

The initial Polish adaptation of the Mind Wandering Questionnaire: translation and verification of the scale internal consistency

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Abstract

Introduction: The aim of the current study was to present the results of the first step of the Mind Wandering Questionnaire (MWQ) adaptation to the Polish sample. The adaptation involved performing translation of the scale, verification of the translated items' accessibility and the analysis of the internal consistency.

Material and methods: MWQ in original form is a single-factor short self-assessing questionnaire composed of five items with a 6-point Likert-type answering scale. The translation of items was performed by a professional language expert according to psychometric rules. The research group included 70 healthy young adults (students), aged 21.53, an equal number of males and females.

Results: The adapted questionnaire exhibited a single-factorial structure and satisfactory parameters of internal consistency: Cronbach's alpha was 0.78, all individual items were significantly correlated with MWQ total score, and the mean value of correlation reached 0.74. The mean value of the adopted MWQ total score reached 15.84 (SD = 4.11).

The study showing the initial step of the questionnaire adaptation revealed that the scale in the Polish version has an internal structure comparable with the original one, and its internal consistency exhibited good parameters.

Conclusions: In the next steps of the scale full adaptation, a convergent validity assessment should be carried out together with correlations with other scales assessing psychological constructs and dimensions of individual differences associated with Mind Wandering, such as neuroticism and impulsiveness.

Keywords: Mind Wandering, Spontaneous Thoughts, Individual Differences, Questionnaire, Factor Structure

Streszczenie

Wstęp: Celem niniejszego badania była analiza wyników pierwszego etapu adaptacji kwestionariusza „Mind Wandering Questionnaire” (MWQ) do populacji polskiej. Adaptacja polegała na wykonaniu tłumaczenia skali, weryfikacji przystępności przetłumaczonych itemów oraz ocenie spójności wewnętrznej.

Materiał i metody: MWQ w oryginalnej formie to jednoczynnikowy, krótki kwestionariusz samooceny, składający się z pięciu pozycji z 6-punktową skalą odpowiedzi typu Likerta. Tłumaczenie pozycji zostało wykonane przez profesjonalnego lingwistę zgodnie z ogólnie przyjętymi zasadami psychometrycznymi. Grupa badana obejmowała 70 zdrowych młodych dorosłych (studentów) w wieku 21,53 lat, zawierała równą liczbę mężczyzn i kobiet.

Zaadaptowany kwestionariusz wykazał jednoczynnikową strukturę i zadowalające parametry spójności wewnętrznej: alfa Cronbacha wyniosła 0,78, wszystkie poszczególne pozycje były istotnie skorelowane z całkowitym wynikiem MWQ, a średnia wartość korelacji osiągnęła 0,74. Przeciętny wynik całkowity MWQ wyniósł 15,84 (SD = 4,11).

Dyskusja: Badanie ukazujące wstępny etap adaptacji kwestionariusza wykazało, że skala w wersji polskiej ma strukturę wewnętrzną porównywalną z wersją oryginalną, jej spójność wewnętrzna wykazała dobre parametry.

Wnioski: W kolejnych krokach pełnej adaptacji skali należy przeprowadzić ocenę trafności zbieżnej wraz z korelacjami z innymi skalami oceniającymi konstrukty psychologiczne i wymiary różnic indywidualnych związanymi ze zjawiskiem odrywania się myślami od wykonywanego zadania, takimi jak neurotyczność i impulsywność.

Słowa kluczowe: Wędrowanie myślami, Spontaniczne myśli, Różnice indywidualne, kwestionariusz, Struktura czynnikowa

1. Introduction

Although it seems natural that humans are not focused exclusively on performing task and solving complex problems, the vast majority of studies carried on by cognitive psychology disdained spontaneous thoughts and imaginative activity. This performance-focus became even more inaccurate having in mind that the above 30% of people's everyday time is spent on other mental activities than specific tasks pursuit or accomplishing a given objective goal [1]. A certain shift in this regard has been observed only in the last two decades, which is probably the result of the development of new methodological solutions enabling the study of spontaneous mental processes not only by referring to introspection but also by documenting the spontaneous activity of the brain, which is systematized and not accidental, just like brain activity observed in the performance of certain cognitive tasks [2, 3, 4].

One of the most explored phenomenon typical for a wide typology of spontaneous mentations is the so-called Mind Wandering (MW) defined as the displacement of interest or attentional resources from the ongoing task to internal task-unrelated thoughts. MW might be also termed "off-task thoughts" because its specificity always corresponds to situations when a subject should be focused on external task-related information but temporarily its attention is intercepted by non-task thoughts, most often, but not exclusively, associated with personal content [5, 6]. Since MW consists in redirecting attention from the ongoing task, then its impact on the task execution might be rather disadvantageous. Due to the above influence of off-task thoughts on cognitive effectiveness, most of the MW-research conducted so far has used the 'thought probe' technique. In an experiment conducted with the application of this methodical solution, task performance is periodically interrupted with an overt question about the extent to which a testee is focused on the task and to what extent current thoughts are occupied by other content, e.g. related to personal thoughts or memories [7]. It is also postulated that MW is mirrored in the distribution of response times (RTs) in tasks programmed to experimentally manipulate response-stimulus intervals [8] and in experiments the construction of which is to cause cognitive overload [9]. In these circumstances, a distribution of the RTs series is characterized by the presence of an increased proportion of rare but substantially prolonged RTs which are considered indicators of attentional lapses resulting from an increased tendency to mind wander. What is worth mentioning, is that in patients with schizophrenia and bipolar disorder such RTs outliers are observable even in the most basic reaction time tasks, which was interpreted as an exponent of abnormally enhanced difficulties in

attentional control [10, 11]. In fact, heightened MW was significantly associated with several adverse conditions and psychopathological features. For example, Robison & Unsworth [12] showed that aggravated MW was noticed during states of reduced alertness, increased fatigue and generally decreased productivity. Kane with co-workers [13] presented data confirming that individuals who frequently mind wandered during task performance obtained higher punctuation in scales assessing dispositional neuroticism. Additionally, Pereira with colleagues [14] connected enhanced MW with lower extraversion and levels of effortful control. Other authors suggest that increased MW should be considered as a risk factor for mental health, due to its well-documented associations with anxiety and generally negative affect [1, 15].

Given that people differ in the severity of their tendency to distract from the task at hand, MW can thus be understood as a trait that determines individual cognitive differences. Traits are typically measured with self-assessment questionnaires, and there were some attempts to apply a questionnaire-related approach to study MW. Currently, the Mind Wandering Questionnaire (MWQ) developed by Mrazek and co-workers [16] is one of the most frequently used scale assessing dispositional likelihood to exhibit "off-task thoughts". The author of the MWQ argued that previously available scales, such as Daydream Frequency Scale (DDFS, [17]), lacked face validity and first of all, DDFS items do not explicitly apply to the task-related situations, but rather more general category of stimulus-independent thoughts generated in settings such as long journeys. On the other hand, in Poland there is an Off-Task Thought Questionnaire (OTTQ, [18]), however, this scale is more focused on the emotional consequences of errors committed during task execution being an effect of inattention. Additionally, OTTQ has a multifactorial structure, a relatively complex psychological background and is available only in the Polish version, while MWQ had been already adopted in several countries (i.a. Turkey, Spain, Croatia) and was used to measure MW individual differences in neuroscientific research [19].

Considering the above, the goal of the current study was to perform an initial Polish adaptation of the Mind Wandering Questionnaire. Since it was not yet verified whether self-administrated methods of MW assessment are not entangled by cultural differences, the first step was to translate the items and scrutinize the accessibility of content. Another goal was to analyze the factorial arrangement of the adopted scale, especially considering that MWQ in the original version, and in various adaptations is a single-factor method. Therefore, besides verification of performed translation, this study examined

the internal consistency of the Polish MWQ.

2. Materials and Methods

2.1. Participants

The study sample contained healthy, cognitively active individuals. The main criteria for inclusion are between 20 and 25 years of age and student status. The exclusion criteria were as follows: diagnosis of neurological and psychiatric disease, the experience of any form of traumatic brain injury, long-term use of medications that may affect cognitive functioning, the occurrence of mental illness and symptoms of early dementia among first-degree relatives, difficulties in school attendance, repeat grades. The group was qualified on the basis of an interview in which the above-mentioned features were asked. The interview was conducted individually with each participant. The subjects gave informed consent to participate in the study. At the introductory stage, 100 students were recruited, 15 of them participated in the initial assessment of the translation of the scale, and 85 were included in the main research. The final number of respondents was 70, which was the result of exclusion criteria application and modeling of the sample to desired characteristics.

2.2. Mind Wandering Questionnaire (MWQ)

The Mind Wandering Questionnaire was developed by Mrazek and co-workers [16] as a short self-descriptive scale containing five items. All items explicitly refer to features or behaviors associated with troubles in maintaining attention focused on task situations. Examinee responds to items on a 6-point Likert-type scale reaching from 1 (almost never) to 6 (almost always). The sum of all obtained points in an MWQ total score may extend from 5 to 30. The original version of the scale has high parameters of internal consistency and reliability, with Cronbach's alpha of 0.85 and inter-item correlations from 0.43 to 0.68. Overall, the scale is single-factorial, principal component factor analysis showed eigenvalue: 3.58, all items expressed high factor loading; min. 0.71, max. 0.84. Authors established a significant association between trait-level MW assessed with MWQ and performance-related MW analyzed with an application of the thought-probe technique [16], which confirmed the convergent validity of the scale. Additionally, among the sample of middle school students, a set of significant relationships has been established between a high total MWQ score and worse mood, greater stress and lower self-esteem, which also confirms that high trait-MW might be considered a risk factor for the development of mental disorders. The MWQ has been translated and adapted for usage in several countries, inter alia Japan [20], Spain [21] and Turkey [22].

After obtaining permission from the author, the scale was translated into Polish and then back-translated into English by a professional language expert. When a comparable version was achieved, the scale in Polish translation has been additionally reviewed by 15 students regarding items' comprehensibility and accessibility in the context of unequivocal self-report. A verified translated version was used in the presented study.

2.3. Statistical analysis

To characterize empirical characteristics regarding translated MWQ scale, the mean, standard deviation, minimal and maximal values were presented, additionally, all individual items and the total MWQ score kurtosis has been computed to describe the degree to which outcomes were concentrated around the peak of the frequency distribution. The Kolmogorov-Smirnov and Lilliefors tests were applied to check for the normality of total score distribution. To compare any subgroups (e.g. men and women) a two-tailed t-test was used. The analysis of the scale's internal consistency was performed with three types of statistical operations: by verifying the inter-correlations between outcomes of individual items and total score with the Pearson's r correlation coefficient, by computing the Cronbach's α as a scale reliability indicator, and, by conducting exploratory factorial analysis (EFA). EFA has been utilized to verify whether adopted version of the scale had also single-factorial structure and to present the exact factorial loads of individual items, eigenvalue and the percent of explained total variance. The statistical significance level was set at $p < 0.05$. All computations have been performed using STATISTICA 13.1 PL software.

3. Results

The following characteristics and obtained results come from the sample of 70 finally included participants. The group contained equal number of men and women (both 35), the mean age was 21.53 (SD = 2.47), men and women did not differ in terms of age: $t(68) = 0.672$, $p = 0.503$ and number of years of education: $t(68) = 0.544$, $p = 0.556$. Table 1. presents descriptive statistics of obtained results for five individual items and the total MWQ score. Negative values of the kurtosis index for these variables mean that the spread of raw scores was slightly wider compared to the normal model of distribution. However, the dispersion of the total MWQ score is consistent with Gaussian distribution (Figure 1.), both, Kolmogorov-Smirnov and Lilliefors tests generated non-significant outcomes ($p > 0.20$).

As Table 2. shows, there were no significant gender differences regarding individual MWQ items and the total score, however, there was some trend towards higher punctuation obtained by women in item 3 ($p = 0.061$).

Table 1. Descriptive statistics of polish MWQ version results in the studied sample.

MWQ	Min.	Max.	Mean	SD	Median	Kurtosis
Item 1	1.00	4.00	2.114	0.925	2.00	- 0.821
Item 2	1.00	6.00	3.214	1.202	3.00	- 0.454
Item 3	1.00	6.00	3.228	1.118	3.00	- 0.710
Item 4	1.00	6.00	3.471	1.200	4.00	- 0.663
Item 5	1.00	6.00	3.814	1.195	4.00	- 0.557
MWQ total	5.00	24.00	15.842	4.113	16.00	- 0.290

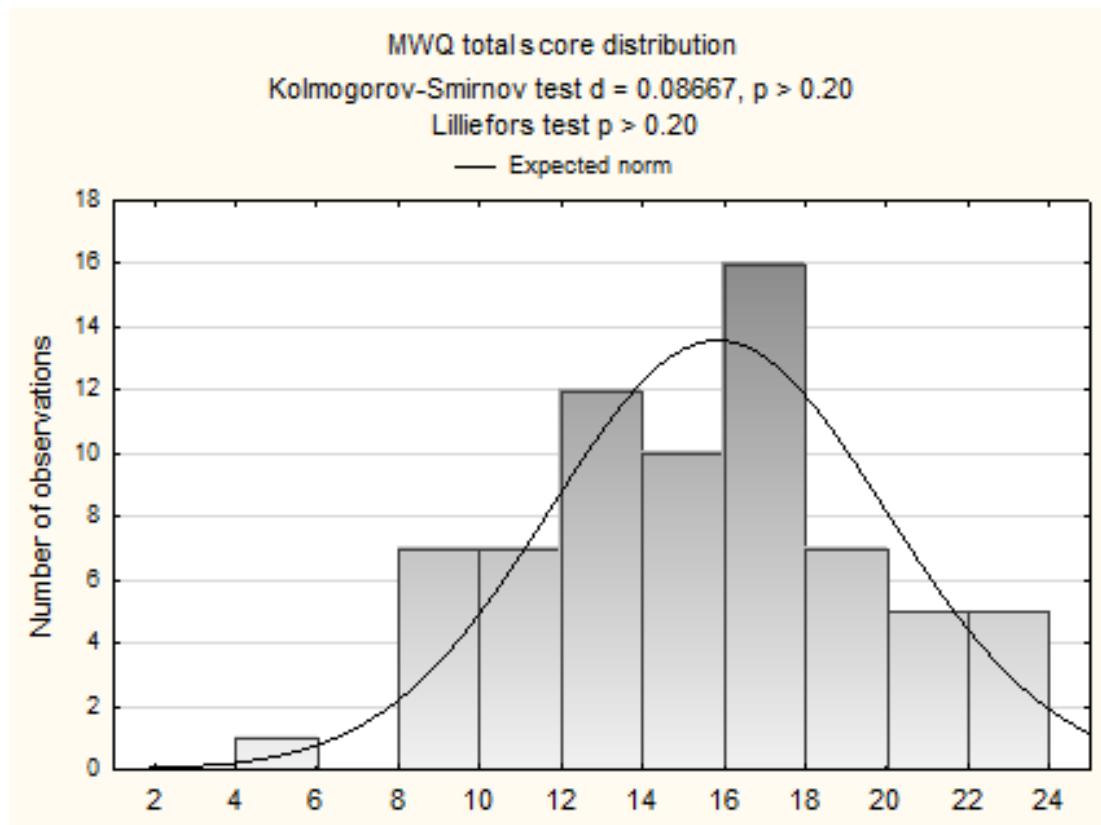


Figure 1. The empirical distribution of Polish MWQ total score results with the curve representing expected normal dispersion.

Table 2. Comparison of Polish MWQ version results in studied men and women.

MWQ	Woman (n = 35), M (SD)	Man (n = 35), M SD	t(68)
Item 1	2.142 (0.974)	2.085 (0.886)	0.256
Item 2	3.228 (1.238)	3.200 (1.183)	0.098
Item 3	3.542 (1.224)	2.914 (0.886)	1.832
Item 4	3.314 (1.231)	3.628 (1.165)	-1.096
Item 5	3.914 (1.291)	3.714 (1.100)	0.697
MWQ total	16.142 (4.298)	15.542 (3.958)	0.607

3.1. Analysis of internal consistency

According to original version of the questionnaire [16] and subsequent adaptations to non-English languages (e.g. Spanish [21]), the method has a single-factor structure with relatively high consistency. To verify whether the described Polish version of the scale also exhibits comparable factorial arrangement, three

complementary statistical procedures were performed: the inter-correlations between outcomes of individual items and total score, determination of Cronbach's α as a scale reliability coefficient, and factorial analysis.

Table 3. presents Pearson's correlations between all individual items and between them and the total score obtained in the Polish version of MWQ. All obtained

Table 3. Inter-correlations between individual MWQ scale items and total score. The right column additionally shows Cronbach's α for each item and MWQ overall outcome.

		Item 1	Item 2	Item 3	Item 4	Item 5	MWQ total	Cronbach's α
Item 1	r	1	0.44	0.34	0.37	0.58	0.67	0.77
	p		< 0.001	0.025	0.010	< 0.001	< 0.001	
Item 2	r	0.44	1	0.37	0.49	0.52	0.79	0.74
	p	< 0.001		0.001	< 0.001	< 0.001	< 0.001	
Item 3	r	0.34	0.37	1	0.43	0.41	0.70	0.77
	p	0.025	0.001		0.002	0.002	< 0.001	
Item 4	r	0.37	0.49	0.43	1	0.50	0.73	0.75
	p	0.010	< 0.001	0.002		< 0.001	< 0.001	
Item 5	r	0.58	0.52	0.41	0.51	1	0.81	0.73
	p	< 0.001	< 0.001	0.002	< 0.001		< 0.001	

correlations are significant at the level of $p < 0.05$, additionally, correlations with overall scale measure are around 0.70 or higher. Cronbach's α for the whole scale reached 0.78, and for every individual item this reliability indicator exceeded 0.70 what also confirms that all items measured the same theoretical construct.

Table 4. contains Polish translation of the scale and the result of exploratory factor analysis. First of all, this analysis confirmed that scale in Polish version is single-factorial, all items significantly loaded the factor. The Eigenvalue was 2.66 and the factorial load explained 53.23 percent of total variance.

Table 4. Exploratory factorial analysis with polish translation of five MWQ items.

	Polish translation of items	Factor 1
Item 1	Trudno mi utrzymać uwagę na prostych lub powtarzających się aktywnościach	0.71
Item 2	W trakcie czytania łapię się na tym, że nie myślę o tekście i muszę dany fragment przeczytać od nowa	0.79
Item 3	Robię różne rzeczy bez zwracania na nie pełnej uwagi	0.67
Item 4	Kiedy się zamyślę zdarza mi się, że „słucham coś jednym uchem a wypuszczam drugim”	0.72
Item 5	Błądzą myślami w trakcie wykładów czy prezentacji	0.82
Eigenvalue		2.66
% explained variance		53.23

4. Discussion

This study aimed at verifying the accessibility of translation and internal consistency analysis of the Polish version of Mind Wandering Questionnaire. It was assumed, that investigation regarding described procedures should be performed before full validation of the scale since the adopted questionnaire might require some corrections. To conduct this initial stage of adaptation a group of young adults was included, some of them initially assessed the translated items in terms of their comprehensibility and the possibility of giving unambiguous reports. The distribution of the adapted MWQ total score complied with Gaussian curve. Comparing with participants recruited by Mrazek [16] Salavera et al. [21] and Kovačević with co-workers [23], our sample was slightly older, due to an attempt to validate the scale on a group which might be qualified as adults, not the adolescents. The total MWQ

score ($M = 15.84$) was similar to the results of the groups from the indicated studies, though some heterogeneity between different populations seems to be present, e.g. total score of the original version reached 18.86, while among Spanish adolescent it was 13.75. In our sample, there were no significant differences between men and women, this aspect was not controlled in previously mentioned studies.

Three procedures regarding verifying scale internal consistency have been carried on. First, inter-correlations between individual items and the total MWQ score were analyzed. All items were significantly and positively correlated, the correlation strength reached between 0.34 and 0.58 what showed that items measure similar constructs, but are not redundant. Such correlational values are considered indicators of good reliability [24]. Additionally, the results regarding all individual

items highly and significantly correlated with the scale total score (strength between 0.67 and 0.81). Another parameter confirmed the good reliability of the Polish MWQ version, the Cronbach's α for the whole scale was 0.78. The original MWQ and other versions adopted for usage in various countries corroborated that the questionnaire has a single-factorial structure. In general, MWQ assesses solely the frequency of MW behaviors, not the content of the off-task thoughts or emotional reactions to performance errors. This feature is the likely source of an MWQ strict and simple structure. Also, Polish version displayed an analogous structure as shown by an exploratory factorial analysis. All items significantly loaded one factor, however, item 3 had a factorial load slightly below 0.70. It is worth noticing, that in the fully-validated Spanish version two items also exhibit factorial load below 0.70 [21], though this MWQ version has not been recognized as not fulfilling the psychometric criteria of a valid and reliable assessment method. The psychometric parameters of items 1 and 3 in our study were slightly lower than the others. Again, analogous features occurred in the Spanish and partly Croatian adaptations. We believe that such a characteristic may result from the fact that item 3 does not directly refer to a specific activity, and besides, the phrase "I do things without paying full attention" is not specific to phenomena in the field of MW. Perhaps, during the development of the final version of the scale, it would be worth slightly modifying the content of this item, also relating it to a specific task situation. Nevertheless, we believe that obtained results indicate that, at this initial level of the scale validation, the translated questionnaire showed good parameters of reliability and internal consistency.

Despite these promising results, further steps to adapt the Polish MWQ are needed. First of all, it is obligatory to evaluate the questionnaire's convergent validity. In previous studies, this was made by establishing correlations between MWQ and various scales assessing mindful attention [21], mood and other variables associated with emotional regulation, self-esteem and life satisfaction [16, 21, 23, 25]. Considering that there is an available scale developed to measure off-task thoughts (OTTQ, [18]) it seems reasonable to add this questionnaire to a set of self-assessment measures which should be used in establishing Polish MWQ convergent validity

Although this step has not been made in previous MWQ adaptations, since high-level MW might be recognized as a disadvantageous feature associated with less desirable personality traits [26] and mood distortions [2], it would be potentially beneficial to supplement the process of method adjustment by examining whether in clinical or subclinical populations in which distortions of attention and intrusive experiences are present (e.g.

ADHD, PTSD) the score of MWQ would be higher compared with healthy controls. If so, then the MWQ outcome might be considered a valid indicator of mental health risk factors.

In conclusion, the presented results of Polish Mind Wandering Questionnaire early-stage adaptation suggest that it might be a valuable method assessing disturbances in attentional control occurring in task-related conditions. It should be noted, however, that the presented results are not yet sufficient for the final evaluation of the presented version of the scale as a fully validated tool that can be used in the Polish population. Research on internal and convergent validity as well as the development of ranges of normative results on a significantly larger study group is necessary. Mind Wandering understood as a dispositional trait is still an object of extensive research, including psychology of individual differences [27], psychopathology [28] and cognitive neuroscience [29]. This seems to additionally justify the development of an MW assessment method that meets high psychometric standards.

Conflict of interest

The author has declared no conflict of interest.

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