The Toronto and Philadelphia Mindfulness Scales: Associations with Satisfaction with Life and Health-Related Symptoms

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ABSTRACT

The treatment efficacy of mindfulness for improved quality of life and health-related symptoms has reliably been found in the literature. Questionnaires have been developed to assess both state mindfulness (Toronto Mindfulness Scale, TMS) and trait mindfulness (Philadelphia Mindfulness Scale, PHLMS). The objective of this study was to directly compare state and trait mindfulness measures to self-reported satisfaction with life and health outcomes. Healthy adults (n= 28) completed self-report questionnaires assessing mindfulness, a Satisfaction with Life Scale and a health outcome measure (Symptom Checklist 90-revised) prior to and after undergoing a 10-week mindfulness meditation intervention program. Correlational analyses between the mindfulness measures and outcome measures clearly demonstrated the association between the PHLMS Acceptance subscale and reductions in symptom severity r(26)= -.46, p= .015. These results suggest that a trait mindfulness measure (i.e., PHLMS) can detect change in mindfulness that is associated with health outcome measures whereas the state-like mindfulness (i.e., TMS) did not.
Key words: meditation, mindfulness, scl-90r, health outcomes, quality of life.

Novelty and Significance

What is already known about the topic?

- Several meditation scales exist and are frequently used in the literature in relation to assessing health outcomes and quality of life. However, it is uncommon to directly compare these scales to determine if one is more suitable than another in association with certain outcomes.

What this paper adds?

- A direct comparison of two, theoretically distinct, well-validated meditation scales on outcome variables relating to health and quality of life in a healthy sample.

Various conceptual interpretations of mindfulness exist. A succinct definition provided by Sauer, *et al*. (2013) is that mindfulness is the "…ability to dispassionately observe the experience of the present moment with non-judgmental openness." (p. 3).

A more specific operationalization was proposed by Bishop, Lau, and Shapiro (2004). who conceptualized mindfulness as having two key facets: (1) an attentional focus on the present, momentary, experience and (2) regulation of one's emotions via a non-judgmental, accepting, open attitude toward what is happening in the present moment (Bishop, Lau, & Shapiro, 2004, Sauer *et al*, 2013). Two scales (described below) were designed to explicitly assess these two factors: the Toronto Mindfulness Scale (TMS) and the Philadelphia Mindfulness Scale (PHLMS) (Sauer *et al*, 2013). Each scale was designed based upon a different theoretical framework: broadly described, the PHLMS was designed to measure everyday mindfulness and presumes that a semi-consistent dispositional mindful tendency across situations (i.e., trait mindfulness) and the TMS was designed to measure the mindful state that an individual is during sitting meditation or at the time of completing the questionnaire (i.e., state mindfulness) (Thompson & Waltz, 2007). Comparison of the state measure TMS with traditional everyday trait-like mindfulness scales has found that these are two different constructs and that presumably an individual scoring high on trait-like mindfulness does not necessarily imply higher state mindfulness (Thompson & Waltz, 2007). Research directly comparing state versus trait mindfulness scales and their association to health outcomes is scant. The present study investigates these two theoretically divergent scales and their association to health-related symptoms and satisfaction with life.

Based upon the theoretical work of Kabat-Zinn (1994) and Bishops's *et al.*. (2004) two-factor approach to mindfulness Cardaciotto, Herbert, Forman, Moitra, and Farrow (2008) developed the PHLMS to directly assess trait mindfulness; specifically, present-moment awareness and acceptance as two independent and yet interrelated factors. Awareness is conceptualized as the continuous monitoring of thoughts, feelings, perceptions and bodily sensations in the present moment. Acceptance is characterized as an individual's perspective on events, including mental events, without interpreting, elaborating, ruminating or suppressing them but rather accepting them in the present moment. The PHLMS items were developed by clinical psychology faculty and graduate students familiar with mindfulness and then reviewed by six recognized experts in mindfulness who have published in the area.

To validate his new measure Cardaciotto et al. (2008) conducted several studies comparing the PHLMS to mental health and quality of life. In a non-clinical student sample ($n= 559$) the PHLMS Acceptance, but not Awareness, subscale was significantly correlated with anxiety (Beck Anxiety Inventory: $r= -.33$) and depression (Beck Depression Inventory: $r= -.35$). In study 6 of the same paper, this finding was replicated in a clinical sample of 78 graduate students seeking treatment at a student counseling center. Additionally, this clinical sample demonstrated a statistically significant positive association between Acceptance and subjective happiness (Subjective Happiness Scale, $r= .33$) and quality of life (Quality of Life Inventory, $r= .42$).

A unique benefit of taking a trait-like approach to mindfulness is that traits by definition are relatively stable and consistent across time and situations (Allport, 1937). Everyday mindfulness, as assessed by the Mindfulness Attention Awareness Scale (MAAS), has been associated with established personality trait measures such as the Five Factor model of personality characteristics (Baer, Smith, Hopkins, Krietemeyer, & Toney,

2006, Brown & Ryan, 2003, Thompson & Waltz, 2007). As reviewed in Brown, Ryan and Creswell (2007) trait mindfulness has also been associated with mental health (i.e., lower emotional disturbance such as depressive and anxiety symptoms), psychological well-being (e.g., higher positive affect, lower negative affect and increased satisfaction with life) and higher levels of eudaimonic well-being (e.g., vitality, self-actualization) (Brown & Ryan, 2003, Carlson & Brown, 2005).

Individuals with little, if any, mindfulness meditation experience will vary amongst one another in their state and dispositional mindfulness scores. Despite these natural individual differences individuals high in dispositional mindfulness have been associated with higher scores on state mindfulness (Brown & Ryan, 2003) and that meditation practice is associated with greater mindfulness. Since trait-like mindfulness is relatively stable but can increase with meditative practice the assessment of trait-like measures can be done at baseline and by assessing change scores post intervention.

Developed by Lau *et al* (2006) the TMS was designed to assess state mindfulness in the moment, that is, immediately following or during formal sitting meditation. As such, it is unique amongst mindfulness measures as it is presently the only self-report questionnaire that captures state-mindfulness. Items for the scale were derived from a team of experts in mindfulness meditation and reflected the conceptual model and operational definition of mindfulness as outlined by Bishop *et al*, (2004). Similar to the PHLMS the TMS consists of two subscales: (1) curiosity and (2) decentering. Curiosity is conceptualized as an individual's ability to reflect on their immediate experiences with a quality of inquisitiveness. Decentering, considered a central aspect of mindfulness (Teasdale *et al*, 2002), is defined as one's awareness of their experience "…with some distance and disqualification rather than being carried away by one's thoughts and feelings" (Lau, Bishop, Segal, *et al*., 2006, p. 1452). Decentering is not often assessed in mindfulness measures and is therefore a unique aspect of the TMS (Bergomi, Tschacher, & Kupper, 2013).

As previously mentioned, dispositional mindfulness has been associated with lower negative affect, higher positive affect, life satisfaction and eudaimonic well-being (Brown & Ryan, 2003, Carlson & Brown, 2005). Aside from the benefits that dispositional mindfulness brings to well-being, simply being in a mindful state can have salubrious effects on well-being (Lau *et al*., 2006). In a study by Brown and Ryan (2003) that associated state/trait mindfulness and affect they found that after controlling for the variance attributable to trait mindfulness (using the Mindful Attention Awareness Scale: MAAS), state mindfulness was associated with higher positive affect and lower negative affect. The assessment of state mindfulness may therefore add meaningful, independent, contributions to the assessment of trait mindfulness.

Carmody, Reed, Kristeller, and Merriam (2008) directly investigated the associations of trait-like (i.e., MAAS) and state mindfulness measures with scales assessing spirituality, medical and psychological symptoms. The 44 participants were assessed before and after an 8-week MBSR intervention. Significant increases in the MAAS change scores were associated with decreases in self-reported medical symptoms, depression and anxiety; TMS change scores neared significance for an association with decreased anxiety ($p=$ .054) and showed statistically significant associations with spiritual well-being (but no

statistically significant associations were found with medical symptoms or depression. This suggests that state measures of mindfulness may be most likely associated with affect, well-being and life satisfaction measures but perhaps not for mental health measures (e.g., depression, anxiety, and physical well-being).

The aim of this study is to directly compare a trait-like mindfulness measure (i.e., PHLMS) and a state-mindfulness measure (i.e., TMS) and their associations to health-related symptoms and satisfaction with life. In specifics, since the PHLMS indicates a dispositional trait-like mindfulness it is hypothesized that the PHLMS scores will be associated with reductions in health-related symptoms and greater satisfaction with life. Since dispositional tendencies take considerable time and practice to be substantially altered, increases (i.e., change scores) in the PHLMS are possible and therefore both baseline and change scores will be associated with changes in health related symptoms and life satisfaction.

Given that there is limited literature on state-mindfulness and health outcome measures it is unclear as to whether the TMS baseline scores will be associated with health-related symptoms or life satisfaction at baseline or their change scores. As a measure of state mindfulness, and therefore a measure of how mindful a participant is at that moment, the TMS is expected to show the greatest associations for the change scores (post-pre intervention) since increased mindfulness measured in the moment may be also be indicative of positive changes in the outcome measures at that moment.

Method

Participants

We recently completed a multi-site, randomized controlled trial (RCT) of Mindfulness-Based Cognitive Therapy (MBCT) intervention adapted for people with traumatic brain injury (TBI) and depression (Bédard *et al*., 2013). The development of the facilitators' capacity to provide the intervention was as important to the study as the RCT. Thus, the first year of the study was devoted to training clinicians and culminated with "healthy" group trials to give the facilitators the opportunity to practice in preparation for the clinical groups (Gibbons *et al*.., 2012). Healthy participants were recruited by word-of-mouth and comprised other clinicians, family members and friends. Exclusion criteria included presence of a brain injury or unusual psychological processes as determined by the Symptom Checklist 90 – Revised. No participants were excluded for these reasons.

Instruments

Philadelphia Mindfulness Scale (PHLMS, Cardaciotto *et al*., 2008). A 20-item trait-mindfulness questionnaire with respondents using a 1-5 Likert-type scale ranging from scores of 10-50 for each of the two subscales: Awareness and Acceptance. Cronbach's alphas are reported to range from 0.75 to 0.86 for Awareness and 0.75 to 0.91 for Acceptance (Park, Reilly-Spong, & Gross, 2013).

Toronto Mindfulness Scale (TMS, Lau *et al.*, 2006). A 13-item state-mindfulness measure that uses a 5 point Likert-type scale from not at all (0) to very much (4). The scale has two sub-scales: Curiosity, 6 items, subscale score ranging from 0-24, and Decentering, 7 items, with a subscale score ranging from 0-28. Cronbach's alphas are reported to range from 0.86 to 0.91 for Curiosity and 0.85 to 0.87 for Decentering (Park et al., 2013).

Symptom Checklist -90 revised (SCL-90r, Derogatis, 1994, Horowitz, Rosenberg, Baer, Ureño, & Villaseñor, 1988). A 90-item measure used to assess the psychological symptom status. Responses range from 0-4 and the summed score ranges from 0-360 with higher scores representing greater symptomology. The SCL-90r can also be scored along 10 subscales that assess a global index of psychological distress. The *Global Severity Index* (GSI) represents a single score indicating the current level or depth of the disorder. The *Positive Symptom Total* (PST) can also be determined by computing a single score indicative of symptom intensity or the average level of distress reported of the symptoms that were endorsed. The Cronbach alpha for the GSI has been reported at .96 for the paper and pencil version of the scale (Vallejo, Jordan, Díaz, Comeche, & Ortega, 2007).

Satisfaction with Life Scale (SWLS, Diener, Emmons, Larsen, & Griffin, 1985). Used to assess global life satisfaction this 5-item Likert-type scale ranges from 1-7 with summed scores ranging from 5 to 35 with the highest score representing higher satisfaction with Life. Deiner *et al*. (1985) report a Cronbach's alpha of 0.87 for the SWLS.

Procedure and Intervention

The curriculum of the mindfulness intervention draws upon elements from the mindfulness-based stress reduction program (Kabat-Zinn, 2009), and Segal, Williams and, Teasdale (2002) manual for MBCT. It was modified by one of the investigators (MF) to address issues associated with TBI (e.g., problems with attention, concentration, memory, fatigue). The intervention comprised one and a half hour weekly sessions for ten weeks, along with a 20-30 minute daily meditation home practice. Although some components of the intervention were designed for people with TBI experiencing depressive symptomatology, "healthy" group participants were encouraged to learn what they could from these sessions (i.e., everyone can feel blue or down) and were reminded that the intention of the group was to give the facilitators the opportunity to practice. Participants were supplied with the book The Mindful Way through Depression: Freeing Yourself from Chronic Unhappiness (Williams, Teasdale, Segal, & Kabat-Zinn, 2007). It was not required reading, but participants were instructed to use the accompanying CD to complete guided meditations.

Ethics approval was obtained at both the sponsor university and the local hospital ethics boards. Participants gave informed consent prior to taking part in the study. A trained Research Assistant completed measures with participants at baseline and following the ten-week intervention.

Statistical Methods

Correlational analyses were conducted to investigate associations between the mindfulness scales (i.e., PHLMS, TMS) and Life Satisfaction and health related symptoms.

Associations were explored for baseline scores on these measures as well as change scores. Change scores were calculated by subtracting post intervention scores from baseline. Consequently, for the mindfulness measures, SCL-90r GSI and PST a positive change score represents a decrease in mindfulness and symptom reduction. Conversely, negative scores represent increases in mindfulness and increased symptom severity.

RESULTS

There were 46 participants assessed at baseline. Mean participant age was 41.2 years ($SD=$ 12.0; range 19.5 to 64.6) and 89.1% ($n=$ 41) were female. Nearly half of participants (45.7%, $n=$ 21) were single and the remaining were married/common-law (41.3%, n= 19) or separated/divorced (13.0%, $n=$ 6). The majority of participants were employed (76.1%, $n=$ 35). Participants lived with family (65.2%, $n=$ 30), alone (21.7%, $n=$ 10) or with friends/other (13.0%, $n=$ 6). The majority had completed a university or college degree (89.1%, $n=$ 41). Post-intervention data were collected for 33 (71.7%) participants of which 28 were complete cases and it is this group which was used for subsequent analyses. We examined baseline demographic differences between those who did and did not complete post-intervention (these data are available from the corresponding author). Other than participant sex, where more men (4 out of 5 males) than women (9 out of 41; $\chi^2(1)$, $n=$ 46)= 7.25, $p=$ .007) did not complete the post assessment, there were no statistically significant demographic differences between those who completed the measures both times and those who did not.

Descriptive statistics for the two mindfulness scales are shown in Table 1. As a whole, PHLMS and TMS scores at baseline were close to the mid-point of the respective subscales (30 for PHLMS Awareness & Acceptance subscales; 12 for TMS Curiosity subscale; 14 for TMS Decentering). At follow-up, mean increases were 5.0, 3.50, 2.42, and 1.25 for the PHLMS Awareness, PHLMS Acceptance, TMS Curiosity, and TMS Decentering subscales, respectively.

Pearson correlations for mindfulness measures on baseline scores are presented in Table 2. Within mindfulness measures, the TMS Curiosity and Decentering scale baseline scores were strongly correlated, $r(26) = .52$, $p <.01$. No statistically significant correlation was observed between subscales within the PHLMS mindfulness measure. Weak to moderate negative correlations were observed between TMS Curiosity scores and both PHLMS Awareness, $r(26) = -.39$, $p <.05$, Acceptance, $r(26)=-.46$, $p <.05$. Negligible correlations were observed between the PHLMS subscales and the TMS Decentering subscale for baseline scores.

Table 1. Descriptive results for the Mindfulness Scales.

		Baseline		Follow-Up	
		Range	Mean (*SD*)	Range	Mean (*SD*)
Philadelphia	Awareness	26-40	33.14 (4.40)	33-43	38.14 (2.62)
	Acceptance	13-45	30.18 (7.06)	23-41	33.68 (4.50)
Toronto	Curiosity	5-23	14.29 (4.35)	6-24	16.71 (4.74)
	Decentering	6-24	14.68 (4.46)	5-26	15.93 (4.93)

Table 2. Correlations between Philadelphia Mindfulness Scale and the Toronto
Mindfulness Scale at Baseline (*n*= 28).

| | | Philadelphia | | Toronto | |
		Awareness	Acceptance	Curiosity	Decentering
Philadelphia	Awareness	--	.05	-.39*	-.18
	Acceptance		--	-.46*	-.13
Toronto	Curiosity			--	.52**
	Decentering				--

Notes: * *p*< .05, ** *p*< .01

Similar associations were observed within mindfulness measures for change scores (i.e., the TMS Curiosity and Decentering change scores were strongly correlated). A weak positive relationship was observed between the PHLMS Awareness and Acceptance change scores, but this was not statistically significant. Unlike with the baseline scores, there was a negligible correlation between TMS Curiosity and both PHLMS subscales. For more, please see Table 3.

Table 4 shows the relationship between baseline and change in mindfulness scores and baseline and change in Satisfaction with Life (SWLS), SCL-90r Global Severity Index (GSI) and Positive Symptom Total (PST). The trait mindfulness (PHLMS) subscale Acceptance baseline was significantly associated with higher baseline SWLS $r(26)= .51$, $p= .005$, and fewer symptoms at baseline GSI $r(26)= -.73$, $p <.001$ and baseline PST $r(26)= -.70$, $p <.001$. Lower scores in baseline Acceptance were also associated with a greater increased change in GSI scores $r(26)= .50$, $p= .007$. An increased change in Acceptance was associated with symptom reduction of GSI $r(26)= -.46$, $p= .015$. No statistically significant associations were found for the Awareness subscale of the

Table 3. Correlations for the Change Scale Scores between the Philadelphia
Mindfulness Scale and the Toronto Mindfulness Scale (*n*= 28).

| | | Philadelphia | | Toronto | |
		Awareness	Acceptance	Curiosity	Decentering
Philadelphia	Awareness	--	.27	-.08	.18
	Acceptance		--	.12	.39*
Toronto	Curiosity			--	.59**
	Decentering				--

Notes: * *p* <.05; ** *p* <.01.

Table 4. Correlations between Mindfulness Scales and Satisfaction with Life and Health-Related Symptoms.

| | | PMS | | TMS | |
		Awareness	Acceptance	Curiosity	Decentering
SWLS	Baseline Mindfulness x Baseline SWLS	.06	.51**	-.29	-.27
	Baseline Mindfulness x ΔSWLS	.05	-.05	.28	.06
	Δ Mindfulness x Δ SWLS	.11	.10	.22	.07
GSI	Baseline Mindfulness x Baseline GSI	-.11	-.73***	.49**	.28
	Baseline Mindfulness x Δ GSI	.09	.50**	-.49**	-.33
	Δ Mindfulness x Δ GSI	-.14	-.46*	.04	.09
PST	Baseline Mindfulness x Baseline PST	-.08	-.70***	.36 (*p*= .06)	.23
	Baseline Mindfulness x Δ PST	.08	.20	-.23	-.21
	Δ Mindfulness x Δ PST	-.07	-.18	-.07	.02

Notes: * *p* <.05; ** *p* <.01; *** *p* <.001.

PHLMS. In summary, the PHLMS results suggest that participants who score high on the acceptance subscale at baseline are more satisfied with life and score lower on symptom intensity and duration (as assessed by the SCL-90r GSI and PST). Moreover, increases in acceptance were associated with reductions in symptom severity (i.e., SCL-90r GSI).

Higher baseline TMS Curiosity scores were positively correlated with GSI reported symptoms at baseline, $r(26)= .49$, $p= .009$, and were also strongly correlated with greater GSI symptom reduction, $r(26)= -.49$, $p= .008$. No statistically significant associations were found between TMS decentering subscale and any of the outcome measures. In contrast to the PHLMS the TMS results suggest that higher scores on the Curiosity subscale are associated with greater intensity and duration.

DISCUSSION

Healthy participants, without any known mental or physical health concerns, were assessed on a trait-like mindfulness measure (i.e., PHLMS) and a state-mindfulness measure (i.e., TMS) to investigate if either or both measures were associated with assessing health-related symptoms and satisfaction with life. It was found that the Acceptance subscale of the trait-like PHLMS showed the most consistent and logical associations. Measured at baseline, the PHLMS Acceptance subscale was associated with higher scores on satisfaction with life and lower scores on health symptom severity and duration. As suggested by Cardaciotto et al. (2008), the Acceptance subscale of the PHLMS can be a useful tool in not only determining the change in mindfulness treatment progress but also in predicting treatment outcomes.

Although the TMS measure was designed to assess mindfulness in the present moment, it does not seem well-suited for assessing changes in satisfaction with life or health outcomes for a healthy population. The TMS curiosity subscale was associated with the SCL-90r global severity index but not in the direction that would have been expected. Individuals scoring higher on mindful curiosity at baseline seem to have higher scores on symptom severity at baseline and over time. Possibly, a subjective state of curiosity which involves a greater awareness of bodily sensations and thoughts may in fact increase attention and rumination of physical ailments rather than dissociate from them. Perlman et al. (2010) have found that mindful meditation wherein participants are trained to not elaborate on sensory experience resulted in a reduction of perceived unpleasantness and pain intensity.

Despite the obvious limitation of a small sample size there were several additional limitations in this study. Participants were assessed prior to the intervention and then within several weeks after the final meditation intervention. This would have little impact on the assessment of the PHLMS; however, as suggested by Lau *et al.* (2006) the "TMS assesses the level of mindfulness during a single point in time and thus may not reflect a respondent's true or average capacity to evoke a state of mindfulness" (p.1462). It is recommended to utilize this scale prior to, during and immediately after a meditation session to effectively capture if mindfulness was evoked. Since there were individual differences in the completion of the TMS this may have lessened the extent to which this measure captured the change in state-like TMS.

In summary, this study demonstrated the utility of applying a trait-like mindfulness scale such as the PHLMS in mindfulness research. This study confirmed that greater acceptance is associated with better satisfaction with life and mental health status. Furthermore, an increase in acceptance was associated with an increase in mental health status suggesting a casual relationship. Future research should further investigate the utility of specific mindfulness scales toward predicting specific outcome variables (e.g., mental and physical health).

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