Measuring daily actions associated with mental health: development of the Things You Do Questionnaire – 15 item

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Abstract

Background: A large number of modifiable and measurable daily actions are thought to impact mental health. The 'Things You Do' refers to five types of daily actions which have been associated with mental health: Healthy Thinking, Meaningful Activities, Goals and Plans, Healthy Habits, and Social Connections. Previous studies have reported the psychometric properties of the Things You Do Questionnaire – 21 item (TYDQ21).

Objective: The current study evaluated a 10-item and 15-item version of the TYDQ21 in both community and treatment-seeking samples with the aim of developing a brief version.

Methods: Using confirmatory factor analysis, the top two or three items were used to develop the 10-item and 15-item versions, respectively. Model fit, reliability, and validity were examined for both versions in two samples: a survey of community adults (n = 6,070) and adults who completed an assessment at a digital psychology service (n = 14,878). Treatment responsivity was examined in a subgroup of participants (n = 448).

Results: The five-factor structure was supported. The brief versions were associated with better model fit than the 21-item version and the 15-item version explained more variance in the 21-item scores than the 10-item version. Internal consistency was appropriate and there were no marked differences between how the brief versions correlated with validated measures of depression or anxiety symptoms. The measure was responsive to treatment.

Conclusions: The 15-item version is appropriate for use as a brief measure of daily actions associated with mental health, balancing brevity and clinical utility.

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Original Manuscript

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Running title: PSYCHOMETRIC EVALUATION OF TYDQ-15

Abstract

Background: A large number of modifiable and measurable daily actions are thought to impact mental health. The 'Things You Do' refers to five types of daily actions which have been associated with mental health: Healthy Thinking, Meaningful Activities, Goals and Plans, Healthy Habits, and Social Connections. Previous studies have reported the psychometric properties of the Things You Do Questionnaire – 21 item (TYDQ21). The 21-item version, however, has an uneven distribution of items across the five factors and may be lengthy to administer on a regular basis.
Objective: The current study aimed to develop and evaluate a brief version of the TYDQ. To do this, we identified the top 10- and 15-items on the 21-item version, and then evaluated the performance of the 10-item and 15-item versions in community and treatment-seeking samples.
Methods: Using confirmatory factor analysis, the top two or three items were used to develop the 10-item and 15-item versions, respectively. Model fit, reliability, and validity were examined for both versions in two samples: a survey of community adults (n = 6,070) and adults who completed an assessment at a digital psychology service (n = 14,878). Treatment responsivity was examined in a subgroup of participants (n = 448).
Results: Parallel analysis supported the five-factor structure. The brief versions were associated with better model fit than the 21-item version according to the Comparative Fit Index, Root Mean Square Error of Approximation, and Tucker Lewis Index. Configural, metric, and scalar invariance were supported. The 15-item version explained more variance in the 21-item scores than the 10-item version. Internal consistency was appropriate (e.g., 15-item $\alpha > 0.90$ in both samples) and there were no marked differences between how the brief versions correlated with validated measures of depression or anxiety symptoms. The measure was responsive to treatment.
Conclusions: The 15-item version is appropriate for use as a brief measure of daily actions associated with mental health while balancing brevity and clinical utility. Further research is encouraged to replicate our psychometric evaluation in other settings (e.g., face-to-face services).

Keywords: daily actions; depression; anxiety; psychometric; mental health

Introduction

Depressive and anxiety disorders are highly prevalent [1–3]. Although effective psychological treatments exist [e.g., 4], many people are unable to, or choose not to, access care [5–7]. Important efforts have been made to reduce barriers to access, including remote treatment delivery via the internet [8] or through large scale low-intensity service models [9]. In addition, there is value in understanding the things people can do each day (i.e., daily actions) to develop and maintain good mental health [10–12].

A broad range of actions, including physical activity [13], practicing gratitude and self-kindness [14], and social connectedness [15] have been argued to improve mental health. However, few studies have compared the benefits of different actions or explored the minimum frequency required to obtain psychological benefits. In a recent study, we explored the relationship between the frequency of performing different actions and mental health status (i.e., depression, anxiety, life satisfaction) in a large survey sample of community volunteers [12]. The actions included those identified by previous research as having a strong association with mental health (e.g., physical activity, gratitude) and many others. Using survey development methodology [16], five different categories of daily actions (i.e., factors) were found to have the strongest associations with mental health: Healthy Thinking (e.g., treating self with respect), Meaningful Activities (e.g., doing something enjoyable), Goals and Plans (e.g., making plans and following through on them), Healthy Habits (e.g., a consistent sleep/ wake routine), and Social Connections (e.g., having meaningful conversations).

As a result of this study, a questionnaire was developed which included the 21 daily actions which comprised the five factors. The Things You Do Questionnaire (TYDQ21) was found to be psychometrically valid and reliable, and higher scores on the TYDQ21 were associated with lower depression and anxiety symptoms in subsequent studies using treatment-seeking samples [17,18]. Furthermore, during an online 8-week online treatment for adults with depression or anxiety, increases in the frequency of TYDQ21 actions were highly correlated with decreases in depression and anxiety [17,18]. Across all studies, adults who reported doing the actions captured by the TYDQ21 at least half the days in each week reported significantly lower depression and anxiety symptoms than those who did the actions less than half the days in each week. This pattern was observed across all five types of actions [12,17,18].

Although relatively brief, the moderate length of the TYDQ21 limits its utility for regular administration during research or treatment trials. The primary purpose of the present study was to explore whether the number of items in the TYDQ21 could be reduced while retaining strong psychometric properties. The secondary purpose was to examine the factor structure in a larger sample of Australian adults who engaged with a national digital psychology service which provides free mental health care, funded by the Australian Government [7]. The performance of 10-item and 15-item versions were compared using the community sample of adults who completed an online survey (n = 6,070) and a sample of adults in routine clinical care who completed an initial assessment at that service (n = 14,878).

Materials and Methods

Study design and participants

The community sample (Sample 1) was taken from the original validation study [12]. Australian adults aged 18 years and over completed online surveys on daily actions and mental health. Participants were recruited via social media and web newsletters from

Australian mental health services; they were invited to participate in a study about daily activities and mental health. The survey was completed online. For this study, only those individuals with complete data for the TYDQ21 were included, and the studies within the original report have been collapsed (n = 6,070).

The routine care sample (Sample 2) includes adults who completed an online assessment at the MindSpot Clinic between September 3, 2021, and May 26, 2022. The MindSpot Clinic is funded by the Australian Department of Health to provide remotely delivered psychological assessments and treatments to adults across Australia; clinical procedures and outcomes have been previously reported [7]. Eligibility criteria included being aged 18 years or older and an Australian resident eligible for public health services. Only individuals who completed an online assessment were included (n = 14,878).

A subsample of the routine care sample (n = 448) was used for the treatment responsivity analyses. This subgroup included those individuals who (a) completed the TYDQ during the initial assessment [between November 2021 and May 2022], and (b) completed at least one lesson of an online treatment for depression and anxiety. The Wellbeing Course is an evidence-based 5-lesson, 8-week transdiagnostic treatment program designed to help adults manage depression and anxiety symptoms. Participants were offered weekly contact with a therapist to support them through the treatment. Further details regarding the Wellbeing Course can be found in Titov et al. [7].

Ethical Considerations

The community sample was taken from [7]; the study was approved by the Macquarie University Human Research Ethics Committee. De-identified data obtained from the MindSpot Clinic was analysed for the treatment-seeking sample; this is approved by the Macquarie University Human Research Ethics Committee and is registered on the Australian and New Zealand Clinical Trials Registry, ACTRN12613000407796. All participants provided informed consent. All data is stored securely and participants did not receive payment or compensation for questionnaire completion.

Measures

Things You Do Questionnaire (TYDQ). The TYDQ is a 21-item self-report measure of daily actions which are associated with mental health [12]. There are five factors: Healthy Thinking, Meaningful Activities, Goals and Plans, Healthy Habits, and Social Connections. Items are scored from 0 (not at all in the last week) to 4 (every day in the last week).

Patient Health Questionnaire 9-item (PHQ9). The PHQ9 is a self-report measure of depressive symptoms, consistent with a diagnosis of Major Depressive Disorder [19]. Items are scored from 0 (not at all) to 3 (almost every day).

Generalized Anxiety Disorder 7-item (GAD7). The GAD7 is a self-report measure of anxiety symptoms which captures symptoms consistent with Generalized Anxiety Disorder [20]. Items are scored from 0 (not at all) to 3 (almost every day).

Statistical Analysis

The statistical purpose of this work was to confirm the previously published structure of the TYDQ21 and explore the psychometric properties of a 10-item and 15-item version. Complete data was used for analyses at baseline, including factor analyses. When longitudinal data was used, missing data at mid-treatment and post-treatment was handled using multiple imputation to replace missing values. Baseline scores (depression, anxiety, daily actions) and lesson completion as predictors of missingness in the imputation model [21].

Confirmation of the number of latent variables was obtained via parallel analysis with the number determined from the number of factors where the observed eigenvalue was greater than the corresponding simulated value [22]. Confirmatory factor analysis (CFA) was used to assess the fit of the originally published model in the new data and to evaluate the fit of revised versions. The model fit profile considered included Chi-Square fit test $p > 0.05$, ratio of Chi-Square value to degrees of freedom < 5, Root Mean Square Error of Approximation (RMSEA) < 0.05, Comparative Fit Index (CFI) > 0.90, and Tucker-Lewis fit index (TLI) > 0.90, based on published guidelines [23]. Configural, metric, and scalar invariance were examined across the community and routine care samples against the following benchmarks: RMSEA < 0.05, CFI > 0.95, and TLI > 0.95. CFA was implemented using MPlus v8 [24] and standardized loadings are reported throughout.

The TYDQ10 and TYDQ15 were created by selecting those items with the highest factor loadings in the full version CFA model. The top two items for each factor were used to develop the 10-item version while the top three items were used to develop the 15-item version. The items selected can be found in **Table 1**.

Table 1. Items included in TYDQ versions and factor loadings for 21-item version.

Item	Label	Factor	21-item	15-item	10-item
1	I kept a healthy daily routine	Routine	0.75	ü	ü
2	I went to bed and woke up at a regular time	Routine	0.56	ü	
3	I treated myself with respect	Thoughts	0.71	ü	ü
4	Instead of worrying about the past, I focused on my preferred future	Thoughts	0.60		
5	I dealt with feelings of frustration or impatience in a healthy way	Thoughts	0.68	ü	
6	I socialised with positive people	Social	0.60	ü	
7	I talked about my day with a friend or family member	Social	0.77	ü	ü
8	I had a meaningful conversation with someone	Social	0.85	ü	ü
9	I spent time doing something I believed in	Goals	0.68		
10	I had a good laugh or did something fun	Activity	0.73		
11	I made a plan and stuck to it	Goals	0.67		
12	I had something to look forward to	Activity	0.74	ü	
13	I allowed myself to be less than perfect	Thoughts	0.44		
14	I prepared and ate a healthy meal	Routine	0.71	ü	ü
15	I did something that was very satisfying to me	Activity	0.76	ü	ü
16	I stopped myself from thinking unhelpful or unrealistic thoughts	Thoughts	0.65		
17	I kept a realistic perspective on things	Thoughts	0.73	ü	ü
18	I did something to help me achieve my goals	Goals	0.79	ü	
19	I did something to improve or maintain the quality of my life	Goals	0.84	ü	ü
20	I did something to help me live my ‘ideal’	Goals	0.82	ü	ü

	life				
21	I did something enjoyable	Activity	0.81	ü	ü

The variance in the 21-item version that is explained by the reduced (10- and 15-item) versions was evaluated by the model R^2 with the full version as the dependent variable and the reduced item versions as the independent variables. The statistical significance of individual domain scores was assessed via the nonparametric bootstrap using 2000 bootstrap samples. Generalized estimating equations using a gamma log-link function and unstructured correlation matrix were used to examine responsivity to treatment change. We report the estimated marginal means and percentage change (95% confidence intervals).

Results

Sample Characteristics

In the community sample the mean age was 45.30 years, 63% were female, 53% lived in a capital city, and 59% were employed (see **Multimedia Appendix 1**). Half of the sample was married or in a de facto relationship (50%) and there was a range of education levels (e.g., trade certificate 29%, undergraduate degree 29%). The sample was mostly Australian born (81%) and 30% had engaged with a mental health professional at the time of the survey or in the past (47%). Less than half of the sample reported clinical-level symptoms of depression (44%) or anxiety (43%) as indicated by a score of ≥ 10 on the PHQ-9 and GAD-7, respectively.

Participants in the treatment-seeking sample were slightly younger in age (M = 34.39 years), primarily female (75%), located in a capital city (61%), and in a married or de facto relationship (63%). Most participants were employed (65%), 42% had received a tertiary education, most were born in Australia (79%), and 42% had previously used mental health services. Unlike the community sample, the majority of participants in the treatment-seeking sample reported symptoms consistent with clinical levels of depression (75%) or anxiety (65%).

Parallel Analysis

In both samples, parallel analyses indicated that a five-factor solution was the most appropriate.

Confirmatory Factor Analysis

Confirmatory models were used to compare the fit of the 10-item and 15-item versions against the full 21-item version using both the community and treatment-seeking samples. A detailed summary of fit statistics can be found in **Table 2.** The 15-item version was associated with superior model fit statistics compared to the full 21-item version in both community and treatment-seeking samples. Similarly, the 10-item version was associated with a better model fit than the full 21-item version. Minimal differences in model fit were seen for the 10-item and 15-item versions. Configural, metric, and scalar invariance was appropriate for all TYDQ versions (see **Multimedia Appendix 2**).

Table 2. Confirmatory factor analyses of the 21, 15 and 10 item versions in the community and treatment-seeking samples.

	Community	**Treatment-seeking**

	21-item	15-item	10-item	21-item	15-item	10-item
Likelihood ratio *	<.001	<.001	<.001	<.001	<.001	<.001
RMSEA	0.05	0.04	0.05	0.07	0.05	0.05
CFI	0.96	0.98	0.98	0.92	0.97	0.99
TLI	0.95	0.97	0.97	0.91	0.96	0.97

* Refers to significance test.

Prediction of Original Factor Scores using Reduced Items

Regression models examined the proportion of variance in the original factor scores which could be explained by the reduced-item factors, as reported in **Multimedia Appendix 3**. Across both community and treatment-seeking samples, the 15-item version explained a higher amount of variance than the 10-item version. For example, the variance explained by the 10-item and 15-item versions of the "Healthy Thinking" factor using the community sample (R^2 = 0.77 vs. 0.86) and treatment-seeking sample (R^2 = 0.77 vs. 0.85).

Internal Consistency

In the community sample, internal consistency was excellent for the 21-item version (α = 0.93) and 15-item version (α = 0.91) and good for the 10-item version (α = 0.87). A similar pattern was found in the treatment-seeking sample. Internal consistency was excellent for the 21-item version (α = 0.92) and 15-item version (α = 0.90) and slightly lower for the 10-item version (α = 0.86).

Construct Validity

Bivariate correlations between the total and factor scores on the TYDQ versions and psychological measures are reported in **Table 3**. Across both community and treatment-seeking samples, the full 21-item version showed moderate correlations with the PHQ9 (*r*'s range -.30 to -.63) and weak to moderate correlations with the GAD7 (*r*'s range -.13 to -.56). Both abbreviated versions of the TYDQ demonstrated weaker correlations with psychological measures, although there were no marked differences between the two versions. The PHQ9 was moderately correlated with the total and factor scores of the 10-item and 15-item TYDQ (*r*'s = -.27 to -.56) in the community sample. These correlations were slightly, but not meaningfully, higher in the treatment-seeking sample (*r*'s = -.36 to -.63). The GAD7 demonstrated weak to moderate correlations with the 10-item and 15-item TYDQ total and factor scores in the community sample (*r*'s = -.10 to -.42) and treatment-seeking sample (*r*'s = -.27 to -.58).

Table 3. Correlations between TYDQ versions and psychological measures in the community and treatment seeking samples.

		Community		Treatment-Seeking	
		PHQ9	**GAD7**	**PHQ9**	**GAD7**
TYDQ21	Total	-.63	-.54	-.56	-.36
	Healthy Thinking	-.59	-.58	-.49	-.42
	Meaningful Activity	-.56	-.48	-.43	-.26
	Goals and Plans	-.49	-.38	-.45	-.26
	Healthy Habits	-.53	-.40	-.50	-.28
	Social Connection	-.40	-.31	-.30	-.13
T	Total	-.56	-.34	-.63	-.53

YDQ15	Healthy Thinking	-.52	-.42	-.60	-.58
	Meaningful Activity	-.44	-.27	-.56	-.47
	Goals and Plans	-.41	-.24	-.44	-.35
	Healthy Habits	-.50	-.28	-.53	-.40
	Social Connection	-.30	-.12	-.40	-.31
TYDQ10	Total	-.54	-.33	-.62	-.52
	Healthy Thinking	-.51	-.41	-.59	-.57
	Meaningful Activity	-.40	-.25	-.52	-.45
	Goals and Plans	-.37	-.23	-.44	-.36
	Healthy Habits	-.45	-.25	-.49	-.37
	Social Connection	-.27	-.10	-.36	-.27

Note. All correlations significant at the $p < .001$ level.

Responsivity to Treatment

Scores on all TYDQ versions increased from initial assessment to post-treatment (see **Table 4**). The largest percentage change was observed on the full TYDQ21 (39% [95% CI 32, 46]) with slightly lower percentage improvements observed on the abbreviated TYDQ15 (35% [95% CI 28, 42]) and TYDQ10 (32% [95% CI 25, 39]).

Table 4. Estimated marginal means and percentage change over treatment for TYDQ versions.

	TYDQ21	**TYDQ15**	**TYDQ10**
Application	27.82 (0.62)	20.71 (0.46)	14.17 (0.33)
Pre-Treatment	32.45 (0.67)	23.95 (0.50)	16.23 (0.35)
Mid-Treatment	36.78 (0.63)	26.69 (0.47)	17.96 (0.33)
Post-Treatment	38.80 (0.77)	27.96 (0.56)	18.69 (0.38)
Percentage change (95% CI)	39 (32, 46)	35 (28, 42)	32 (25, 39)

Note. Mean (SE) reported.

Discussion

The current study developed and evaluated a brief version of the TYDQ21 [12], a measure of daily actions associated with mental health. The questionnaire assesses how often individuals perform five different types of healthy actions, referred to as the 'Things You Do'. These five domains include Healthy Thinking, Meaningful Activities, Goals and Plans, Healthy Habits, and Social Connections. The abbreviated questionnaire versions included the top two items (TYDQ10) or three items (TYDQ15) with the highest loading on each of the five factors. This approach enabled us to retain and replicate the original five-factor structure while assessing the psychometric properties of these two brief questionnaires. Overall, the TYDQ15 emerged as the preferred abbreviation of the full TYDQ21. Compared to the TYDQ10, the TYDQ15 showed acceptable model fit, explained a larger proportion of variance on the full 21-item version, and had slightly higher internal consistency. Both the TYDQ15 and TYDQ10 were responsive to treatment and increased over time; however, improvements on the TYDQ15 more closely resembled that of the full 21-item measure. Therefore, although both brief adaptations appear to psychometrically sound, the current

study recommends the use of the TYDQ15 to maintain a balance between brevity and clinical utility.

Unlike on the TYDQ21, each of the five factors on the TYDQ15 include an equal number of items (i.e., three items per factor). The number of items per factor ranged from three to seven on the TYDQ21 [12]; as a result, the total score was more heavily weighted towards the factors with the most items (i.e., healthy thinking, goals and plans). By removing the additional items from over-represented factors, the TYDQ15 total score provides a more appropriate overall average estimate of how often individuals are performing the 'Things You Do' actions. It is possible that evening the distribution of the five factors within the model resulted in the superior model fit observed in the current study. As a psychometric evaluation study, we examined longitudinal changes in total but not factor scores on the TYDQ versions. Recent evidence suggests that the five factors on the TYDQ change differently across treatment; indeed, larger pre-post increases have been observed for the Healthy Thinking (d = 0.58), Meaningful Activities (d = 0.62), and Goals and Plans (d = 0.62) compared to Healthy Routines (d = 0.44) and Social Connections (d = 0.29) [25]. Further work is needed to explore longitudinal changes in the frequency of daily actions over treatment, and to delineate the relative contributions of treatment vs. non-specific factors to these changes.

The current study is not without limitations. We attempted to make our findings as generalizable as possible by conducting our analyses in a large community sample (n > 6,000) and large treatment-seeking sample (n > 14,000). However, these samples are limited by their inclusion of only Australian adult participants. In addition, the demographics of the treatment-seeking sample are somewhat skewed (e.g., mostly female). Further research is needed to replicate our psychometric evaluation of the TYDQ15 in other demographic groups – this is critical for understanding the influence of contextual factors on the association between daily actions and mental health. Secondly, the TYDQ was optional to complete during the online assessment for the treatment-seeking sample, resulting in item- and scale-level missingness. This decision was made to reduce questionnaire burden considering that participants were signing up for a health service, rather than directly participating in a research trial. Third, this study did not have access to a sample in which the TYDQ is administered regularly in the absence of treatment, and this is an avenue for future research.

The current study provides a psychometric evaluation of the TYDQ15 as a measure of daily actions associated with mental health. The abbreviated 15-item version was associated with acceptable reliability, validity, model fit, and responsivity to treatment. The TYDQ15 is more amenable to regular administration during psychological interventions (e.g., on a weekly or fortnightly basis) compared to the TYDQ21. By retaining three items per factor, the clinical utility of the questionnaire is largely retained. Indeed, there is still scope for practitioners to review how often individuals are performing different types of daily actions and then supporting individuals to increase how often they perform specific actions based on this personalised feedback. For instance, regular administration of the TYDQ15 may assist practitioners to support their patient identify barriers to fostering social relationships or reduce social isolation based on their Social Connections score, or to focus on reducing self-critical thinking or developing emotion regulation skills based on their Healthy Thinking score. This monitoring and feedback approach could be taken alongside not only standard psychological treatments, but also low intensity interventions carefully designed to support individuals to increase how often they are doing the specific daily actions associated with mental health. Future research may explore the potential of action-based interventions, together with routine monitoring of daily action frequency using the TYDQ15, to improve mental health using less resources than traditional psychological treatments. Our findings suggest that the TYDQ15 is an appropriate measure of daily actions that are associated with mental health, and may hold utility as a clinical resource.

Conflict of interest

NT and BFD are authors and developers of the treatment courses used at the MindSpot Clinic but derive no personal or financial benefit. All other authors declare no competing interests.

Funding statement
This study did not receive any direct funding.

Data Availability
The dataset from the original survey is available from the senior author (NT) upon reasonable request. Due to the confidential nature of the treatment-seeking sample, the data is not available for sharing.

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Supplementary Files

Multimedia Appendixes

Clinical and demographic characteristics of community and treatment-seeking samples.
URL: http://asset.jmir.pub/assets/8c41c4940aab697e71e5751720b0b397.docx

Measurement invariance in community and treatment-seeking samples.
URL: http://asset.jmir.pub/assets/5d4b89018e9b2e05b61673db4a997da9.docx

Variance explained (R2) in the 21-item measure by the briefer versions in the community and treatment-seeking samples.
URL: http://asset.jmir.pub/assets/0d70367dbfc83902d4883c74367ef0e2.docx