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VALIDATION OF THE POLISH ADAPTATION OF THE FIVE FACET MINDFULNESS QUESTIONNAIRE

In this research study the Polish adaptation of the Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) was developed based on strong results of empirical research. A model of mindfulness was presented in which five factors (Acting With Attention, Nonreactivity, Nonjudging, Observing, and Describing) are cited as essential in facilitating health and well-being. In this study the English version of 39-item FFMQ was used to develop the Polish adaptation. The psychometric properties of the Polish FFMQ were assessed in a sample of 800 people (200 artistically gifted young people aged 15-19 years and 600 adults aged 20-50 years) through a validation procedure (reliability analysis, confirmatory factor analysis, and analysis of correlations with other tests measuring psychological variables such as neuroticism, emotional stability, rumination, openness to experience, extraversion, and reflection). The results confirmed the reliability of the test (Cronbach's α = .73-.86), except in the case of the Nonreactivity scale (α = 0,65-0,66) as well as the validity (4-factor hierarchical model without the Observing scale) of the Polish FFMQ for nonclinical populations aged 15-50 years. Replications in meditating samples and in patients are needed.

Keywords: mindfulness, psychometric properties, Five Facet Mindfulness Questionnaire.

THEORETICAL BACKGROUND

The topic of mindfulness has attracted widespread interest from the public (more than 9% of Americans declare that they practice mindfulness as a health recovery method) and researchers (Chiesa & Serretti, 2009, 2010; Didonna, 2009; Glomb, Duffy, Bono, & Yang, 2011) for over a decade. In the United States alone, there are more than 250 medical centres that offer various therapeutic interventions based on mindfulness techniques or deliver mindfulness training

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courses. The world specialist literature indicates a rapidly growing interest in the field (recently, more than 120 articles have been published annually in scientific journals – see Williams & Zylowska, 2009). The collected bibliography on the subject just for the years 1975-2009 includes more than 1,000 publications listed on 113 pages (Williams & Zylowska, 2009). A review of publications on mindfulness issued in 2007 lists more than 11,000 items (Glomb, Duffy, Bono, & Yang, 2011). The PsycINFO database includes 2,221 items (papers, books, theses) that contain *mindfulness* as a keyword, and Medline – 640 items (Glomb et. al., 2011).

Such concepts as "mindfulness," "meditation," "calmness," and "acting with awareness" or "mindful awareness" are used interchangeably in the contemporary literature on the subject and are defined on the one hand as a specific state (a technique) and on the other hand as a target life quality (a trait) that may stem from a person's individual dispositions or represent the durable effect of practising various training methods. Mindfulness in the former sense refers to a specific state of attention arising from paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally (Kabat-Zinn, 1994). Mindfulness in this sense refers to the ability of a person's attention to perceive details in a peripheral field of perception and to note and remember them preverbally (extensive attention – see Kolańczyk & Mikołajczyk, 2011; Lazar, 2005; Scharmer, 2009). The results of numerous research projects indicate that individuals with increased mindfulness indicators perceive pictures that are usually ignored by nonmindful individuals (the awareness of one's own body and the recognition of contents appearing in one's consciousness, i.e., thoughts, emotions, and beliefs). This ability, as demonstrated by researchers (Treadway & Lazar, 2009), is determined by specific electrical activity in particular regions of the brain (different in individuals in the state of mindfulness): stronger activity in the prefrontal cortical area (related to positive emotional states), the absence of alpha-blocking habituation (increased consciousness of various stimuli), increased α activity (a marker of relaxation and decreased anxiety), increased theta activity (an indicator of reduced anxiety), and increased gamma activity (a marker of affect regulation).

The concept of "mindfulness" as defined above may be used to describe a special type of meditation techniques characterized by open monitoring. These techniques are usually distinguished from other techniques based on focused attention or are regarded as a potential development of such techniques (Lutz, Slagter, Dunne, & Davidson, 2007). Mindfulness as embedded in the concept of open monitoring includes various nonanalytical mental exercises, ranging from

breath control, through becoming aware of inner bodily experiences, to a variety of proactive and passive meditation practices (Kabat-Zinn, 2003; Lazar et al., 2005). According to many researchers studying this phenomenon, mindfulness thus understood may not be identified with any specific meditation technique or therapeutic method because in its scientific conceptualization it refers to a specific style of life filled with openness and acceptance (Jankowski & Holas, 2009).

Mindfulness is understood in the specialist literature as a trait that differentiates people (resulting from genetic predisposition, environmental circumstances, and explicit training) and has specific neural, psychological, and biological correlates and psychometric indicators (Davidson, 2010). The results of numerous research projects in the field of neuropsychobiology indicate that the brains of mindful people differ significantly from the brains of nonmindful people in terms of structural features (increased grey matter concentration – Holzel et al., 2008; a smaller right amygdala – see Taren, Creswell, & Gianaros, 2013) and in functional terms (the synchronization of brain stem, the limbic system, and cerebral cortex; the integration of attention and memory networks and control system; the integration of corresponding regions in both cerebral hemispheres; increased activity of mirror neurons – see Siegel, 2007; Slagter, Davidson, & Lutz, 2011).

The results of numerous research projects also reveal that mindfulness training results not only in structural and functional alterations in the brain (neuroplasticity), but also in nonspecific changes observed on the behavioural level. Like no other sports, physical, or simulation exercise, mindfulness training enhances and deepens the ability to apply acquired skills under new and untrained conditions (Guillot & Collet, 2005; Munzert, Lorey, & Zentgraf, 2009). As demonstrated in numerous studies, physical, sports, and simulation training only develops skills in familiar and trained situations. It may be concluded, then, that the trait of mindfulness differentiates individuals significantly, and its basic mechanisms have a multilevel and nonspecific nature.

As demonstrated by numerous research projects, mindfulness predispositions may be enhanced through systematic practices (Spencer, 2008). The practices lead to pro-health changes because they reduce the tendency of the mind to respond to appearing internal and external stimuli in a way that causes and augments stress and emotional conflict. Many researchers confirm that this ability results in a significantly reduced number of automatic reactions and increased flexibility. It is assumed that paying nonjudgmental and accepting attention to current experience enables individuals to better understand themselves and activates self-regulatory processes in their bodies that may result in a reduction in

the physical and psychological symptoms of stress. Consequently, mindful people enjoy better psychological health and general well-being (Baer et al., 2012).

A vast body of empirical materials collected as a result of research in individuals practicing various meditation techniques suggests that the practice of meditation based on mindfulness leads to a significant reduction in cognitive and emotional disorder symptoms and to an improvement in general psychological well-being (Brown & Ryan, 2003; Hofmann, Sawyer, Witt, & Oh, 2010; Kabat-Zinn, 1990; Kearney, McDermott, Martinez, & Simpson, 2011; Lynch, Chapman, Rosenthal, Kuo, & Linehan, 2006; Shapiro, Carlston, Astin, & Freedman, 2006). It is also proposed that the wide range of desirable results of practicing various mindfulness techniques are related to the direct effects of systematic mindfulness exercises: empathy (Krasner et al., 2009; Shapiro et al., 1998), stillness (Spencer, 2008), altruism (Rosch, 1998), social connectedness (Hutcherson et al., 2008), compassion (Austin, 1998), and creativity (Capurso, Fabbro, & Crescentini, 2014; Colzato, Ozturk, & Hommel, 2012, 2013).

The results of various research projects seem to identify mechanisms actuating mindfulness traits and predispositions in an individual and to confirm the accuracy of research instruments based on self-description and self-reports. It seems that the state and trait of mindfulness are activated by five interrelated mechanisms (the first three seem to play an important role in health recovery processes – see Baer, Smith, Hopkins, Krietemeyer, & Toney 2006), namely:

1) Acting With Awareness (Actaware) – doing things with the awareness of one's acts, i.e., tasting food, enjoying the aesthetic aspect of cleaning, the dynamics of walking or jogging, etc. (in contrast to behaving mechanically as if on automatic pilot, when the individual is unaware whence and why they are in specific circumstances);

2) Nonjudging (Nonjudge) – taking a nonevaluative stance towards the thoughts, feelings, and sensations appearing in the field of attention (in contrast to denial and repression) associated with sympathy for the self (the ability to experience unpleasant internal phenomena without nonproductive rumination);

3) Nonreactivity (Nonreact) – low reactivity to stimuli received by an expanded field of attention at a high sensitivity level (a low sensitivity threshold);

4) Describing – the ability of distanced observation of experience components running through the mind, combined with the ability to label all those components;

5) Observing – the ability to feel all sensations related to muscular, body organ, and body part activity. This is the mindfulness facet (factor) that is the most

frequently discussed at present due to its correlations with elements theoretically inconsistent with the prevailing model of mindfulness.

THE ORIGINS AND DESCRIPTION OF THE FIVE FACET MINDFULNESS QUESTIONNAIRE

The discovery and identification of mindfulness elements is an important phase in exploratory research aimed at defining specific characteristics of mindfulness (including in particular the characteristics of mindfulness in comparison with other meditation techniques) and its clinical efficiency. The instruments developed for this purpose and improved to ensure their psychometric reliability enable us to describe the specific structure of the trait of mindfulness with growing precision (Baer et al., 2008). The most popular research instruments used to measure mindfulness as a trait include: the Freiburg Mindfulness Inventory (FMI; Buchheld, Grossman, & Wallach, 2001), the Kentucky Inventory of Mindfulness Skills (KIMS; Baer, Smith, & Allen, 2004), the Mindfulness Questionnaire (MQ; Chadwick, Hember, Mead, Lilley, & Dagnan, 2005), the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003), the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006), and the Cognitive and Affective Mindfulness Scale (CAMS; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007; Feldman, Hayes, Kumar, & Greeson, 2003).

Among these instruments, the Five Facet Mindfulness Questionnaire represents a particularly useful proposal (Baer et al., 2006) based on 112 items originating from other instruments used to measure mindfulness (the Cognitive and Affective Mindfulness Scale, the Freiburg Mindfulness Inventory, the Kentucky Inventory of Mindfulness Skills, the Mindful Attention Awareness Scale, and the Mindfulness Questionnaire) that were subjected to a specific research procedure (exploratory factor analysis, principal axis factoring with oblimin oblique rotation) on a large sample of students (N = 613) (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). The exploratory factor analysis resulted in the identification of 39 items that were characterized by the highest loadings (the value of .40 was adopted as a criterion for rejecting an item) on each factor (eight items in each of the Observe, Actaware, Nonjudge, Describe scales and seven items in the Nonreact facet). The five factors were characterised by satisfactory internal validity, with Cronbach's α values ranging from .75 (Nonreact) to .91 (Describe). Correlations among the identified factors were weak although statistically significant (between .15 and .34).

In order to examine the psychometric value of the FFMQ, the researchers (Baer et al., 2006) assessed its external validity by verifying the correlations between mindfulness facets and other psychological constructs. According to expectations, the Observe and Describe facets were strongly correlated with emotional intelligence and alexithymia. The Nonreact factor was characterised by the strongest correlation with compassion and the Actaware factor was correlated principally with increased dissociation and absentmindedness. Of the five FFMQ factors, the Nonjudge factor was characterized by the highest correlations with such psychological symptoms as neuroticism, suppression, emotion regulation disorders, and experiential avoidance. Unexpected results included correlations revealed between the Observe facet and increased dissociation, absentmindedness, psychological symptoms, and thought suppression, but the correlations turned out to be insignificant in light of an analysis of a sample of experienced meditators.

Taking into account fit indices and, principally, differences in chi-square-test significance, Baer and colleagues (2006, 2008) concluded that the five-facet hierarchical model was more accurate for experienced meditators (N = 667) than for a sample of individuals less experienced in meditation (N = 190) (the hierarchical model: CFI = .97, NNFI = .96, RMSEA= .06; the nonhierarchical model: CFI = .96, NNFI = .95, RMSEA = .06). They also revealed that the four-facet hierarchical model (excluding the Observe factor) was better than the four-facet nonhierarchical model. The final regression analysis revealed that the Observe factor is responsible for a discrepancy between empirical data and models, because this factor plays a key mediation role between meditation experience and mindfulness. In general, the results obtained by Baer and colleagues (2006, 2008) support the hierarchical model, provided that the Observe scale is not correlated with the superordinate aspect of mindfulness in a nonmeditating sample.

The results of FFMQ validations performed in various countries are consistent with the results obtained by the Baer team (2006, 2008) and strongly confirm the reliability of the test. The results of numerous validation tests also confirm the validity of the 5-facet model (Dundas, Vøllestad, Binder, & Sivertsen, 2013 – Norway; Heeren, Douilliez, Peschard, Debrauwere, & Philippot, 2011 – France; Hou, Wong, Lo, Mak, & Ma, 2013 – China; Sugiura, Sato, Ito, & Murakami, 2012 – Japan; Veehof, ten Klooster, Taal, Westerhof, & Bohlmeijer, 2011 – the Netherlands). However, some research projects revealed that the 4-facet model without the Observe scale is more reliable in certain groups of subjects (Cebolla et. al., 2012 – Spain; Dundas, Vøllestad, Binder, & Sivertsen, 2013 – Norway; Sugiura, Sato, Ito, & Murakami, 2012 – Japan; Tran et al., 2013 – Aus-

tria). The results of validations also confirm a better fit of empirical data to hierarchical models in people with a wide meditation experience.

Some researchers indicate psychometric issues concerning both the reliability and validity of the FFMQ. For example, an Austrian research project revealed a low reliability of the Nonreact scale (Tran et. al., 2013). In view of evidence of a poor fit of the complete set of test items (39 items) to the assumed models, a growing number of attempts have been made to shorten the FFMQ and validate such short forms (Bohlmeijer, Klooster, Fledderus, Veehof, & Baer, 2011; Tran et al., 2013).

To summarize, it may be concluded that the FFMQ is a valuable and promising instrument designed to measure mindfulness skills. Numerous valuable research projects have been conducted using this test (Offenbächer et al., 2011). The particular strength of the FFMQ lies in its suitability for including a certain number of mindfulness facets that have well operationalized characteristics. Despite the positive results of FFMQ validations, its authors suggest that studies be continued to confirm the positive psychometric properties of this research instrument, in particular with respect to the structure of its distinguished factors.

DESCRIPTION OF THE PROCEDURE USED TO PREPARE THE POLISH ADAPTATION

The Polish adaptation is based on the English version of the FFMQ published in 2006 (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). The psychometric properties of the original questionnaire were satisfactory.

The test items were translated into Polish in the first phase. The translation method was used, that is, a faithful translation from English was prepared, with necessary modifications allowed where the language peculiarities of the original might result in nonequivalence of the instrument (the translation was done by two independent translators of English, including a native speaker of English). The translation was eventually assessed in terms of theoretical validity (the competent judges method was used with three psychologists involved). Based on the procedure described above, an experimental version was compiled and subjected to an initial verification test in a selected group of young people aged 15-20 (N = 20).

This version was then used in a survey aimed at verifying the psychometric value of the questionnaire. The validation procedure was carried out in the years 2011-2012 (on 200 pupils from the State Schools of Arts in Cracow (SSA) aged

15-19: 76% – female, 23% – male; *M* = 17.2, *SD* = 1.34) and 2012-2013 (600 students of the Pontifical University of John Paul II in Cracow (PUJP2), aged 20-50: 67% – female, 33% – male; *M* = 27.17, *SD* = 7.52).

The psychometric properties of the FFMQ, including its reliability and validity, were tested using the following research techniques and methods:

1) calculations of the discriminating power of items relative to results in subscales and the general result. A fourfold point correlation coefficient was used;

2) the reliability of the test was estimated using Cronbach's α coefficient for each of the subscales (internal consistency) and the test-retest method (absolute stability);

3) internal validity was tested using confirmatory factor analysis;

4) the NEO-FFI Personality Inventory developed by Costa and McCrae (Neuroticism, Openness to Experience, Extraversion), Cattell's Self-Analysis Form (Emotional Stability) and the Rumination-Reflection Questionnaire (Rumination and Reflection) were used to estimate the external validity of the test. The NEO-FFI Personality Inventory is a test with confirmed reliability (Cronbach's α ranging from .68 for Openness to experience and Agreeableness to .82 for Conscientiousness) and validity. In addition, it has Polish standards developed for male and female populations and age groups (Zawadzki, Szczepaniak, & Strelau, 1995; Zawadzki, Strelau, Szczepaniak, & Śliwińska, 1998). The Self-Analysis Form is compiled using the questions contained in the comprehensive 16PF Personality Inventory, developed by Cattell to assess and measure 16 personality structure components distinguished by him, also known as personality factors or aspects. The questionnaire is characterized by confirmed validity and reliability (stability, according to the test-retest method, of at least .92; split-half reliability of at least .82; discriminating power ranging from .40 to .90) (Siek, 1983). The Rumination-Reflection Questionnaire used is a Polish adaptation of the 13-item version (Carter, 2010) of the Rumination-Reflection Questionnaire (Trapnell, Campbell, 1999). The questionnaire is characterized by confirmed reliability (Cronbach's α equals .77 for Rumination and.79 for Reflection), stability (r = .91 for Rumination; r = .94 for Reflection) and validity (Radoń, 2014).

PSYCHOMETRIC PROPERTIES OF THE POLISH ADAPTATION

The psychometric properties of the Polish adaptation were verified by estimating the discriminating power of the test in the first phase, and then its reliability. Further phases included an assessment of fit of the empirical data obtained to the original theoretical model, completed using confirmatory factor analysis (CFA). The differential and convergent validity of the FFMQ were assessed in the final phase.

Discriminating Power

The discriminating power of a test item represents the extent to which the item differentiates the survey population in terms of a measured trait. It is expressed by the coefficients of correlation of individual test items with the result obtained for a test subscale. The fourfold point correlation coefficient was used (with an acceptable index exceeding .70) to calculate the discriminating power of the FFMQ. The correlations obtained were characterised by very strong statistical significance ($p < .001$), and were high (exceeding .70) or very high (at least .90). This confirms the good discriminating power of the test.

The Reliability of the FFMQ

The reliability of the FFMQ was estimated on the basis of the results obtained in survey groups, using the internal consistency method. Internal consistency was assessed using Cronbach's α coefficient.

Table 1
Descriptive Statistics and Internal Consistency Coefficients of the Polish Version of the FFMQ (SSA Sample)

Scale	*M*	*SD*	Skewness	Kurtosis	Cronbach's α
Nonreact	2.93	1.16	0.01	-0.41	.66
Observe	3.52	1.18	-0.05	-0.59	.73
Actaware	3.14	1.10	-0.03	-0.55	.79
Describe	3.09	1.09	0.03	-0.38	.74
Nonjudge	3.11	1.20	-0.17	-0.17	.86

Table 2
Descriptive Statistics and Internal Consistency Coefficients of the Polish Version of the FFMQ (PUJP2 Sample)

Scale	*M*	*SD*	Skewness	Kurtosis	Cronbach's α
Nonreact	2.89	0.58	-0.20	1.80	.65
Observe	3.07	0.67	-0.34	0.63	.71
Actware	3.30	0.66	0.18	0.41	.76
Describe	3.24	0.67	0.19	-0.12	.80
Nonjudge	3.23	0.71	0.36	0.47	.79

An analysis of the statistical results revealed that the distribution of results did not deviate from normal (a Shapiro-Wilk test; the skewness was minimal except for the Nonjudge scale, and the kurtosis was slightly higher but also acceptable). No differences were identified in the degree of mindfulness between the male and female populations (except for the Nonreact scale in the PUJP2 sample in which males scored an average of 3.07 and females – of 2.76; $t = 2.427$, $p = .017$). The values of reliability coefficients (Tables 1 and 2) are basically acceptable (from .73 to .86 for the SSA sample; from .71 to .80 for the PUJP2 sample) except for the Nonreact scale, where Cronbach's α values, .66 for the SSA sample and .65 for the PUJP2 sample, are below the acceptable limit of .70 (however, similar results were obtained in an Austrian research project – see Tran et al., 2013). Although the values of reliability coefficients are acceptable, save for one exception, they are slightly weaker than those obtained using the original FFMQ scale (from .75 to .91 – see Baer et al., 2006, 2008).

The Validity of the Polish Adaptation

The theoretical validity of the test was verified using confirmatory factor analysis (CFA). The one-, five-facet nonhierarchical and hierarchical models were tested, as well as four-facet nonhierarchical and hierarchical models with the Observe scale excluded. In the final phase, considering the revealed low reliability of the Nonreact scale, the validity the of four-facet models (nonhierarchical and hierarchical) was verified excluding the Nonreact scale (Tables 3 and 4, Figures 1 and 2).

Table 3
Goodness-of-Fit Indices of the Polish Version of the FFMQ (SSA Sample)

Model	CMIN/*df*	GFI	AGFI	CFI	RMSEA	PCLOSE
1-factor	2.04	.67	.58	.54	.08	.30
4-factor without OB	2.08	.91	.90	.89	.04	.33
4-factor hierarchical without OB	2.09	.93	.91	.91	.04	.67
4-factor without NR	1.89	.11	.66	.69	.08	.00
4-factor hierarchical without NR	1.85	.74	.77	.69	.08	.00
5-factor	1.12	.83	.81	.58	.04	.35
5-factor hierachical	2.12	.67	.71	.44	.04	.97

Note. GFI – goodness-of-fit index; AGFI – adjusted goodness-of-fit index; CFI – comparative fit index; RMSEA – root mean square error of approximation; PCLOSE – test of closeness of fit.

Analyses of CFA indicators revealed that the one-facet model, the two five-facet models, the hierarchical four-facet model with the Observe scale excluded, and the two four-facet models with the Nonreact scale excluded were not valid. Only the four-facet hierarchical models with the Observe scale excluded were valid for both survey samples (the indices of fit to empirical data were poor but acceptable, and slightly better in the PUJP2 sample). It should be emphasised that the remaining models turned out not to be valid, but the confirmatory factor analysis indicators for the older group (PUJP2) were close to the acceptability threshold (CMIN/*df*, GFI, AGFI, RMSEA and PCLOSE).

Table 4
Goodness-of-Fit Indices of the Polish Version of the FFMQ (PUJP2 sample)

Model	CMIN/*df*	GFI	AGFI	CFI	RMSEA	PCLOSE
1-factor	1.70	.88	.83	.66	.07	.04
4-factor without OB	2.01	.91	.90	.89	.04	.80
4-factor hierarchical without OB	2.08	.94	.91	.91	.04	.99
4-factor without NR	2.12	.91	.89	.89	.04	.99
4-factor hierarchical without NR	2.04	.90	.89	.85	.05	.90
5-factor	2.05	.89	.87	.84	.04	.99
5-factor hierachical	2.19	.88	.87	.82	.04	.99

Note. GFI – goodness-of-fit index; AGFI – adjusted goodness-of-fit index; CFI – comparative fit index; RMSEA – root mean square error of approximation; PCLOSE – test of closeness of fit.

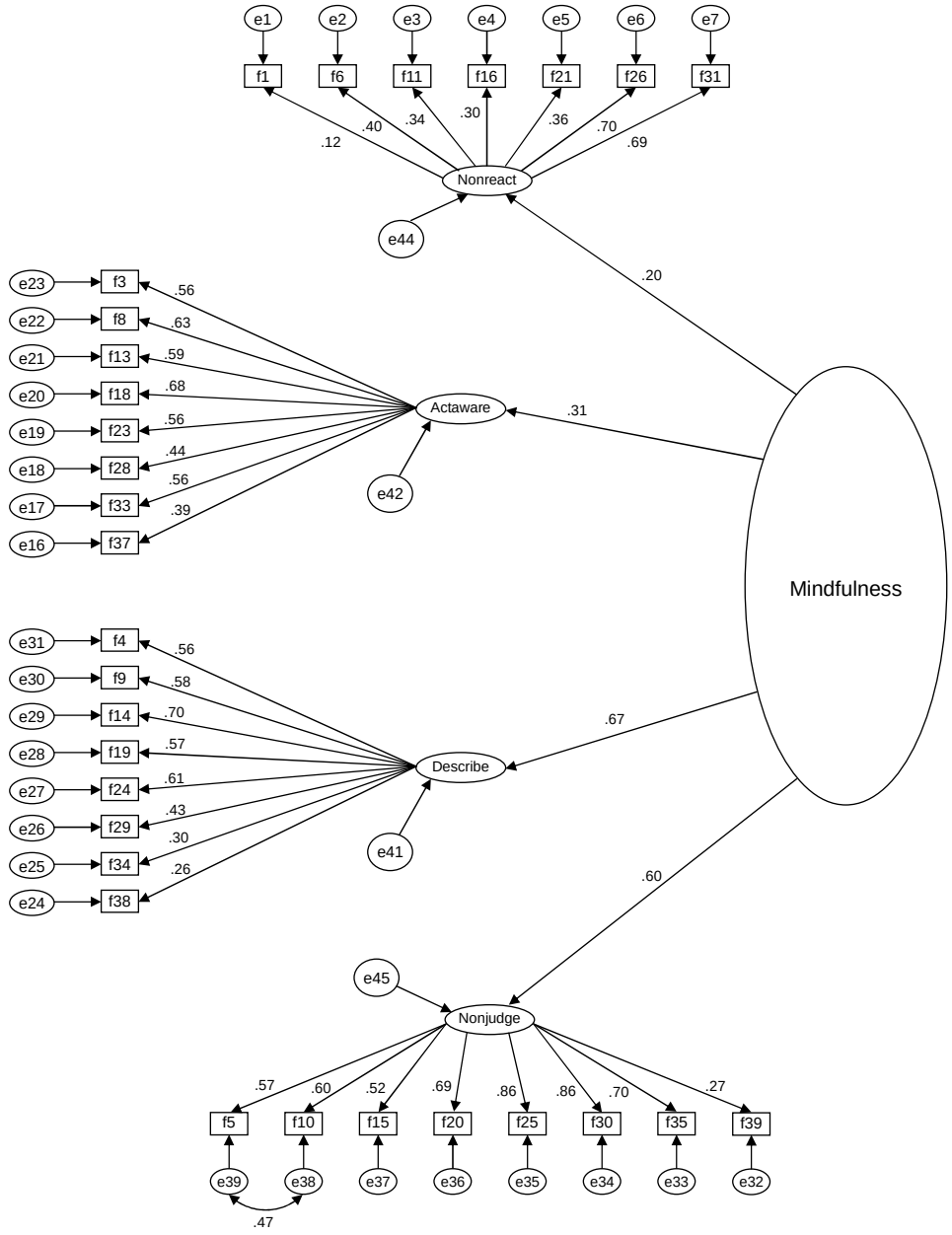

Figure 1. Confirmatory Factor Analysis of the Polish version of the FFMQ (SSA sample).

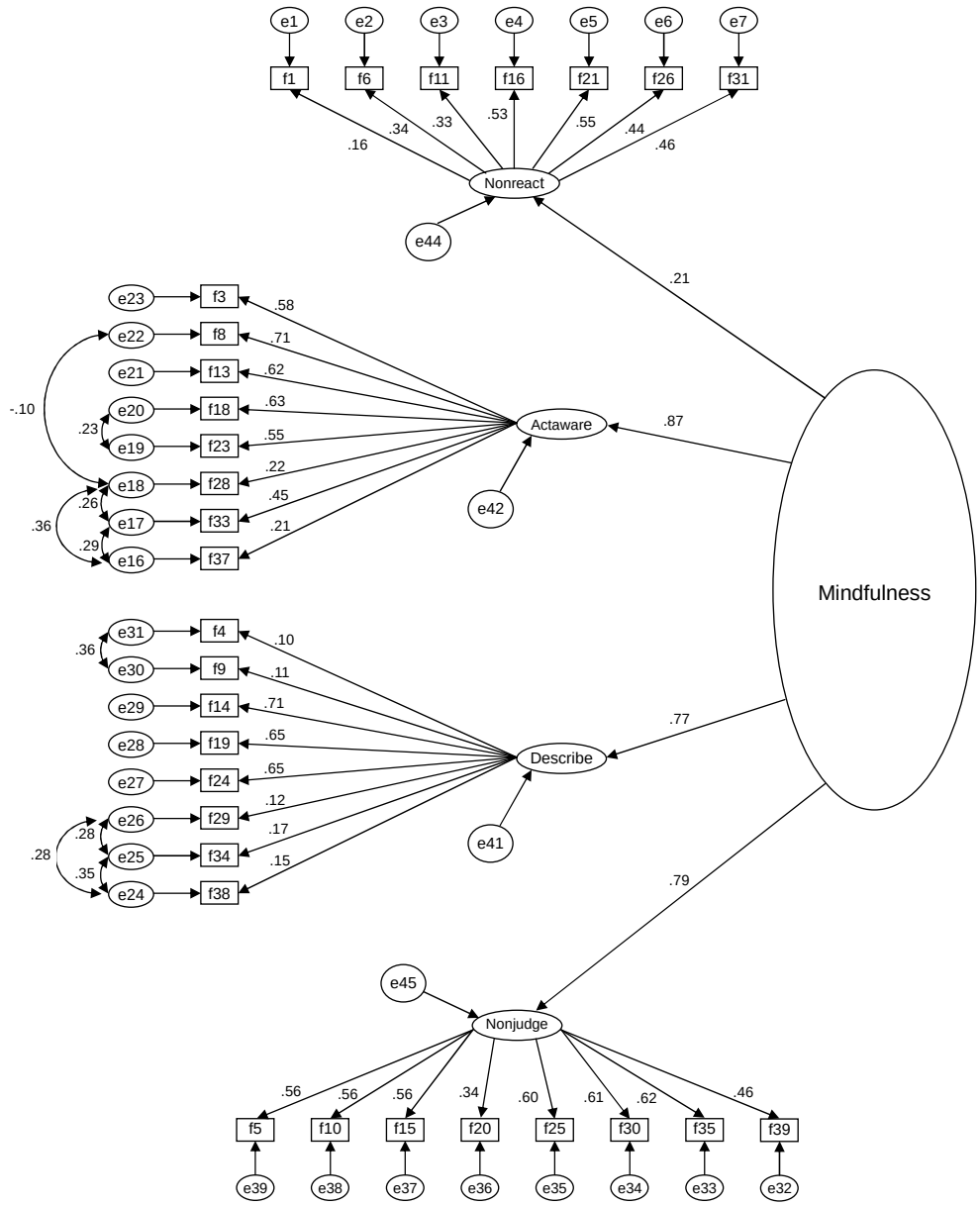

Figure 2. Confirmatory Factor Analysis of the Polish version of the FFMQ (PUJP2 sample).

The NEO-FFI Personality Inventory developed by Costa and McCrae (Neuroticism, Openness to Experience, Extraversion), Cattell's Self-Analysis Form (Emotional Stability) and the Rumination-Reflection Questionnaire (Rumination and Reflection) were used to examine external validity. It was assumed that individual factors would be negatively correlated (Baer et al., 2006; Brown & Cordon, 2009; Brown & Ryan, 2003; Brown et al., 2007) with neuroticism (NEO-FFI by Costa and McCrae), rumination (the Rumination-Reflection Questionnaire), and emotional instability (the Self-Analysis Form by Cattell), positively correlated with openness to experience (the NEO-FFI by Costa and McCrae), and unrelated to extraversion (the NEO-FFI by Costa and McCrae) and reflection (the Rumination-Reflection Questionnaire).

Table 5
Correlations Between Mindfulness and Selected Psychological Constructs

Predictable correlations	Nonreact	Observe	Actaware	Describe	Nonjudge
Negative					
Neuroticism	-.37**	-.31**	-.26**	-.29**	-.45**
Rumination	-.16*	-.35**	-.28**	-.11	-.27**
Emotional Instability	-.35**	-.33**	-.35**	-.37**	-.17
Positive					
Openess	.12	.29**	.45**	.37**	.43**
Not significant					
Reflection	.08	.38**	.09	.12	.08
Extraversion	.09	.14	.17	.09	.11

Note. * $p <= .05$; ** - $p <= .01$

The results of the correlation analysis of mindfulness with various psychological constructs (Table 5) confirmed the assumptions to a significant extent. Thus, it was demonstrated that all or almost all mindfulness factors were significantly and negatively correlated with neuroticism (from $r = -.26$, $p = .05$ for Actaware to $r = -.45$, $p = .01$ for Nonjudge), emotional instability (from $r = -.33$, $p = .01$ for Observe to $r = -.37$, $p = .01$ for Describe) and rumination level (from $r = -.16$, $p = .05$ for Nonreact to $r = -.35$, $p = .01$ for Observe). Furthermore, all or almost all mindfulness factors were significantly and positively correlated with openness to experience (from $r= .29$, $p = .01$ for Observe to $r = -.45$, $p = .01$ for Actaware) and were unrelated to extraversion and reflection (save for one

exception, where a positive correlation with Observe was noted, $r = 38$, $p = .01$). In certain instances, relations inconsistent with the assumptions were observed – that is, rumination unrelated to the Describe facet, emotional instability unrelated to the Nonjudge facet, openness to experience unrelated to the Nonreact facet, and a positive correlation between reflection and the Observe facet ($r = .38$, $p = .01$).

Table 6
Intercorrelations Among FFMO Factors

Scale	Nonreact	Observe	Actaware	Describe	Nonjudge
Nonreact	–	.17**	-.02	.12*	-.01
Observe	.17**	–	-.04	.23**	-.07
Actaware	-.02	-.04	–	.28**	.50**
Describe	-.12*	.23**	.28**	–	.27**
Nonjudge	-.01	-.07	.50**	.27**	–

Note. * $p <= .05$; ** $p <= .01$

Statistical correlations between individual mindfulness factors were examined in the final phase of the project. The analysis of relations between these factors (Table 6) suggests that correlations between them are basically weak or moderate (from $r = .12$ at $p = .05$ to $r = .28$ at $p = .01$; in one instance, namely the correlation between Actaware and Nonjudge, $r = .50$ at $p = .001$) and similar to the original scale in its English version (from $r = .15$ at $p = .05$ to .34 at $p = .01$). Certain scales were unrelated (no significant correlations with two scales in each case, except the Describe scale, which was significantly correlated with each of the mindfulness scales).

DISCUSSION OF RESULTS

To summarize, it may be concluded that the Polish adaptation of the FFMQ is a promising instrument regarding its reliability (the accuracy of measurements of the mindfulness trait) and validity (it measures what it claims to measure). It should be emphasised that the validity and reliability of the examined instrument were confirmed not only for an adult population (aged 20-50) but also for young people (aged 15-19). The results obtained revealed the interesting fact that the

reliability of the test was slightly better in the younger group than in the older one (the differences were minimal but visible).

The discrepancies in reliability and validity measures revealed during this research project do not significantly differ from those obtained in other projects. It must be emphasized that the demonstrated low reliability of one of the scales – Nonreact – was also confirmed by other projects (the Austrian validation – Tran et al., 2013). In addition, as demonstrated by the results of other projects (Baer, Carmody, & Hunsinger, 2012, p. 758), the reliability measures of mindfulness facets seem to be very sensitive to the meditation experience of survey participants. In samples with limited meditation experience, Cronbach's α coefficients for individual mindfulness factors may be relatively low, starting even from .60, but they grow to .90 and more with the increase in meditation experience or participation in therapeutic practices based on mindfulness techniques (in this project, their values ranged from .65 to .86). Therefore, in research conducted in certain samples, reliability coefficients slightly lower than .70 may be regarded as acceptable (the measure of meditation experience was not controlled, so the hypothesis requires further confirmatory tests). Thus, it may be assumed that the psychometric reliability of the validated test in both nonclinical samples seems to be acceptable (the test is suitable for assessing mindfulness skills in a reliable manner).

This project also revealed a lack of fit between the empirical data and the five-facet mindfulness model that found the firmest empirical support under other conditions (in the older sample, the five-facet model was close to the acceptability level). This result is confirmed by numerous other validation projects in which the lack of fit between this model and empirical data was demonstrated (Cebolla et al., 2012; Hou et al., 2013; Tran et al., 2013; Veehof et al., 2011).

On the other hand, this project confirmed a good fit of the empirical data with the noncorrelated four-facet model (poor but acceptable fit indices) with the isolated Observe scale. It must be emphasised here that the poor fit of empirical data obtained in this project does not differ from those obtained in other validation projects (in particular the Austrian one – see Tran et al., 2013), which revealed a similar level of fit. The results probably indicate the need to introduce significant modifications in the test, namely to shorten it by limiting the number of items. This proposal is supported by the results of recent validation tests (24 or even 20 items are proposed instead of 39 – see Bohlmeijer, Klooster, Fledderus, Veehof, & Baer, 2011; Tran et al., 2013) and other research projects.

Considering the conclusions drawn from other research projects (Baer et al., 2006, 2008), it is suggested that the validity of the noncorrelated four-facet

model revealed in this project may result from the broad range of meditation experience in the participants (i.e., they may indicate advanced meditation skills; for significant correlations between creativity and frequent occurrence of mystical experiences in the younger survey sample – see Radoń, 2010; the choice of a Catholic university by the individuals from the older sample indicates an inclination to meditate). The results of this and other research projects indicate that in the case of individuals with advanced meditation skills the hierarchical five- or four-facet model, with all facets regarded as determinants of one principal factor of mindfulness, is characterized by better validity indices. The level of advancement in meditation was not controlled in this project; consequently the above statement should be regarded as a mere hypothesis.

The discrepancies in the fit of empirical data to various mindfulness models, as confirmed by numerous validation projects, may result from a wide variety of reasons, such as varying conceptualizations of mindfulness, varying models, cultural differences, or advancement in meditation skills. At the present stage of research on mindfulness, the validity of its competing models is still being discussed, and the models themselves require a considerable amount of work to become precise (Baer et al., 2006, 2008; Tran et al., 2013):

1) other tests designed to measure mindfulness assume and confirm the one-dimensional nature of the mindfulness construct;

2) there are low correlations between FFMQ factors (originally from .15 to .34);

3) some research projects confirm the validity of a hierarchical model, others confirm the validity of a nonhierarchical model; some successfully validate the four-facet model while others validate the five-facet model.

The relations between mindfulness and other psychological constructs determined in this project reveal that all (or almost all) mindfulness facets, in accordance with the theoretical assumptions underlying the mindfulness model (Baer et al., 2006; Brown & Cordon 2009; Brown & Ryan 2003; Brown et al., 2007), are negatively correlated with the degree of neuroticism, emotional instability, impulsivity, and rumination and positively correlated with openness to experience. This result confirms to a significant extent the external validity of the test. It may also indirectly confirm the salutogenic role of mindfulness, confirmed on numerous occasions (improved mental health, quality of life, and general well-being – see Brown & Ryan, 2003; Kabat-Zinn, 1990; Lynch et al., 2006; Shapiro et al., 2006).

The discrepancies in external validity revealed in this project (on the one hand, the lack of expected correlations between individual mindfulness facets

and neuroticism, emotional instability, rumination, and openness to experience and, on the other hand, no intercorrelations between certain mindfulness facets), considering their marginal nature (isolated discrepancies), presumably do not compromise the fundamental value of the validated test. The revealed lack of correlations may result to a significant extent from the structural assumptions underlying the model (the essential statistical assumption in the model is a maximum reduction of covariance between individual facets).

Particular attention should be paid to the unexpected positive and very significant correlation that was found between reflection and one of the mindfulness facets, Observe. Taking into account the results of other validation projects that analyzed reflection and, principally, its correlations with openness to experience (Trapnell & Campbell, 1999), it should be concluded that the occurrence of positive correlations with certain mindfulness facets (with Observe in this project) may result from assumptions underlying the reflection-rumination model: reflection is positively correlated with openness to experience, which in turn is correlated with mindfulness.

Finally, it should be stated that the Polish adaptation of the FFMQ, despite its low indices of reliability and theoretical validity, is a valuable instrument and may be successfully used to conduct surveys in samples of individuals aged 15–50 from non-clinical populations. However, further validation of the test in clinical samples and in samples with controlled meditation experience is recommended. Validation of short FFMQ forms should also be conducted.

Research projects in other groups of participants should also be carried out in the future to determine whether the reason for low reliability and poor fit to the theoretical model lies in survey sample selection, cultural conditions, religious peculiarities, lack of meditation skills, or other psychological factors. Very interesting results could be obtained by surveying subjects advanced in meditation, with various backgrounds (not necessarily mindful individuals, but with tests measuring mindfulness used). Comparative studies (meditating vs. nonmeditating samples) would be scientifically valuable and might determine the effect of training duration and meditation quality on the results obtained in questionnaire scales. Further research into neuroimaging is recommended (structural changes in the brain, electrical, functional and hormonal activity of various brain regions) with particular attention paid to measurements of various mindfulness submechanisms, using psychometric instruments designed for this purpose, prior to, during, and after meditation.

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