor loadings for each TMPS item. We labeled the first factor "Managing the Pain." This factor accounted for 40% of the variance, with a Cronbach α of 0.94. We labeled the second factor "Enduring the Pain". This factor accounted for 15% of the variance, with a Cronbach α of 0.84. Both factors had simple structure with highly salient loadings (minimum loadings of 0.53 and 0.59 for "Managing the Pain" and "Enduring the Pain", respectively). Simple structure was also visible in a mean item complexity of 1.1. A two-factor model with oblique rotation led to negligible differences (data not shown). The strength of the correlation between oblique factors was negligible (r = 0.13), which supports a choice for orthogonal rotation.

A three-factor model with orthogonally rotated factors accounted for 59% of the variance in TMPS (RMSEA = 0.07, SRMR = 0.04, TLI = 0.92) and had a slightly better fit than the two-factor model ($\chi^2 = 253.6$ vs. $\chi^2 = 362.4$). The same items that comprised the factor "Managing the Pain" in the two-factor model also grouped together in the three-factor model. However, simple structure was lost, as two items had stronger loadings on the third factor and three more items had loadings on the third factor that were close to our cut-off value of

Table 2
Factor loadings for exploratory factor analysis with Varimax rotation of the Tolerance for Mental Pain Scale.

Scale Items	Managing the Pain	Enduring the Pain
7. **I suffer very much**	**0.83**	0.15
12. **I cannot get the pain out of my mind.**	**0.82**	0.08
20. I think about the pain all the time.	**0.81**	0.15
4. **I cannot concentrate because of my pain.**	**0.78**	0.03
19. **The pain is too much to take.**	**0.78**	0.16
15. The pain is very intense.	**0.77**	0.02
9. **I cannot contain the pain inside me.**	**0.77**	0.08
5. The pain fills me up completely.	**0.77**	0.10
10. When I feel the pain, I find it difficult to do things I usually enjoy.	**0.74**	−0.06
3. I feel that my pain interrupts everything I do.	**0.71**	0.12
18. Time passes very slowly when I feel the pain.	**0.67**	−0.13
14. My mental pain feels sometimes like intense physical pain.	**0.65**	−0.05
2. I believe that I can do nothing to decrease the pain.	**0.57**	0.29
13. I feel that I must get rid of the pain immediately.	**0.53**	−0.15
16. **Although it's tough to bear the pain, I know that it will go away.**	0.01	**0.85**
17. **I believe that I will find a way to reduce the pain.**	0.03	**0.83**
8. **I believe that time will make the pain disappear.**	0.03	**0.69**
1. **I believe that my pain will go away.**	0.31	**0.62**
11. **I believe that if I do the right thing, the pain will disappear.**	−0.09	**0.59**

Note. Factor loadings >0.4 are in boldface. The item "I cope with the pain even though it's difficult to bear" was not included because of a negative correlation with the total scale. Items shown in boldface are included in the TMPS-10.

0.40. Mean item complexity was worse for the three-factor model (1.4 vs. 1.1), which slightly improved when allowing oblique rotation (1.3). Although the third factor accounted for a considerable amount of unique variance (11%), its three items (14, 15, and 18) had strong cross-loadings on "Managing the Pain", with a between-factor correlation of 0.59. Inspection of the individual items did not show a strong common theme and two of the items appeared to reflect characteristics of psychological pain ("The pain is very intense", "My mental pain feels sometimes like intense physical pain") more than tolerance for psychological pain. Therefore, with exception of the item "Time passes very slowly when I feel the pain", factor three did not appear conceptually congruent with the purpose of the measure. These observations prompted us to continue analysis with the orthogonally rotated two-factor model.

3.3. Item reduction

A high number of items per factor increases respondent burden and can make Cronbach α appear artificially high (Nunnally and Bernstein, 1994). This does not appear to be the case for the factor "Enduring the Pain", with five items and a Cronbach α of 0.84, but may apply to the factor "Managing the Pain". This factor comprises fourteen items, ten of which with strong loadings >0.70. One-out analysis showed that Cronbach α dropped from 0.94 to 0.93, if any of the fourteen items was left out. Together, this suggests that a great deal of overlap exists between items on this factor and that it may be possible to reduce the number of items without losing internal consistency or essential content. We approached this by selecting items with the strongest loadings (see Table 2) that on face value appeared to add unique content until a Cronbach α of 0.90 was achieved, as this level is considered to represent excellent internal consistency (Cicchetti, 1994). We decided to not include the item "I think about the pain all the time", because its content seemed similar to the item "I cannot get the pain out of my mind" and the factor loading of the latter was slightly higher (0.82 vs. 0.81). Similarly, we chose the item "I cannot contain the pain inside me" over "The pain is very intense", both with a loading of 0.77, because the former seemed to add more unique content. Also, "The pain is very intense" seemed to overlap with the item "I suffer very much", which was already included. The resulting five items achieve a Cronbach α of 0.90. Together with the five items of the factor "Enduring the Pain", we refer to these ten items as the TMPS-10 (shown in boldface in Table 2 and in the Appendix). Table 3 shows basic descriptive statistics for the two factors of the TMPS-10. A small but significant correlation between the two factors was observed ($r = 0.17$, $p = .01$), indicating that each factor captures a different aspect of tolerance for psychological pain. Fit indices indicated a good fit of the TMPS-10 with our data ($\chi^2 = 48.6$, $p < .005$, RMSEA = 0.06, SRMR = 0.04, TLI = 0.97).

Table 3
Basic descriptive statistics for the TMPS-10 and its factors ($N = 225$).

	α	Mean	SD	Skew	Kurtosis
TMPS-10	0.91	3.40	0.87	−0.17	−0.67
Managing the Pain	0.90	3.58	1.12	−0.40	−0.90
Enduring the Pain	0.84	3.22	1.15	−0.32	−0.96

Note. The TMPS-10 mean score is determined by averaging its two factors.

3.4. Concurrent and discriminant validity of the TMPS-10

A strong inverse correlation was observed between the factor "Managing the Pain" and the intensity of psychological pain ($r = -0.81$, $p < .001$). For the factor "Enduring the Pain", the correlation was small ($r = -0.20$, $p = .003$). Interestingly, the correlation for "Enduring the Pain" differed between men and women. A significant correlation of medium strength existed for women ($r = -0.33$, $p < .001$), whereas the correlation for men was negligible and non-significant ($r = -0.11$, $p = .32$). We did not observe gender differences for the association between the factor "Managing the Pain" and intensity of psychological pain. The mean total score did not significantly differ between men and women: 3.39 (*SD* 0.79) vs. 3.40 (*SD* 0.92), $t = 0.13$, $p = .89$. Similarly, the mean factor scores did not differ between men and women: 3.65 (*SD* 1.08) vs. 3.53 (*SD* 1.15), $t = 0.80$, $p = .43$ for "Enduring the Pain", and 3.13 (*SD* 1.17) vs. 3.28 (*SD* 1.13), $t = 0.96$, $p = .34$ for "Managing the Pain".

For both TMPS-10 factors, the mean score was significantly lower for respondents with a lifetime history of attempted suicide ($n = 55$) than for participants with no history of suicide attempt ($n = 170$): 2.98 (*SD* 1.00) vs. 3.78 (*SD* 1.09), $t = 5.03$, $p < .001$ for "Managing the Pain" and 2.95 (*SD* 0.98) vs. 3.30 (*SD* 1.19), $t = 2.22$, $p = .03$ for "Enduring the Pain". The mean factor score for "Managing the Pain" was even lower in respondents who had attempted suicide in the past year, 2.64 (*SD* 1.16), but the number of respondents in this subsample was too small ($n = 16$) for statistical testing.

A small correlation with age was observed for both factors, with

probabilities close to being statistically significant, $r = 0.12$, $p = .07$ and $r = -0.13$, $p = .06$, for "Managing the Pain" and "Enduring the Pain", respectively. No gender differences were observed for factor correlations with age.

4. Discussion

The purpose of this study was to analyze the factor structure of the TMPS in a sample of U.S. adults and describe how the measure's metrics may vary by age and gender. Confirmatory factor analysis did not indicate a good fit with the original three-factor model as proposed by the authors of the TMPS. Subsequent exploratory factor analysis showed a good fit for a two-factor solution with a strongly reduced number of items. We refer to the reduced-items TMPS as TMPS-10 and labeled its two factors "Managing the Pain" and "Enduring the Pain". The essential difference between "Managing the Pain" and "Enduring the Pain" is one of active coping versus passive coping. "Managing the Pain" demonstrates the presence of coping skills to actively stop or reduce the pain, as can be inferred from its items "The pain is *not* too much to take" and "I *can* contain the pain inside me." "Enduring the Pain" reflects passive coping as its items speak of a belief that the pain will go away rather than that the pain is actively managed. Both understandings of tolerance for psychological pain were present in how Orbach et al. (2004) envisioned the TMPS, and together they provide a more complete picture of someone's tolerance for psychological pain.

The conceptual basis of these two factors has important implications for the clinical setting. Clients who score high on "Enduring the Pain" but low on "Managing the Pain" may be especially at risk of exhausting what limited tolerance for psychological pain they have when psychological pain does not subside, thereby increasing their risk for suicide. Clients with a low score on both factors may be most at risk for suicide. In contrast, a high score on "Managing the Pain" indicates the presence of coping skills to actively stop or reduce the pain, thereby lowering the risk of suicide. Becker et al. (2018) reported positive associations between tolerance for psychological pain and coping skills. In this context, it is also interesting that Li et al. (2017) concluded that avoidance, a particular coping mechanism, may be a stronger predictor of suicide risk than the intensity of psychological pain. Additional research is necessary to test these assertions about tolerance for psychological pain and individual coping skills.

With the exception of item 2, the items loading on the factor "Enduring the Pain" are the same as those reported by Orbach et al. for the original factor - 'Belief in the ability to cope with the pain.' This finding supports the conclusion that these items are a valid representation of this facet of tolerance for psychological pain across multiple samples. We chose to relabel the factor, as we felt that "Enduring the Pain" more adequately describes the essence of its individual items. It is reasonable to assume that one's resolve to endure the pain is strengthened by one's belief that the pain will eventually go away and that this is indicative of higher tolerance for psychological pain. The items of the factor "Managing the Pain" are a combination of items from the two remaining original factors of the TMPS, which could not be clearly distinguished in our data. Our lack of support for the original factor "Containing the pain" is reinforced by Becker et al. (2018), who described tolerance for psychological pain as a form of emotion regulation. However, they did not find a significant correlation between emotion regulation and "Containing the pain", whereas they did find significant correlations between emotion regulation and the other two TMPS factors. Rather than use one of the original factor labels (Surfeit of the Pain, Containing the Pain), we chose to label the combined items as "Managing the Pain". We felt that this more clearly reflects a unique facet of tolerance for psychological pain. Also, the original label "Surfeit of the pain" is more easily confused with intensity of psychological pain. Cronbach α for the two TMPS-10 factors was in the range of good to excellent internal reliability consistency (Cicchetti, 1994), with only half the number of items of the original scale.

Our results show significantly lower scores on both TMPS-10 factors for respondents with a lifetime history of attempted suicide, compared to respondents who never attempted suicide. As one would expect tolerance for psychological pain to be lower in people who attempt suicide, these results support discriminant validity of the TMPS-10. We also found concurrent validity of the TMPS-10, as both factors showed an inverse correlation with the intensity of psychological pain. One might expect that greater psychological pain is more difficult to tolerate than lower levels of psychological pain. Interestingly, the inverse correlation between "Enduring the Pain" and the intensity of psychological pain was significant for women but not for men. While women had more difficulty tolerating psychological pain as its intensity increased, men's ability to tolerate psychological pain was not associated with the intensity of psychological pain. These findings indicate the need to control for and examine gender differences when studying tolerance for psychological pain as assessed on the TMPS-10. As women are known to use different coping strategies than men in the context of physical pain (Bartley and Fillingim, 2013), it seems likely that they also use different strategies to manage their psychological pain. Of note, we did not observe gender differences in tolerance for psychological pain (neither its total score nor the individual factors). This finding deviates from the body of knowledge on physical pain that seems to converge on the notion that women have a lower pain threshold and lower pain tolerance than men (Bartley and Fillingim, 2013; Mogil, 2012). The strength of the correlations between age and the TMPS-10 factors was small and may be negligible clinically. However, correlations suggest that a person's confidence in their ability to manage their psychological pain increases with age, even though their expectation that time will reduce or dissipate the pain decreases with age. This reinforces that TMPS-10 scores should be reported separately for each factor, rather than as a single total score.

The original three-factor model of the TMPS proposed by Orbach et al. was not supported in our sample, perhaps because the scale was developed in Hebrew and in adolescent samples. In addition, we used the English translation that was provided to us by Orbach. Some aspects of tolerance for psychological pain as represented in the original TMPS may not have been fully captured in the English translation. While the two-factor model that we tested during exploratory factor analysis resulted in a significant χ^2 test, this was likely the result of our relatively large sample size ($N = 225$) and not an indication of poor model fit, as it is rare to achieve non-significant χ^2 values when using samples sizes of 200 and over (Barrett, 2007). Other commonly used fit indices (RMSEA, SRMR, and TLI) indicated a good fit of our reduced-items two-factor model, when compared to widely accepted cut-off values (Hu and Bentler, 1999).

Some limitations of the analysis need to be addressed. Our sample may be affected by selection bias, as it contained a higher percentage of adults who had attempted suicide than observed in the general U.S. adult population (U.S. Census Bureau, 2016). As such, one could say our sample was more vulnerable than general population adults. Also, respondents to our survey were limited to adults who used Facebook. Because of demographic differences between our sample and general population adults, we cannot assume that our results apply to the overall U.S. adult population. In addition, we excluded one item ("I cope with the pain even though it's difficult to bear") from our analysis, as its score showed an inverse correlation with the scale score. While it is unclear whether similar correlations were found in other studies that used the TMPS, we would point to the fact that the wording of this item reflects two opposing sentiments: 'I cope with the pain' versus 'It's difficult to bear'. Some participants may have responded to the coping sentiment, whereas others responded to the sentiment regarding their difficulty to bear the pain. Our concern about this item was supported by a significant quadratic association between the item and the scale score, which ultimately drove our decision to exclude the item from analysis.

In conclusion, we recommend using the TMPS-10 to assess tolerance for psychological pain for research purposes. Our data support the two-factor structure of the TMPS-10 over the three-factor structure of the original TMPS and corroborate validity and reliability of the TMPS-10 in our sample. With only half the number of items of the original scale, the TMPS-10 has a lower response burden and minimizes the risk of over-inflating internal consistency reliability due to redundant items. A lower response burden is of particular relevance when research participants are faced with a battery of multiple psychological assessments, like psychological pain, tolerance for psychological pain, suicidal behavior, coping and emotion regulation skills, as well as covariates of psychological pain like hopelessness and depression. Additional research with the TMPS-10 is needed to further examine its validity and reliability and to assess its applicability and utility across varied samples. These data will broaden the foundation for interpretation of TMPS-10 tolerance for psychological pain scores when collected in clinical practice. Assessing tolerance for psychological pain is essential for therapy that focuses on a patient's ability to manage and endure psychological pain and when assessing a patient's risk for suicide.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2019.01.101.

Appendix. 10-item tolerance for mental pain scale

TMPS-10

The following statements relate to the degree that you are able to tolerate mental pain, when you experience mental pain. Please read the statements carefully and indicate the degree to which they most accurately describe you, by circling the appropriate number between 1 (not true) and 5 (very true). There are no right or wrong answers.

When I feel mental pain,

		Not true				Very true
1.	I believe that my pain will go away.	1	2	3	4	5
2.	I cannot concentrate because of my pain.	1	2	3	4	5
3.	I suffer very much.	1	2	3	4	5
4.	I believe that time will make the pain disappear.	1	2	3	4	5
5.	I cannot contain the pain inside me.	1	2	3	4	5
6.	I believe that if I do the right thing, the pain will disappear.	1	2	3	4	5
7.	I cannot get the pain out of my mind.	1	2	3	4	5
8.	Although it's tough to bear the pain, I know that it will go away.	1	2	3	4	5
9.	I believe that I will find a way to reduce the pain.	1	2	3	4	5
10.	The pain is too much to take.	1	2	3	4	5

Factor *Managing the Pain*: items 2, 3, 5, 7, and 10. Reverse all scores.
Factor *Enduring the Pain*: items 1, 4, 6, 8, and 9.

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