

# Psychometric Characteristics of Lithuanian Version of Multidimensional Assessment of Interoceptive Awareness (MAIA<sup>LT</sup>)

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**Summary.** *Background.* The *Multidimensional Assessment of Interoceptive Awareness* (MAIA) is a questionnaire that enables to assess the awareness of bodily sensations in the most precise way of all currently existing tools.

*Materials and methods.* In this paper, the Lithuanian version of the questionnaire, MAIA<sup>LT</sup>, was examined by means of reliability and validity in a sample of 386 subjects aged 17–30 years (49% were females).

*Results.* The results revealed acceptable reliability as internal consistency (i. e. Cronbach's alpha = 0.7) in five out of eight scales: Attention Regulation, Emotional Awareness, Self-regulation, Body Listening, and Trusting. The Not-worrying scale had questionable reliability (i. e. Cronbach's alpha = 0.6). However the Noticing and Not-distracting scales had poor and unacceptable reliability. Confirmatory factor analysis showed that MAIA<sup>LT</sup> questionnaire of the remaining six scales had acceptable structure.

*Conclusions.* Six out of eight scales of the current version of MAIA<sup>LT</sup> questionnaire had sufficient psychometric properties. We conclude that the current version of MAIA<sup>LT</sup> questionnaire may require additional adaptation steps before its use in professional psychologists' practice. However, we encourage its use for the scientific purposes.

**Keywords:** interoception questionnaire, body awareness, mind-body, gender.

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**Abbreviations:** MAIA – Multidimensional Assessment of Interoceptive Awareness, RMSEA – Root Mean Square Error of Approximation, SRMR – Standardized Root Mean square Residual, IFI – Incremental Fit Index, CFI – Comparative Fit Index.

## BACKGROUND

Bodily sensations can be divided into two major categories – interoceptive and proprioceptive sensations. The interoception refers to the processing of information originating inside the body either consciously or unconsciously [1]. It includes sensations such as pain, touch, temperature

[2]. The interoception helps maintaining homeostasis and adapting to the changing environment. Therefore, the interoception has an influence on emotions, motivation, behaviour, cognitive processes and, potentially, on self-representation [3]. Although a construct of interoception is often represented as unimodal, the newer tendencies are to treat it as a quality having different aspects. For example, it is already well known that interoceptive awareness (i. e. what one thinks about his or her sensations) and interoceptive accuracy (i. e. how one is accurate while tracking his or her sensations, e. g. counting heartbeats without taking pulse) are different entities, often even not positively correlated in between [4, 5].

Previously, in Western medicine, psychiatry and psychodynamic psychology, the enhanced awareness of bodily sensations or “paying too much attention to them” were considered to be strongly connected with severe physical or emotional issues. The bodily sensations were defined as distressful feelings and there was a tendency to interpret them as symptoms of various somatic diseases, anxiety disorders etc. [6, 7]. The current view differs in the way that the awareness of bodily sensations is beneficial to

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### Adresas:

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one's health: the body-mind relation enhancing practices may aid in treating different somatic and psychical illnesses. By this account, the body awareness and the technique of mindfulness (i. e. an awareness and acceptance of the moment without making any judgements or trying to analyse what is happening) are underlined [6, 8, 9]. Researches of interoception may deepen the understanding of the decision-making process in humans [10, 11], reaction to pain and its tolerance [12, 13], and point to a possible solution for the addiction-linked behaviours [2]. The variety of interoception-related areas of interest creates an urge to seek for tools to assess this construct.

Mehling et al. [1] performed a database search for bodily awareness tools. 39 questionnaires were found in total. Authors excluded those questionnaires that evaluated exclusively anxiety and emotions (without attention to the corresponding physical sensations), self-consciousness, and body image or self-objectification; they also excluded instruments that used observer rating only. None of the remaining 12 questionnaires met the criteria for a desired interoception tool, i. e. they: a) did not cover important aspects of bodily awareness; b) did not allow differentiation between an adaptive and maladaptive awareness; c) did not meet basic psychometric requirements.

After finding no suitable comprehensive tool for the evaluation of bodily senses, Mehling et al. created new questionnaire, the *Multidimensional Assessment of Interoceptive Awareness* (MAIA) [6]. To date, MAIA seems to be the only questionnaire that enables to evaluate interoceptive awareness in a detailed manner. MAIA is allowed for translation and use without any payment or written permission from its authors. MAIA is already translated into Brazilian Portuguese, Dutch, French, German, Hebrew, Hungarian, Italian, Japanese, Persian, Polish, Spanish, Swedish, and also into Lithuanian.

At the moment, there are six articles available containing psychometrics of MAIA's validity and reliability: two on the original English MAIA version and four on its translations into different languages. For the original MAIA version, in the first article, the sample consisted of 325 subjects, about half of them were highly experienced as instructors of mind-body therapies with at least five years of teaching experience (mean age 53.1 years, SD=10.5 years), others were less experienced instructors or clients of body awareness-enhancing therapies (mean age 42.2 years, SD=11.5 years) [6]. In the second article, the sample consisted of 435 primary care patients (mean age 54 years, SD=12 years) with current or past lower back pain complaints [14]. The German sample consisted of 1076 participants (mean age 38.7 years, SD=9.3 years; age range from 18 to 59 years); the majority of them filled the questionnaire on the internet [15]. The Spanish version sample included 470 Chilean participants (mean age 30.5 years, SD=10.6 years; age range from 18 to 70 years) from general population [16]. The Polish version was explored in a sample of 75 females (mean age 41 years, SD=12 years); about half of them had practiced fitness for at least of 1.5 year [17]. The Italian version was assessed in

a sample of 321 healthy Italian psychology students (mean age 20.5 years, SD=0.9 years; age range from 19 to 27 years) [18].

**The validity of the constructs** was proved in several ways. The content validity was proved by confirmatory factor analysis [6, 14–16, 18]. The criterion validity was proved 1) by estimation of connections with other similar questionnaires and 2) by showing no connection with non-related questionnaires. In particular, the MAIA scales positively correlated with scales for evaluating aspects of mindfulness or body sensations from the following questionnaires: Five Factor Mindfulness Questionnaire (FFMQ), Body Consciousness (BCQ) and Body Responsiveness Questionnaire (BRQ) [6, 15]. Moreover, the score of Not-worrying scale showed negative correlation or no correlation with the questionnaires or separate scales from questionnaires designed to evaluate anxiety as a state or a trait [6, 14, 15].

**The reliability** was found to be high for five to six of eight MAIA scales in existing articles on MAIA psychometrics. However, reliability as internal consistency is questionable or poor for Not-distracting, Not-worrying scales and Noticing scale [6, 14, 16–18]. The German validation article additionally included test-retest reliability: for the different scales, it ranged from 0.66 to 0.79 [15].

One of the limitations of earlier MAIA studies is the fact that the above mentioned MAIA psychometrics were obtained from females-dominated samples: 79% of females in original investigation on MAIA validation [6], 100% in Polish study [17], 91.3% in Italian [18], 76.6% in Chilean [16], and 67.9% in German sample [15].

## OBJECTIVE

The aim of this study was to assess the psychometric properties of Lithuanian MAIA translation in Lithuanian speaking 17–30 years-old population.

## METHODS

### The MAIA questionnaire

The MAIA questionnaire consists of 32 items that are grouped into 8 scales. The scales are created to identify the following aspects: 1) *Noticing* – awareness of uncomfortable, comfortable, and neutral body sensations; 2) *Not-distracting* – tendency not to ignore or distract oneself from sensations of pain or discomfort; 3) *Not-worrying* – tendency not to worry or experience emotional distress with sensations of pain or discomfort; 4) *Attention Regulation* – ability to sustain and control attention to body sensations; 5) *Emotional Awareness* – awareness of the connection between body sensations and emotional states; 6) *Self-regulation* – ability to regulate distress by attention to body sensations; 7) *Body Listening* – active listening to the body for

Table 1. The descriptive statistics of MAIA<sup>LT</sup> scales

Scale (Questions)	Interquartile range	Skewness	Kurtosis	Minimum	Quartile 1	Median	Quartile 3	Maximum
Noticing (1-4)	1.00	-0.71	0.50	0.50	3.00	3.50	4.00	5.00
Not-distracting (5-7)	1.00	0.20	0.22	0.00	1.67	2.00	2.67	5.00
Not-worrying (8-10)	1.33	0.20	-0.31	0.00	1.67	2.33	3.00	5.00
Attention Regulation (11-17)	1.14	-0.20	0.02	0.43	2.29	2.86	3.43	5.00
Emotional Awareness (18-22)	1.20	-0.69	0.61	0.00	2.80	3.40	4.00	5.00
Self-regulation (23-26)	1.50	-0.15	-0.36	0.00	1.75	2.50	3.25	5.00
Body Listening (27-29)	1.67	-0.02	-0.56	0.00	1.33	2.33	3.00	5.00
Trusting (30-32)	1.67	-0.85	0.76	0.33	3.00	4.00	4.67	5.00

insight; 8) *Trusting* – experience of one’s body as safe and trustworthy. The answers are given on a Likert scale from 0 (never) to 5 (always). The score of the scale is counted by averaging the scores of items belonging to each scale. Scores for items from 5 to 9 have to be reversed.

**The MAIA translation**

The Multidimensional Assessment of Interoceptive Awareness was translated from English into Lithuanian independently by the researchers, i. e. MB and AG, and also by the translation office. During the next step, researchers had a discussion with the purpose to choose the most proper forms of items with regard to the definition of each construct described in the MAIA authors’ article [6] and the comments in the article about MAIA translation into Spanish [16]. When encountering inconsistencies, the investigators also looked through the French version of the MAIA. Finally, consultations with the authors of MAIA via email concerning the proper translation of some items were arranged. After the preparation of the first translation of the questionnaire, a pilot research was performed in a sample of 32 students of kinesiotherapy at Vilnius University. The students were asked to identify those items that were difficult to understand or that might have different meanings and to evaluate the overall understandability of the questionnaire. The students rated the MAIA as overall understandable and easy to fill in. The filling procedure lasted around five minutes. However, the pilot research revealed that three of 32 items were less understandable among students and were adjusted accordingly. The translated MAIA version preserved the structure of the original questionnaire. The final Lithuanian MAIA version was approved by the MAIA authors and they placed it on the website together with the translations into other languages: [www.osher.ucsf.edu/maia/](http://www.osher.ucsf.edu/maia/)

**Participants**

For the validation of the MAIA<sup>LT</sup>, 386 subjects (49% female), aged 17–30 years (M=21.19, SD=2.31) filled in the questionnaire. The majority of the participants were students (biomedical sciences, humanitarian sciences, physical sciences, social sciences, technological sciences and arts). The years of their education ranged from 10 to 24 (M=14.9, SD=1.9). Participants spent the largest part of

their lives in different places of Lithuania: 18% – in a village, 46% – in a town and 35% – in a city.

**Statistical analysis**

Cronbach’s alpha was calculated to evaluate reliability, in particular, internal consistency reliability. The reliability of the scale at Cronbach’s alpha =0.7 was considered acceptable. Confirmatory analysis was performed using *cfa* and *sem* extensions for R statistics package. The fitness of confirmatory factor analysis was evaluated according to RMSEA, SRMR (a good value is 0.05, and acceptable value is 0.08), IFI and CFI (a good value is 0.95, and acceptable value is 0.90) [19]. Significance level was set at p=0.05.

**RESULTS**

As indicated by Shapiro-Wilk test the majority of ratings of the items and scales were not normally distributed. Although the data did not fit normal distribution, the modules of kurtosis and skewness of the scores on items did not exceed 1.0 with the exception of question 32 (though both kurtosis and skewness did not exceed interval from -1.5 to 1.5). In addition, answers to every question contained all possible six values. The descriptive statistics of the MAIA<sup>LT</sup> scales is presented in Table 1.

The **reliability** as the internal consistency of MAIA<sup>LT</sup> was acceptable (i. e. Cronbach’s 0.7) for five out of eight scales – Attention Regulation, Emotional Aware-

Table 2. The reliability as internal consistency of MAIA<sup>LT</sup> scales (Cronbach’s alpha)

Scale (Questions)	Cronbach’s alpha
Noticing (1-4)	0.549
Not-distracting (5-7)	0.409
Not-worrying (8-10)	0.632
Attention Regulation (11-17)	0.799
Emotional Awareness (18-22)	0.734
Self-regulation (23-26)	0.794
Body Listening (27-29)	0.810
Trusting (30-32)	0.820

ness, Self-regulation, Body Listening and Trusting – and questionable reliability for Not-worrying scale ( $0.7 > 0.6$ ) (see Table 2). The lowest reliability was observed for Not-distracting and Noticing scales.

For the evaluation of **validity** of the MAIA structure, confirmatory factor analysis was performed after rejection of Not-worrying and Trusting scales. Confirmatory factor analysis showed that six factors (remaining scales) solution provided an adequate fit to the data ( $\chi^2=760.91$ ,  $df=260$ ,  $p<0.001$ ;  $RMSEA=0.072$  and  $SRMR=0.072$ , thus these two fit indices were acceptable ( $< 0.08$ ), also  $IFI=0.852$  and  $CFI=0.850$ , thus these two fit indices were almost acceptable).

## DISCUSSION

The study aimed at the translation of the MAIA questionnaire into the Lithuanian language and assessment of its psychometric characteristics.

The Lithuanian version of MAIA has comparable psychometric characteristics to English, German, Polish, Italian and Spanish versions. We obtained acceptable reliability as internal consistency (Cronbach  $0.7$ ) for Attention Regulation, Emotional Awareness, Self-regulation, Body Listening and Trusting scales, questionable reliability for Not-worrying scale ( $0.7 > 0.6$ ), poor reliability for Noticing scale ( $0.6 > 0.5$ ), and unacceptable reliability for Not-distracting scale ( $< 0.5$ ). Note that these five scales had acceptable or good reliability in all previous MAIA studies [6, 14–18]. Not-distracting scale consistently was reported to have the lowest reliability as internal consistency across almost all versions of the MAIA [6, 14, 15, 17, 18].

It is worth noting however, that the answers to the questionnaire might depend on how much experience in body awareness-enhancing practices participants had. In contrast to our study, in the initial study by MAIA authors, all participants had prior skills in body awareness-enhancing practice. Bornemann and colleagues [15] found, that 3-months interoceptive training improved five out of eight aspects of interoceptive awareness, compared to a retest control group. Current version of MAIA is not excellent, but can capture the aspects of interoceptive awareness including adaptive and maladaptive features [6]. Several limitations of our study should be mentioned. First of all, we enrolled a sample of young adults (17–30 years) and it remains unclear how the results would look like in a broader population. Further studies should determinate MAIA<sup>LT</sup> psychometric characteristics after inclusion of more specific population, e. g. practitioners of body awareness-enhancing therapies, clinical patients. According to the regulations [20], criteria of psychological assessment tools are milder for those being used in scientific research, in comparison to those that are used in psychologist's practice; thus we consider MAIA<sup>LT</sup> as suitable for use in research, not for use in practice.

## CONCLUSIONS

The reliability as the internal consistency of MAIA<sup>LT</sup> was acceptable (i. e. Cronbach's  $0.7$ ) for Attention Regulation, Emotional Awareness, Self-regulation, Body Listening and Trusting scales, and questionable (i. e. Cronbach's  $0.6$ ) for Not-worrying scale; and the MAIA<sup>LT</sup> structure of these six scales is acceptable based on the confirmatory factor analysis. We conclude that the current version of MAIA<sup>LT</sup> questionnaire may require additional adaptation steps before its use in professional psychologists' practice. However, we encourage its use for the scientific purposes.

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## LIETUVIŠKOSIOS DAUGIAMAČIO INTEROCEPCINIO ĮSISĄMONINIMO KLAUSIMYNO (MAIA<sup>LT</sup>) VERSIJOS PSICHOMETRINĖS CHARAKTERISTIKOS

### Santrauka

*Įvadas.* Daugiamatnio interocepinio įsisąmoninimo klausimynas (MAIA<sup>LT</sup>) leidžia išsamiausiai įvertinti kūno pojūčių įsisąmoninimo aspektus.

*Tiriamieji ir tyrimo metodai.* Į lietuvių kalbą išversto MAIA klausimyno patikimumas ir validumas įvertintas apklausus 17–30 m. amžiaus 386 žmones (moterų 49 %).

*Rezultatai.* MAIA<sup>LT</sup> patikimumas pagal vidinį suderinamumą yra geras (Kronbacho alfa 0,7) penkioms iš aštuonių skalių: „dėmesio reguliavimo“, „emocinio įsisąmoninimo“, „savireguliacijos“, „įsiklausymo į kūną“ ir „pasitikėjimo“. „Nesijaudinimo“ skalės patikimumas yra abejotinas (Kronbacho alfa 0,6). Tačiau „sensorinės pagavos“, „nepaisymo“ skalių patikimumas yra atitinkamai silpnas ir nepriimtinas, tad šios MAIA<sup>LT</sup> skalės neturėtų būti naudojamos. Patvirtinančioji faktorinė analizė leidžia teigti, kad likusių šešių MAIA<sup>LT</sup> skalių struktūra yra tinkama.

*Išvados.* Šešios iš aštuonių MAIA<sup>LT</sup> klausimyno skalių pasižymi pakankamomis psichometrinėmis charakteristikomis. Rekomenduotini papildomi adaptacijos žingsniai prieš naudojant klausimyną psichologinėje praktikoje. Antra vertus, esama MAIA<sup>LT</sup> versija gali būti taikoma moksliniuose tyrimuose.

**Raktažodžiai:** interocepcijos klausimynas, kūno pojūčių įsisąmoninimas, lytis.

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