

# Multidimensional Assessment of Interoceptive Awareness (MAIA)

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| <b>Title</b>          | Multidimensional Assessment of Interoceptive Awareness (MAIA)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Domain</b>         | Self-Regulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Type</b>           | Self-report                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Duration (min)</b> | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>    | <p>The Mindful Attention and Awareness Scale is a 32 item self-report measure composed of the following 8 subscales: Noticing: awareness of uncomfortable, comfortable and neutral bodily sensations; (ii) Not-Distracting: the tendency to not ignore or distract oneself from sensations of pain or discomfort; (iii) Not-Worrying: the tendency to not react with emotional distress or worry to sensations of pain or discomfort; (iv) Attention Regulation: the ability to sustain and control attention to bodily sensation; (v) Emotional Awareness: the awareness of the connection between bodily sensations and emotional states; (vi) Self-Regulation: the ability to regulate psychological distress by attention to bodily sensations; (vii) Body Listening: actively listening to the body for insight; and (viii) Trusting: experiencing one's body as safe and trustworthy.</p> <p>Individuals rate items based on a 6 point Likert scale from 0-5 with '0' indicating 'Never' and '5' indicating 'Always'. Total scores are obtained through reverse coding items 5, 6, 7, 8, 9 and summing all items. Sub-scale scores can be calculated and itemized descriptions are available free from the Osher Center for Integrative Mindfulness (OCIM) (<a href="https://www.osher.ucsf.edu/maia/">https://www.osher.ucsf.edu/maia/</a>).</p> <p>Higher total scores and subscale scores indicate higher levels of positive awareness.</p> <p>The primary purpose in developing the MAIA was to aid in delineating between beneficial versus maladaptive interoceptive attention; the latter being associated with hypochondriasis, somatization and anxiety disorders while adaptive attention has been widely associated with positive health outcomes and enhanced resilience. Since its inception in 2012 the MAIA has been translated into 16 languages and implemented extensively in both cross sectional and longitudinal studies.</p> <p>The MAIA is available free from the University of California OCMI webpage at (<a href="https://www.osher.ucsf.edu/maia/">https://www.osher.ucsf.edu/maia/</a>)</p> |
| <b>OSF Link</b>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

Adult/Child

adult

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|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Computerized                             | computerized                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Identified                               | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Identified Description                   | <p>Due to minimal consensus concerning the concept and measurement of 'body awareness', or interoceptive attention, authors of the MAIA describe an iterative process to identify core constructs/framework for this measure: (a) the creation of general framework and item pool using existing expertise and literature reviews (b) using a series of 2 focus groups gathering feedback from instructors, patients and experts to review the conceptual items and (c) analysis of results and revision of the conceptual framework. The final model includes 5 dimensions and 13 sub-dimensions. The 5 overarching dimensions are:</p> <p>Awareness of body sensations: includes awareness of negative, positive, and neutral sensations. Emotional reaction and attentional response to sensations.</p> <p>Capacity to regulate attention: various ways of controlling one's attention as an active regulatory process.</p> <p>Trusting body sensations &amp; beliefs about importance of sensations: reflects the extent to which one views awareness of bodily sensations as helpful for decision making or health.</p> <p>Mind body integration: viewed as an overarching goal of mind-body therapies.</p> <p>Each of these dimensions, excluding awareness of body sensations has associated sub-dimensions. For more information regarding the dimensions, sub-dimensions, and creation of the framework please refer to the reference supplied.</p> |
| Identified Supporting Documentation      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Identified PMCID, PUBMED ID, or CITATION | <p>Text Citation: Mehling, W. E., Price, C., Daubenmier, J. J., Acree, M., Bartmess, E., &amp; Stewart, A. (2012). The Multidimensional Assessment of Interoceptive Awareness (MAIA). PLoS ONE, 7(11), e48230. <a href="http://doi.org/10.1371/journal.pone.0048230">http://doi.org/10.1371/journal.pone.0048230</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Measured                                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Measured Description                     | <p>The internal consistencies in initial psychometric testing for the English MAIA ranged from .66-.82 with 5 of the 8 sub-scales showing un-standardized alpha's &gt;.70. In addition, confirmatory factor analyses resulted in good model fit for the 8 factor model of the scale (CFI=.886).(Mehling et al 2012)</p> <p>Concerning convergent and discriminant validity the MAIA has been rigorously tested in conjunction with numerous questionnaires<sup>1</sup>. The English version has included: Revised NEO Personality Inventory; Checklist Generalized Anxiety Disorder; Checklist Panic Disorder; Checklist Social Anxiety Symptoms; Checklist Obsessive Compulsive Disorder Symptoms; Defense Style Questionnaire; Toronto Alexithymia Scale; Glasgow Sensory Questionnaire; Somatosensory Amplification Scale; Autism Quotient; Pain Catastrophizing Scale; Attachment styles by</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

Experiences in Close Relationships Revised; Demographics of Adverse Childhood Experiences Study; Spielberger State-Trait Anxiety Inventory; Beighton clinical exploration of hypermobility (Mehling et al 2016).

For information regarding the internationally validated versions please refer to the studies cited below and the webpage (<http://www.osher.ucsf.edu/maia/>):

| Measured<br>Supporting<br>Documentation         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measured<br>PMCID,<br>PUBMED ID, or<br>CITATION | <p>Text Citation: Mehling, W. E., Price, C., Daubenmier, J. J., Acree, M., Bartmess, E., &amp; Stewart, A. (2012). The Multidimensional Assessment of Interoceptive Awareness (MAIA). PLoS ONE, 7(11), e48230. <a href="http://doi.org/10.1371/journal.pone.0048230">http://doi.org/10.1371/journal.pone.0048230</a></p> <p>Text Citation: Mehling W. 2016 Differentiating attention styles and regulatory aspects of self-reported interoceptive sensibility. Phil. Trans. R. Soc. B 371: 20160013. <a href="http://dx.doi.org/10.1098/rstb.2016.0013">http://dx.doi.org/10.1098/rstb.2016.0013</a></p> <p>Text Citation: Lin, F., Hsu, C., Mehling, W., &amp; Yeh, M. (2017). Translation and psychometric testing of the chinese version of the multidimensional assessment of interoceptive awareness. Journal of Nursing Research, 25(1), 76-84. doi:10.1097/jnr.0000000000000182</p> <p>Text Citation: Bornemann, B., Herbert, B. M., Mehling, W. E., &amp; Singer, T. (2015). Differential changes in self-reported aspects of interoceptive awareness through 3 months of contemplative training. Frontiers in Psychology, 5 doi:10.3389/fpsyg.2014.01504</p> <p>Text Citation: Cañi, G., Ambrosini, E., Picconi, L., Mehling, W. E., &amp; Committeri, G. (2015). Investigating the relationship between interoceptive accuracy, interoceptive awareness, and emotional susceptibility. Frontiers in Psychology, 6, 1202. doi:10.3389/fpsyg.2015.01202</p> <p>Text Citation: Valenzuela-Moguillansky, C., &amp; Reyes-Reyes, A. (2015). Psychometric properties of the multidimensional assessment of interoceptive awareness (MAIA) in a Chilean population. Frontiers in Psychology, 6, 120. <a href="http://doi.org/10.3389/fpsyg.2015.00120">http://doi.org/10.3389/fpsyg.2015.00120</a></p> <p>Text Citation: Brytek-Matera, A., &amp; Kozieł, A. (2015). The body self-awareness among women practicing fitness: A preliminary study. Polish Psychological Bulletin, 46(1), 104-111. doi:10.1515/ppb-2015-0014</p> <p>Text Citation: Valenzuela-Moguillansky, C., &amp; Reyes-Reyes, A. (2015). Psychometric properties of the multidimensional assessment of interoceptive awareness (MAIA) in a Chilean population. Frontiers in Psychology, 6, 120. <a href="http://doi.org/10.3389/fpsyg.2015.00120">http://doi.org/10.3389/fpsyg.2015.00120</a></p> |
| Influenced                                      | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Influenced<br>Description                       | <p>The MAIA has been evaluated in conjunction with multiple mindfulness based interventions including Mindfulness Based Stress Reduction (MBSR), Mindfulness Based Cognitive Therapy (MBCT) and Mindfulness-Based Childbirth and Parenting. A recent longitudinal RCT investigated the effect of MBCT versus control (TAU) on the positive interoceptive awareness, assessed using the MAIA, on participants with chronic pain and comorbid depressive (Dejong et al 2016). Results showed significant main effects of time associated with MAIA subscales including attention</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

regulation ( $F(1, 24) = 5.34, p = 0.030$ ), emotional awareness ( $F(1, 24) = 4.63, p = 0.042$ ), self-regulation ( $F(1, 24) = 5.93, p = 0.023$ ) and not distracting ( $F(1, 24) = 4.87, p = 0.037$ ).

The scale has also been influenced by trainings in various mindful practices including body scan and breath meditations, yogic practices, tai-chi inspired running and Integrative Exercise (aerobic/resistance training merged with traditional mindfulness/yogic practices) (Mehling et al 2016). In a 3 month randomized control trial investigating the effects of mindfulness training on interoceptive awareness participants were trained in body scanning techniques, traditional sitting meditation, and yogic exercises. At 3 month follow up subscales of the MAIA demonstrated significant improvement in intervention versus control conditions specifically within attention regulation ( $F(1, 226) = 42.65, p < 0.001$ ), emotional awareness ( $F(1, 226) = 4.34, p = 0.04$ ), body listening ( $F(1, 226) = 35.56, p < 0.001$ ), self-regulation ( $F(1, 226) = 53.61, p < 0.001$ ) and body trusting ( $F(1, 226) = 14.90, p < 0.001$ ) (Bornemann et al 2014). In addition, interventions investigating the effects of mindfulness trainings on physiological outcomes have shown promise in increasing interoceptive awareness as measured by the MAIA. The Mindfulness-Based Blood Pressure Reduction (MN-BP) Study at Brown University presented preliminary findings at the International Symposium for Contemplative Studies (San Diego, Nov. 10-13, 2016). This study is currently investigating the effects of mindfulness training on cardiovascular disease risk factors among individuals with both controlled and uncontrolled hypertension. Preliminary results from the Stage 1 trials, shown in supporting documentation, demonstrate significant improvements in MAIA scores at 3-month post intervention.

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| Influenced Supporting Documentation      | <a href="#">Mindfulness-Based-Blood-Pressure-Reduction-Study-MAIA-Baseline_3month.jpg</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Influenced PMCID, PUBMED ID, or CITATION | <p>Text Citation: Bornemann, B., Herbert, B. M., Mehling, W. E., &amp; Singer, T. (2014). Differential changes in self-reported aspects of interoceptive awareness through 3 months of contemplative training. <i>Frontiers in Psychology</i>, 5, 1504. <a href="http://doi.org/10.3389/fpsyg.2014.01504">http://doi.org/10.3389/fpsyg.2014.01504</a></p> <p>Text Citation: De Jong, M., Lazar, S. W., Hug, K., Mehling, W. E., Hölzel, B. K., Sack, A. T., ... Gard, T. (2016). Effects of Mindfulness-Based Cognitive Therapy on Body Awareness in Patients with Chronic Pain and Comorbid Depression. <i>Frontiers in Psychology</i>, 7, 967. <a href="http://doi.org/10.3389/fpsyg.2016.00967">http://doi.org/10.3389/fpsyg.2016.00967</a></p> <p>Text Citation: Mehling W. 2016 Differentiating attention styles and regulatory aspects of self-reported interoceptive sensibility. <i>Phil. Trans. R. Soc. B</i> 371: 20160013. <a href="http://dx.doi.org/10.1098/rstb.2016.0013">http://dx.doi.org/10.1098/rstb.2016.0013</a></p> |
| Outcome (Validated vs Invalidated)       | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Outcome                                  | validated                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Outcome Description                      | To our knowledge, as of July 2017, the MAIA has yet not been validated in conjunction with direct measures of health behavior change. Much of the analyses currently published indicates that                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

increases in the MAIA are inversely related to negative mental health outcomes (i.e anxiety and depression) but limited research has been undertaken regarding health behavior. However, the previously cited MB-BP study (see “Influenced” subsection above) is investigating the MAIA in conjunction with health behaviors associated with cardiovascular disease risk reduction, such as physical activity and dietary behavior change.

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|---------------------------------------|---------------------------------------------------|
| Outcome Supporting Documentation      |                                                   |
| Outcome PMCID, PUBMED ID, or CITATION |                                                   |
| Owner                                 | Eric Loucks<br><a href="#">Send email to Eric</a> |