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Exploring the Multidimensional Assessment of Interoceptive Awareness in youth aged 7–17 years

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Abstract

Objective: This study aimed to adapt the Multidimensional Assessment of Interoceptive Awareness (MAIA) questionnaire for younger respondents.

Method: The language of the MAIA was revised and children aged 7–10 years ($n = 212$) and adolescents aged 11–17 years ($n = 217$) completed the questionnaire.

Results: The original eight-factor model was tested for fit using confirmatory factor analysis. The model had an acceptable fit in the total sample and younger subsample and overall fit in the older subsample was adequate following modification. Internal consistency was good, except for the Noticing, Not-Distracting and Not-Worrying scales. Results also demonstrated a negative linear relationship between the trusting scale and age, suggesting that youths may lose trust in their body as they age.

Conclusion: The adapted MAIA can be used with a younger population and, depending on the research question, individual MAIA scales may be selected. The survey is available at https://osher.ucsf.edu/maia.

KEYWORDS

adolescence, childhood, internal state, interoception, interoceptive awareness, MAIA

1 | INTRODUCTION

Interoception refers to the processing of internal bodily signals (Craig, 2009; Khalsa et al., 2018). Interoceptive awareness is the self-perceived tendency to detect internal bodily signals such as heartbeat, hunger, thirst, pain and breathing, and further encompasses how emotions, beliefs and attitudes are related to the internal state (Khalsa et al., 2018; Mehling, 2016). As such, interoceptive awareness is a multifaceted construct (see, Garfinkel et al., 2015; Khalsa et al., 2018; Mehling et al., 2018, Mehling, 2016, for discussions on terminology and definitions).

Having an accurate conscious perception of internal states has been evidenced to be important for regulating behaviour. For example, differences in interoceptive awareness have been linked to a range of clinical and health conditions (Khalsa et al., 2018; Pace-Schott et al., 2019; Quadt et al., 2018), such as inaccurate pain sensitivity (Simons et al., 2014), diabetes and obesity (Herbert & Pollatos, 2012; Pauli et al., 1991), and it has been suggested as a factor in depression (Harshaw, 2015; Terhaar et al., 2012), anxiety (Paulus & Stein, 2006), alexithymia (Herbert & Pollatos, 2012) and anorexia (Pollatos et al., 2016). Interoception has also been proposed as a fundamental process for shaping the bodily self (Tsakiris, 2017) and self-awareness (Seth, 2013).

The Multidimensional Assessment of Interoceptive Awareness (MAIA) questionnaire was designed to capture multidimensional facets of interoceptive awareness that might be particularly relevant for clinical settings (Mehling et al., 2012; Mehling, 2016). The original version (Mehling et al., 2012) is a 32-item survey including eight different scales: Noticing, Not-Distracting, Not-Worrying, Attention Regulation, Emotional Awareness, Self-Regulation, Body-Listening and Trusting. To improve the reliability of two of the scales, Not-Distracting and Not-Worrying, five items were added for an updated 37-item questionnaire (MAIA v2; Mehling et al., 2018). To date, the MAIA has been translated and validated in over 25 different languages (see https://osher.ucsf.edu/maia). Most of the research conducted with the MAIA has used adult samples (see Mehling, 2016 for a review), and less is known about how multidimensional interoceptive awareness develops throughout the lifespan. One previous study preliminarily indicates that the MAIA may have acceptable psychometric properties in adolescents (Todd et al., 2019), however, only six of the eight MAIA scales were examined.

It has been proposed that interoception should be considered as a dynamic developmental characteristic (Khalsa et al., 2018). However, examinations of changes in interoception across the lifespan have shown mixed results. For example, examinations of cardiac perceptual accuracy using methods such as heartbeat perception tasks (e.g., Schandry, 1981) have indicated age-related increases (Nicholson et al., 2019; Schaan et al., 2019) and decreases (Khalsa, Rudrauf, and Tranel, 2009) in cardiac perceptual accuracy. Age-related trends may also differ in autism compared to typical development (Mash et al., 2017). For example, Mash et al. (2017) report that cardiac perceptual accuracy was positively associated with age in a typical population but, interestingly, negatively associated with age among participants with autism. Despite recent methodological advances (e.g., Maister et al., 2017), the developmental trajectory of interoceptive processing remains poorly understood (for a review, see Murphy et al., 2017). Limited evidence indicates that during childhood and adolescence, age appears to be associated with increased activity in brain areas representing interoception, typically the frontal-insula-parietal-anterior cingulate cortex neural network (Klabunde et al., 2019; Li et al., 2017). Conversely, Koch and Pollatos (2014) showed in a large-scale study ($N = 1350$) that levels of cardiac perceptual accuracy in children aged between 6 and 11 years are similar to adult levels. However, the validity of the heartbeat counting task has been questioned (e.g., Desmedt et al., 2020). Of note, some research indicates that the heartbeat can be sensed by exteroceptive somatosensory information via chest vibrations (Khalsa, Rudrauf, Sandesara, et al., 2009), which depends on factors such as body fat, blood pressure (O'Brien et al., 1998; Rouse et al., 1988), and resting heart rate (Knapp-Kline & Kline, 2005). Moreover, these body characteristics often change during the lifespan development (Murphy, Geary, et al., 2018). The mixed pattern of results and insensitivity of the heartbeat detection task may suggest that this method for measuring interoception in a younger population may be limited.

Though some research has examined cardiac perceptual accuracy in children, there is little research which has directly explored interoceptive awareness in typically developing children and adolescents. An exception is studies examining children with autism, where a Child-Adapted Awareness section of the Body Perception Questionnaire (BPQ; Palser et al., 2018) has been applied. The authors noted that different questionnaires appear to produce different findings (Palser et al., 2020), depending on whether they assess anxiety-driven bodily awareness (such as the BPQ) or a more mindful awareness style (such as the MAIA). Specifically, as an example of anxiety-driven bodily awareness, the BPQ asks participants to rate the frequency of interoceptive states typically associated with anxiety such as sweaty palms or muscle tension in the face. Alternatively, as an example of mindful awareness styles, the MAIA asks about awareness in varying contexts such as when upset or in a conversation. There is some evidence that conditions and characteristics which may be related to interoception are different in young people compared to adults. Alexithymia, a condition which is defined by a limited ability to recognise one's own emotions and verbalise them (Sifneos, 1996), has been explored with an age-appropriate questionnaire for children (Rieffe et al., 2006) and shown to be more prevalent in adolescence compared to adults (Säkkinen et al., 2007). In adults, interoception and alexithymia appear to be linked (Murphy, Catmur, et al., 2018; Trevisan et al., 2019). But this association depends on the instrument used for interoceptive awareness (Trevisan et al., 2019) and has not been determined in youth.

To the best of our knowledge, there are no measures that fully capture multiple dimensions (i.e., those dimensions that relate to cognition and behaviour that can be adaptive, such as mindful attention to subtle physical cues, or maladaptive, such as hypervigilance to threat signals) of interoceptive awareness in children or adolescents. Therefore, the aim of the present study was to initiate the development of a suitable measure of interoceptive awareness in individuals under the age of 18 years by adapting the adult version of the MAIA. An adapted MAIA could be used to assess interoceptive awareness as a potential mechanism of action in behavioural therapeutic approaches, which is important for a multitude of reasons. Briefly, children are particularly vulnerable to anxiety, depression, post-traumatic stress disorder, obesity and other health conditions, because they are increasingly occupied with computer and smartphone screens (Stald et al., 2014). Importantly, interoception is a key element of emotional regulation in children and adolescents (de Witte et al., 2016). Given the decreasing rates of outdoor physical activity, behavioural interventions based on cognitive behavioural therapy (Seligman & Ollendick, 2011), mindful awareness (Henje Blom et al., 2016), and interoceptive exposure (Flack et al., 2018) are needed.

As a preliminary hypothesis, we expected that the eight-factor original model would evidence adequate fit in the younger sample (Todd et al., 2019). We also hypothesised that scores would be internally reliable, with the exception of the Noticing, Not-Distracting and Not-Worrying subscales, which have evidenced poor internal consistency previously (Mehling et al., 2012; Mehling, 2016). We additionally examined the invariance of MAIA scores across different age groups (7–10 and 11–17 years) and gender using multigroup confirmatory factor analysis (CFA). We analysed invariance across configural, metric, and scalar levels and did not examine strict invariance, because it is rarely met (van de Schoot et al., 2012) and acknowledged to be overly restrictive (Byrne, 2004). A preliminary examination of convergent validity was examined using the Fornell–Larcker criterion (Fornell & Larker, 1981), with the expectation that adequate convergent validity would be evidenced (Mehling et al., 2012).

2 | METHODS

2.1 | Setting

This study was part of a larger project that took place as part of the Live Science residency programme run at the Science Museum, London, United Kingdom. In a dedicated space in a gallery within the museum, visitors to the museum could complete questionnaires on tablet devices and take part in experimental research on dedicated desktop computers. The overall project aimed to examine the relationship between cognitive and perceptual processes regarding the self and others. In addition to completing the MAIA, participants were also invited to take part in three reaction time-based experiments investigating tactile attention, mental rotation of bodies and action perception, which are not reported here.

The residency programme ran over a period of six weeks (in October and November 2017) where researchers were present three days a week during museum opening times to collect data. Data from those over the age of 18 years have been published as the MAIA v2 (Mehling et al., 2018). The experimental tasks will be reported separately. The study was approved by the Middlesex University Psychology ethics board (Project ID: 1846).

2.2 | Participants

Participants were a convenience sample of visitors to a Live Science residency at the Science Museum, London. Inclusion criteria included being aged 7–17 years and able to comprehend English. Four hundred and eighty-two participants answered the questionnaire. Participants were excluded if they responded "Yes" to being under 18-years old but provided an age below 7 ($n = 1$) or above 17-years old ($n = 4$). Participants were also excluded if they did not complete the questionnaire ($n = 48$). The analysis was based on a sample of $N = 429$ participants with complete data. Out of these, 89% ($n = 381$) were right-handed, 9% ($n = 40$) left-handed and 2% ($n = 8$) ambidextrous. 77% ($n = 332$) were native English speakers and 47% ($n = 203$) were girls, 52% boys and less than 1% ($n = 3$) were nonbinary or preferred not to say, participants age ranged between 7 and 17 years with a mean age of 10.78 years ($SD = 2.55$).

2.3 | Instruments

2.3.1 | MAIA questionnaire

As in the original scale designed for adults (Mehling et al., 2012) the modified version uses self-report responses to assess interoceptive awareness in multiple dimensions. The 32-item survey includes eight different scales: Noticing, Not-Distracting, Not-Worrying, Attention Regulation, Emotional Awareness, Self-Regulation, Body-Listening and Trusting, which capture related but separate aspects of interoceptive awareness (Mehling et al., 2012). For each item, participants are prompted to respond by indicating on a 6-point Likert scale how often each statement applies to them in general life, ranging from *never* (0), to *always* (5) (see Appendix A for complete scale and scoring). The Noticing scale explores participants' awareness of body sensations (e.g., "I can tell where in my body I am comfortable"). The Not-Distracting scale measures a tendency to ignore bodily feelings of discomfort or pain (e.g., "I distract myself when I feel uncomfortable or feel pain"). The Not-Worrying scale is an index of participants' ability to not become emotionally reactive to negative sensations (e.g., "I get worried if I feel pain or if I feel uncomfortable"). The Attention Regulation scale explores a capacity to regulate attention when multiple sensory stimuli compete (example: "I can focus on the feelings in my body, even when there is a lot going on around me"). The Emotional Awareness scale explores participants' ability to be aware of the relationship between bodily states and affective ones (example: "I can feel how my body changes when I feel happy"). The Self-Regulation scale measures participants' ability to use attention to bodily states to regulate psychological distress (example: "I can use my breath to help me calm down and relax"). The Body-Listening scale is an index of participants' ability to attend to bodily sensations for psychological insight (e.g., "I listen to my body to help me choose what to do"). Finally, the Trusting scale measures the degree to which participants experience their body as safe and trustworthy (e.g., "I feel my body is a safe place"). The reliability (Cronbach's α) for the eight scales in the original MAIA (Mehling et al., 2012) ranges between 0.66 (Not-Distracting) and 0.87 (Attention Regulation) (see Table 4 for individual Cronbach's α of each scale). To note is that the reliability of the Not-distracting scale has since been improved in the MAIA v2 by adding additional items (Mehling et al., 2018).

2.3.2 | Sociodemographic questionnaire

In addition to the 32 items, the participants completed demographic information which included: Age in years, sex, dominant hand, and whether English is the first language.

All questions were set up to force an answer for each item and it was not possible to skip items.

2.4 | Materials and scale adaptation

We modified the language of the 32 items of the original MAIA questionnaire (Mehling et al., 2012) to be more suitable for a younger age group (see Table 1 for original and modified items). The items were first rewritten by authors A. J., J. S. and a research assistant (RA). The RA then presented the questions to a small focus group ($N = 5$) of children aged 7–9 years. The group provided qualitative feedback on the language and whether they understood the items. Items that included terminologies, such as “tension” and “experience” were not well understood and, therefore, further revised. For example, “When I am tense I notice where the tension is located in my body” was revised to “When I am nervous I can tell where in my body the feelings come from” and “I notice that my body feels different after a peaceful experience” was revised to “After a peaceful moment, I can feel my body is different.” Finally, the items and any language discrepancies were further revised and finalised collaboratively by A.J., J.S., and W.M.

2.5 | Procedure

Participation was voluntary and on an opportunistic basis. Consent/assent was obtained for all participants by a parent or legal guardian who needed to be present with the child. To administer the survey, an online version of the questionnaire was generated using a survey software (Qualtrics) and participants completed the questionnaire on tablets (Kindle Fire, Amazon) at the museum. Therefore, no missing data were generated unless they aborted the questionnaire prematurely. The participants always completed the MAIA questionnaire first, and this task was completely independent of the other tasks.

2.6 | Data analyses

We used CFA to examine the factor structure of the original eight-factor model using the lavaan (Rosseel, 2012), semTools (Jorgensen et al., 2018) and MVN (Korkmaz et al., 2014) packages in *R* (R Development Core Team, 2014). A CFA was first computed with the full set of data from $N = 429$ participants. To further assess the dimensionality of the scales and items, additional CFAs were computed with two subsamples: The first subsample composed of participants aged 7–10 years ($n = 212$), and the second subsample compose of participants aged 11–17 years ($n = 217$). The data did not meet normal distribution thresholds at either the univariate (Sharipo-Wilks $p < .001$) or multivariate level (Mardia's skewness = 8395.44, $p < .001$, Mardia's kurtosis = 37.75, $p < .001$). Therefore, we obtained parameter estimates using the robust maximum likelihood method with the Satorra–Bentler correction (Satorra & Bentler, 2001). Goodness-of-fit was examined using the following indices: the normed model chi-square ($\chi^2/df = \chi^2_{\text{normed}}$), with values lesser than 3.0 indicating good fit (Hu & Bentler, 1999); the Steiger-Lind root mean square error of approximation (RMSEA), with values close to 0.06 indicating good fit, and values up to 0.08 evidencing adequate fit (Steiger, 2007); the standardised root mean square residual (SRMR), with values greater than 0.09 indicating good fit (Hu & Bentler, 1999); the comparative fit index (CFI), with values close to or greater than 0.95 indicating good fit (Hu & Bentler, 1999); the Tucker–Lewis index (TLI), with values close to or greater than 0.95 indicating good fit (Hu & Bentler, 1999); and Bollen's Incremental Fit Index (BL89), with values close to or greater than 0.95 indicating good fit (Hu & Bentler, 1999). Convergent validity was examined using the Fornell–Larcker criterion (Fornell & Larker, 1981), with average variance extracted (AVE) values of 0.50 or greater considered adequate.

TABLE 1 Items in the original Multidimensional Assessment of Interoceptive Awareness (MAIA) and the reworded items for youth

Item	Original MAIA	MAIA youth
1	When I am tense I notice where the tension is located in my body.	When I am nervous I can tell where in my body the feelings come from.
2	I notice when I am uncomfortable in my body.	I can tell when I am uncomfortable in my body.
3	I notice where in my body I am comfortable.	I can tell where in my body I am comfortable.
4	I notice changes in my breathing, such as whether it slows down or speeds up.	I can tell when my breathing changes, like if it slows down or speeds up.
5	I do not notice (I ignore) physical tension or discomfort until they become more severe.	I ignore bad feelings in my body until they become very strong.
6	I distract myself from sensations of discomfort.	I distract myself when I feel uncomfortable or feel pain.
7	When I feel pain or discomfort, I try to power through it.	When I feel uncomfortable or feel pain, I try to get over it.
8	When I feel physical pain, I become upset.	When I feel pain in my body, I become upset.
9	I start to worry that something is wrong if I feel any discomfort.	I get worried if I feel pain or if I feel uncomfortable.
10	I can notice an unpleasant body sensation without worrying about it.	I can tell if I have a bad feeling in my body but I don't worry about it.
11	I can pay attention to my breath without being distracted by things happening around me.	I can focus on how I breathe without thinking about anything else.
12	I can maintain awareness of my inner bodily sensations even when there is a lot going on around me.	I can focus on the feelings in my body, even when there is a lot going on around me.
13	When I am in conversation with someone, I can pay attention to my posture.	When I am talking to someone, I can focus on the way I am standing or sitting.
14	I can return awareness to my body if I am distracted.	Even if I am distracted I can go back to thinking how my body feels.
15	I can refocus my attention from thinking to sensing my body.	I can return my focus from thinking about things to feeling my body.
16	I can maintain awareness of my whole body even when a part of me is in pain or discomfort.	I can pay attention to my whole body even when a part of it is in pain.
17	I am able to consciously focus on my body as a whole.	I can focus on my entire body when I try.
18	I notice how my body changes when I am angry.	I can feel how my body changes when I am angry.
19	When something is wrong in my life I can feel it in my body.	When something is wrong in my life I can feel it in my body.
20	I notice that my body feels different after a peaceful experience.	After a peaceful moment, I can feel my body is different.
21	I notice that my breathing becomes free and easy when I feel comfortable.	I can feel that my breathing becomes free and easy when I am comfortable.
22	I notice how my body changes when I feel happy/joyful.	I can feel how my body changes when I feel happy.
23	When I feel overwhelmed I can find a calm place inside.	I can feel calm even if there is a lot going on.

TABLE 1 (Continued)

Item	Original MAIA	MAIA youth
24	When I bring awareness to my body I feel a sense of calm.	When I focus on how I feel in my body, I calm down.
25	I can use my breath to reduce tension.	I can use my breath to help me calm down and relax.
26	When I am caught up in thoughts, I can calm my mind by focusing on my body/breathing.	When I am thinking too much, I can calm my mind by focusing on my body/breathing.
27	I listen for information from my body about my emotional state.	I listen for clues from my body about my emotions.
28	When I am upset, I take time to explore how my body feels.	When I am upset, I take time to check how my body feels.
29	I listen to my body to inform me about what to do.	I listen to my body to help me choose what to do.
30	I am at home in my body.	I feel good in my body.
31	I feel my body is a safe place.	I feel my body is a safe place.
32	I trust my body sensations.	I trust the way my body feels.

Note: Original MAIA (Mehling et al., 2012).

We also used multigroup CFA (Chen, 2007) to examine measurement invariance between the younger and older subsamples at the configural, metric and scalar levels. It has been suggested that ΔCFI lesser than 0.01 is an appropriate index of metric invariance (Cheung & Rensvold, 2002), and Chen (2007) suggested that invariance is supported when $\Delta CFI < 0.01$ and $\Delta RMSEA < 0.015$ or $\Delta SRMR < 0.030$.

In addition to *R*, SPSS v25 was used for reliability and analysis of age and sex variables. Internal consistency was estimated using both Cronbach's α (to facilitate comparison with previous MAIA validation papers) and ω (Zumbo et al., 2007), which is likely to provide a more reliable estimate (Dunn et al., 2014; Reis, 2019). For both indices, values greater than .70 indicate adequate internal consistency. Convergent validity was examined using the Fornell–Larcker criterion (Fornell & Larker, 1981), with AVE values of 0.50 or greater considered adequate (Malhoutra & Dash, 2011). The demographics, handedness, and whether participants were native English speaking or not was not analysed further as there were too few left-handed and nonnative English speakers to perform any reliable comparison.

3 | RESULTS

The data were deemed appropriate for factor analysis, Bartlett's sphericity test $\chi^2(496) = 3373.99$, $p < .001$; KMO = 0.867. Assessment of skewness and kurtosis showed most items fell in the range −1 to 1 (see Table 2). There were eight items that exceeded this criterion, but no item had values outside −1.2 to 1.0 allowing the approximation of each item to a normal distribution.

In the total sample, model fit for the end-factor solution was acceptable for most indices, but slightly less-than ideal for CFI, TLI and BL89: $SB\chi^2(436) = 601.46$, $p < .001$, $SB\chi^2_{normed} = 1.38$, robust RMSEA = 0.030 (90% CI = 0.024–0.035), SRMR = 0.055, robust CFI = 0.932, robust TLI = 0.921, BL89 = 0.934, AIC = 46,982.17. The standardised estimates of factor loadings ranged from 0.20–0.79, with significance levels determined by critical ratios (all $p < .001$; for a summary, see Table 2). A similar pattern of results was observed for the younger subsample: $SB\chi^2(436) = 511.16$, $p = .007$, $SB\chi^2_{normed} = 1.17$, robust RMSEA = 0.031 (90% CI = 0.017–0.041),

TABLE 2 Item descriptives ($N = 429$)

Item	Mean	Standard deviation	Skewness	Kurtosis	Skew./SE	Kurt./SE	FL	Var	Scale
1	2.62	1.59	−0.15	−0.99	−1.31	−4.20	0.43	0.81	Noticing
2	3.57	1.45	−0.91	−0.05	−7.73	−0.19	0.43	0.81	
3	3.59	1.44	−0.90	0.07	−7.6	0.29	0.41	0.83	
4	3.78	1.46	−1.15	0.43	−9.76	1.84	0.35	0.88	
5	2.55	1.46	0.06	−0.86	0.51	−3.66	0.22	0.95	Not-Distracting
6	2.08	1.58	0.44	−0.83	3.69	−3.54	0.47	0.78	
7	1.55	1.46	0.78	−0.20	6.59	−0.84	0.52	0.73	
8	2.38	1.55	0.04	−1.02	0.37	−4.33	0.69	0.52	Not-Worrying
9	2.55	1.54	−0.01	−1.01	−0.06	−4.29	0.60	0.64	
10	2.55	1.39	−0.04	−0.68	−0.32	−2.89	0.20	0.96	
11	2.72	1.70	−0.21	−1.19	−1.76	−5.07	0.56	0.68	Attention Regulation
12	2.66	1.52	−0.07	−0.93	−0.63	−3.95	0.62	0.61	
13	2.73	1.66	−0.29	−1.10	−2.47	−4.68	0.49	0.76	
14	2.45	1.52	0.03	−0.95	0.25	−4.06	0.67	0.55	
15	2.60	1.43	−0.15	−0.78	−1.25	−3.34	0.62	0.62	
16	2.55	1.55	−0.07	−0.95	−0.6	−4.05	0.56	0.69	
17	3.39	1.48	−0.69	−0.52	−5.88	−2.20	0.58	0.67	
18	3.49	1.46	−0.80	−0.22	−6.81	−0.93	0.48	0.77	Emotional Awareness
19	3.03	1.57	−0.43	−0.81	−3.68	−3.46	0.48	0.77	
20	3.35	1.53	−0.74	−0.41	−6.27	−1.73	0.62	0.62	
21	3.74	1.34	−1.08	0.62	−9.13	2.66	0.64	0.59	
22	3.78	1.32	−1.07	0.52	−9.05	2.21	0.69	0.53	
23	2.55	1.47	−0.15	−0.83	−1.3	−3.51	0.47	0.78	Self-Regulation
24	2.64	1.45	−0.18	−0.74	−1.51	−3.16	0.70	0.51	
25	3.05	1.55	−0.45	−0.84	−3.78	−3.56	0.64	0.60	
26	2.30	1.51	0.05	−0.94	0.44	−4.00	0.64	0.60	
27	2.31	1.57	0.01	−1.07	0.03	−4.53	0.74	0.45	Body-Listening
28	1.83	1.51	0.39	−0.83	3.3	−3.53	0.58	0.67	
29	2.38	1.51	−0.01	−0.89	−0.08	−3.79	0.63	0.60	
30	3.73	1.14	−0.83	0.37	−7.05	1.56	0.72	0.49	Trusting
31	3.78	1.26	−0.97	0.42	−8.23	1.77	0.79	0.38	
32	3.67	1.30	−0.85	0.02	−7.19	0.10	0.71	0.50	

Note: Factor loadings are standardised with significance levels determined by critical ratios (all $p < .001$).
Abbreviations: FL, factor loading; Kurt./SE, Kurtosis/Standard error (Kurtosis ratio); Skew./SE, Skewness/Standard error (Skewness ratio); Var., residual variable (variances).

SRMR = 0.066, robust CFI = 0.939, robust TLI = 0.931, BL89 = 0.943, AIC = 24,014.13. For the older subsample, whereas some indices were adequate, CFI, TLI and BL89 were below acceptable levels: $SB\chi^2(436) = 598.00$, $p < .001$, $SB\chi^2_{normed} = 1.37$, robust RMSEA = 0.045 (90% CI = 0.036–0.054), SRMR = 0.072, robust CFI = 0.875, robust TLI = 0.858, BL89 = 0.883, AIC = 22,813.37. Therefore, modification indices were consulted to improve model fit, with modifications being based on correlations between similar items from the same factor, and in accordance with the results from likelihood ratio tests. Specifically, error covariances were successively freed between Items 11 and 12, MI = 13.37; $\chi^2(1) = 13.07$, $p < .001$, and Items 13 and 16, MI = 13.42; $\chi^2(1) = 14.87$, $p < .001$, both from the Attention Regulation subscale. These modifications resulted in a significantly improved model fit, although CFI, TLI and BL89 remained less-than-ideal: $SB\chi^2(434) = 573.94$, $p < .001$, $SB\chi^2_{normed} = 1.32$, robust RMSEA = 0.042 (90% CI = 0.032–0.051), SRMR = .072, robust CFI = 0.894, robust TLI = 0.879, BL89 = 0.899, AIC = 22,789.42.

Next, we examined the eight-factor model for measurement invariance across gender and the two age groups (see Table 3 for full metrics). As can be seen, full scalar invariance was supported across age groups based on ΔSRMR and for gender full scalar invariance was supported across all indices.

3.1 | Reliability

In the total sample, convergent validity was less-than-adequate, because while AVE was greater than 0.50 for the Trusting subscale, values for the remaining scales ranged from 0.17–0.43. Table 4 shows estimates for internal consistency reliability using Cronbach's α and ω. Estimates are shown for each scale for the entire sample (7- to 17-years old; $N = 429$), and both the younger (7- to 10-years old; $n = 212$) and older (11- to 17-years old; $n = 217$) subsamples. In the complete sample, internal consistency for the first three scales was low: Noticing ($\alpha = .43$, $\omega = .44$, 95% CI = 0.33, 0.52), Not-Distracting ($\alpha = .36$, $\omega = 0.39$, 95% CI = 0.22, 0.51) and Not Worrying ($\alpha = .47$, $\omega = 0.53$, 95% CI = 0.41, 0.60). Cronbach's α for the Not-Distracting scale would improve to 0.39 by removing Item 5 ("I ignore bad feelings in my body until they become very strong."). Further, α for Not-Worrying would improve from .47 to .59 if Item 10 ("I can tell if I have a bad feeling in my body but I don't worry about it.") was removed. No other scale would be improved in internal consistency reliability by excluding individual items.

In the age-split subsamples, reliability was similar or greater in the older compared to younger samples (Table 4), and reliability would improve by excluding the same items as above (items 5 and 10). Specifically, for Not-Distracting, removal of Item 5 would increase the α in the young group from .29 to .33 and .43 to .48 for the older group. For Not-Worrying, removal of Item 10 would increase α from .43 to .57 and .52 to .62 for the young and older youth groups, respectively. No other single item removal would increase the Cronbach's α for both age groups. Although we observed a higher Cronbach's α in older children's scores, compared to the younger age group, on the three most problematic scales, these still do not reach an acceptable α (>.65).

A Feldt test for independent samples (Feldt et al., 1987) comparison between the Cronbach's α of the original and youth MAIA scales was conducted using "cocron" (Diedenhofen & Musch, 2016). Alphas for the first seven scales were significantly larger in the original adult sample compared to the MAIA-y, all seven scales $\chi^2(1) > 10.00$, $p < .01$. For Trusting, there was no difference between original and youth MAIA, $\chi^2(1) = 0.10$, $p = .75$. Feldt tests comparing the scale αs (Table 4) for the young and older youth participants showed no significant difference for any of the eight scales; all $\chi^2(1) < 3.32$, $p > .07$. Pearson's inter-scale correlations are presented in Table 5 and reveal significant correlations between all scales except Not-Worrying, which only correlated with Emotional Awareness.

3.2 | Age and sex comparisons

A series of two-way analyses of variances with sex and age as independent variables was performed separately for each scale (see Table 6 for descriptive statistics). Sex and age did not interact with any of the factors. There were

TABLE 3 Measurement invariance across the younger (7- to 10-years old) and older (11- to 17-years old) subsamples and gender

	Model	$SB\chi^2$	*df*	Robust CFI	Robust RMSEA	SRMR	Model Comparison	$\Delta SB\chi^2$	ΔRobust CFI	ΔRobust RMSEA	ΔSRMR	Δ*df*	*p* Value
Age group	Configural	1110.53	872	0.906	0.039	0.067							
	Metric	1140.78	896	0.904	0.039	0.069	Configural vs. Metric	30.25	0.002	<0.001	0.002	24	.177
	Scalar	1219.07	920	0.884	0.042	0.071	Metric vs. Scalar	78.29	0.020	0.003	0.002	24	<.001
Gender	Configural	1049.28	872	0.927	0.034	0.063							
	Metric	1082.17	896	0.923	0.034	0.067	Configural vs. Metric	32.89	0.004	<0.001	0.004	24	.102
	Scalar	1129.28	920	0.915	0.036	0.068	Metric vs. Scalar	47.11	0.008	0.002	0.002	24	<.001

Abbreviations: CFI, comparative fit index; RMSEA, Steiger–Lind root mean square error of approximation; SB, Satorra–Bentler; SRMR, standardised root mean square residual.

TABLE 4 Descriptive statistics and internal consistency reliability statistics for the eight scales

	Number of items	α MAIA-y	ω (95% CI)	Scale mean (*SD*)	Range of item–scale correlations	α MAIA 7–10 years	ω 7–10 years	α MAIA 11–17 years	ω 11–17 years	α original MAIA
Noticing	4	.43	0.44 (0.33, 0.52)	3.39 (0.90)	0.18–0.29	.34	0.35 (0.22, 0.36)	.52	0.53 (0.39, 0.63)	.69
Not-Distracting	3	.36	0.39 (0.22, 0.51)	2.06 (0.99)	0.14–0.25	.29	0.30 (0.22, 0.34)	.44	0.46 (0.27, 0.58)	.66
Not-Worrying	3	.47	0.53 (0.41, 0.60)	2.49 (1.04)	0.15–0.38	.43	0.45 (0.39, 0.50)	.52	0.59 (0.43, 0.70)	.67
Attention Regulation	7	.78	0.78 (0.74, 0.82)	2.73 (1.02)	0.45–0.59	.78	0.79 (0.73, 0.83)	.78	0.79 (0.73, 0.83)	.87
Emotional Awareness	5	.70	0.71 (0.65, 0.76)	3.48 (0.98)	0.36–0.57	.71	0.72 (0.64, 0.78)	.69	0.70 (0.61, 0.77)	.82
Self-Regulation	4	.70	0.71 (0.65, 0.75)	2.63 (1.08)	0.34–0.54	.69	0.70 (0.62, 0.76)	.70	0.71 (0.62, 0.77)	.83
Body-Listening	3	.69	0.70 (0.62, 0.74)	2.17 (1.20)	0.47–0.52	.65	0.66 (0.55, 0.73)	.73	0.74 (0.65, 0.79)	.82
Trusting	3	.78	0.78 (0.73, 0.82)	3.73 (1.03)	0.60–0.65	.77	0.77 (0.69, 0.83)	.79	0.79 (0.72, 0.85)	.79

Note: Original Multidimensional Assessment of Interoceptive Awareness (MAIA) (Mehling et al., 2012).
Abbreviations: CI, confidence Interval; MAIA-y, youth-adapted version of MAIA; α, Cronbach's alpha; ω, McDonald's omega.

TABLE 5 Interscale correlations (Pearson's correlation coefficients) ($N = 429$)

	Not Distracting	Not Worrying	Attention Regulation	Emotional Awareness	Self-Regulation	Body-Listening	Trusting
Noticing	−.17***	−.06	.40***	.42***	.24***	.25***	.20***
Not-Distracting		−.15**	−.29***	−.21***	−.22***	−.16**	−.11*
Not-Worrying			.091	−0.13**	.028	−.041	.024
Attention Regulation				.44***	.56***	.42***	.28***
Emotional Awareness					.42***	.46***	.31***
Self-Regulation						.46***	.44***
Body-Listening							.27***

*$p < .05$.
**$p < .01$.
***$p < .001$.

TABLE 6 Means and standard deviations (*SD*) for the eight Multidimensional Assessment of Interoceptive Awareness MAIA-y scales by age and sex

Age (years) n (n girls)		7 42 (15) Mean (*SD*)	8 49 (23) Mean (*SD*)	9 64 (35) Mean (*SD*)	10 56 (27)[a] Mean (*SD*)	11 61 (31) Mean (*SD*)	12 46 (19) Mean (*SD*)	13 38 (20)[a] Mean (*SD*)	14 36 (16) Mean (*SD*)	15+ 35 (16)[a] Mean (*SD*)	Total 429 (202) Mean (*SD*)
Noticing	Boys	3.36 (1.16)	3.02 (0.92)	3.28 (0.82)	3.37 (0.66)	3.24 (0.8)	3.81 (0.59)	3.18 (0.96)	3.16 (0.81)	3.83 (0.94)	3.36 (0.88)
	Girls	3.28 (0.78)	3.47 (1.11)	3.26 (1.01)	3.20 (0.94)	3.55 (0.9)	3.87 (0.81)	3.29 (1.15)	3.58 (0.69)	3.63 (0.52)	3.44 (0.93)
	Total	3.33 (1.03)	3.23 (1.03)	3.27 (0.92)	3.29 (0.80)	3.4 (0.86)	3.83 (0.68)	3.23 (1.04)	3.35 (0.78)	3.69 (0.81)	3.39 (0.90)
Not-Distracting	Boys	2.32 (1.19)	2.09 (0.96)	2.28 (0.93)	2.11 (0.86)	2.02 (1.07)	1.75 (0.70)	2.09 (1.04)	2.32 (1.09)	1.88 (0.75)	2.10 (0.97)
	Girls	2.02 (1.20)	1.74 (1.08)	2.06 (1.00)	2.20 (1.09)	2.02 (0.89)	2.32 (1.24)	1.93 (1.09)	1.79 (0.76)	2.19 (0.93)	2.03 (1.03)
	Total	2.21 (1.18)	1.93 (1.02)	2.16 (0.97)	2.15 (0.97)	2.02 (0.97)	1.99 (0.99)	1.99 (1.05)	2.08 (0.98)	2.00 (0.83)	2.06 (0.99)
Not-Worrying	Boys	2.72 (1.24)	2.41 (1.21)	2.45 (1.01)	2.59 (1.05)	2.48 (1.06)	2.83 (1.04)	2.31 (0.99)	2.87 (1.12)	2.75 (1.01)	2.6 (1.08)
	Girls	2.33 (1.32)	2.38 (0.81)	2.39 (1.10)	2.35 (1.06)	2.56 (1.06)	2.39 (1.01)	2.28 (0.76)	2.44 (0.88)	2.27 (0.77)	2.39 (0.98)
	Total	2.58 (1.26)	2.39 (1.03)	2.42 (1.05)	2.46 (1.05)	2.52 (1.05)	2.64 (1.04)	2.31 (0.86)	2.68 (1.03)	2.49 (0.95)	2.49 (1.04)
Attention Regulation	Boys	2.58 (1.24)	2.51 (0.91)	2.55 (0.99)	2.92 (1.18)	2.82 (0.89)	3.05 (0.96)	2.79 (0.88)	3.01 (0.88)	3.42 (0.70)	2.83 (1.01)
	Girls	2.50 (1.12)	2.60 (1.08)	2.73 (1.29)	2.52 (0.96)	2.86 (0.87)	2.75 (0.97)	2.34 (0.77)	2.38 (0.98)	2.63 (1.22)	2.62 (1.04)
	Total	2.55 (1.19)	2.55 (0.98)	2.65 (1.16)	2.74 (1.08)	2.84 (0.87)	2.93 (0.97)	2.57 (0.84)	2.73 (0.96)	3.02 (1.05)	2.73 (1.02)
Emotional Awareness	Boys	3.48 (1.25)	3.55 (0.94)	3.49 (0.77)	3.50 (1.26)	3.28 (1.10)	3.7 (0.92)	3.44 (0.75)	3.11 (0.82)	3.68 (0.73)	3.47 (0.99)
	Girls	3.69 (1.01)	3.63 (0.85)	3.61 (0.95)	3.56 (1.24)	3.34 (0.95)	3.39 (1.08)	3.40 (1.03)	3.20 (0.80)	3.5 (0.82)	3.49 (0.98)
	Total	3.56 (1.16)	3.59 (0.89)	3.55 (0.87)	3.53 (1.23)	3.31 (1.02)	3.57 (0.99)	3.40 (0.89)	3.15 (0.80)	3.58 (0.76)	3.48 (0.98)
Self-Regulation	Boys	2.74 (1.31)	2.51 (1.08)	2.41 (1.18)	2.77 (1.12)	2.43 (1.11)	2.78 (1.00)	2.36 (1.08)	2.58 (0.80)	2.88 (1.04)	2.61 (1.09)
	Girls	3.05 (1.05)	3.01 (1.07)	2.71 (1.15)	2.31 (1.03)	2.60 (1.09)	2.70 (0.92)	2.89 (0.97)	2.44 (0.74)	2.36 (1.29)	2.67 (1.06)
	Total	2.85 (1.22)	2.74 (1.09)	2.57 (1.17)	2.56 (1.09)	2.52 (1.09)	2.74 (0.96)	2.65 (1.03)	2.51 (0.77)	2.59 (1.2)	2.63 (1.08)
Body-Listening	Boys	2.06 (1.62)	2.32 (0.99)	2.17 (0.96)	2.03 (1.44)	1.66 (1.20)	2.60 (1.04)	1.89 (1.20)	1.97 (1.30)	2.23 (1.12)	2.11 (1.24)
	Girls	2.73 (1.22)	2.42 (1.17)	2.31 (1.21)	2.26 (1.21)	2.19 (1.20)	1.91 (1.19)	2.18 (0.99)	1.77 (1.08)	2.54 (1.02)	2.26 (1.16)
	Total	2.30 (1.51)	2.37 (1.07)	2.25 (1.10)	2.15 (1.32)	1.93 (1.22)	2.32 (1.14)	2.00 (1.11)	1.88 (1.20)	2.34 (1.07)	2.17 (1.2)

(Continues)

TABLE 6 (Continued)

Age (years) n (n girls)		7 42 (15) Mean (*SD*)	8 49 (23) Mean (*SD*)	9 64 (35) Mean (*SD*)	10 56 (27)[a] Mean (*SD*)	11 61 (31) Mean (*SD*)	12 46 (19) Mean (*SD*)	13 38 (20)[a] Mean (*SD*)	14 36 (16) Mean (*SD*)	15+ 35 (16)[a] Mean (*SD*)	Total 429 (202) Mean (*SD*)
Trusting	Boys	4.15 (0.98)	3.85 (0.91)	3.55 (1.13)	3.63 (1.25)	3.49 (0.92)	4.00 (0.88)	3.78 (0.82)	3.38 (0.96)	3.65 (0.97)	3.73 (1.01)
	Girls	4.09 (0.91)	4.13 (0.95)	3.83 (1.13)	3.80 (0.99)	3.81 (0.94)	3.54 (1.28)	3.77 (0.82)	3.33 (0.94)	3.04 (1.25)	3.74 (1.05)
	Total	4.13 (0.95)	3.98 (0.93)	3.70 (1.13)	3.72 (1.12)	3.66 (0.93)	3.81 (1.07)	3.74 (0.82)	3.36 (0.94)	3.33 (1.14)	3.73 (1.03)

[a]One participant in the 10, 13 and 15+ years age group did not indicate their sex.

two sex differences. For Not-Worrying, boys ($M = 2.60$) scored higher than girls, $M = 2.39$, $F(1, 408) = 4.62$, $p = .032$, $\eta_p^2 = 0.01$. This sex-related difference has also been found in adults (Grabauskaitė et al., 2017). For Attention Regulations, boys ($M = 2.83$) scored higher than girls, $M = 2.62$, $F(1, 408) = 6.40$, $p = .012$, $\eta_p^2 = 0.02$.

Two scales showed an effect of age. There was a main effect of Age for Noticing, $F(8, 408) = 2.61$, $p = .009$, $\eta_p^2 = 0.05$ and Trusting, $F(8, 408) = 2.40$, $p = .016$, $\eta_p^2 = 0.05$. To investigate the nature of the effect two post-hoc (Bonferroni corrected) polynomial trend tests were fitted to the age variable. If the effect of age on a scale represented an increase or a decrease across increasing age groups, we expected a linear effect. If the effect was driven by an increase or decrease specifically in the middle, around early adolescence (10- to 13-years old) and the onset of puberty (Sawyer, Azzopardi, Wickremarathne & Patton, 2018) we would expect a quadratic effect. However, unweighted trend test analysis of Age for the Noticing scale showed no linear or quadratic effect (*ps* > .07). For Trusting polynomial analysis showed the effect was due to a negative linear trend, $F(1, 420) = 15.63$, $p < .001$, and not quadratic ($p = .96$). In other words, this indicated that the older the youth participants, the less trusting they were of their body.

4 | DISCUSSION

In the present study, we conducted a preliminary assessment of the psychometric properties of an adapted version of the MAIA—the MAIA-y–in a sample of children and adolescents. Overall, the results of this study indicated that the eight-factor structure of MAIA-y is acceptable in a youth sample. Specifically, confirmatory factor analyses indicated an acceptable model fit in the total sample and younger age group, but some model fit indices were less-than-ideal in the older age group. Nevertheless, the eight-factor model was found to be invariant at the scalar level across both gender and the two age categories (7- to 10-years old and 11- to 17-years old). The eight-factor structure of the MAIA-y is a replication of the adult MAIA (Mehling et al., 2012), the MAIA-2 (Mehling et al., 2018), and several translated versions of the MAIA, such as the German, (Bornemann et al., 2015), Persian (Abbasi et al., 2018), and Chinese (Lin et al., 2017) translations.

Though the majority of the scales had acceptable levels of internal consistency reliability, the Noticing, Not-Distracting and Not-Worrying scales evidenced poor internal consistency reliability. As the age range spanned key developmental stages, we split the data into subsamples of younger children (aged 7–10 years) and adolescents (aged 11–17 years). In doing so, we found that the poor reliability of the first three scales was particularly pronounced in the younger age group, although estimates for internal consistency reliability for the Noticing, Not-Distracting and Not-Worrying scales did not reach acceptable levels for either group. Relatively poor reliability of the first three scales, particularly Not-Distracting and Not-Worrying, has also been observed in the original adult MAIA (Mehling et al., 2012). Moreover, the same pattern of reliability and range of α values has been observed in a number of translated versions of the MAIA (e.g., German: Bornemann et al., 2015; Italian: Calì et al., 2015; and Spanish: Valenzuela-Moguillansky & Reyes-Reyes, 2015), as well as with primary care patients (Mehling et al., 2013). Indeed, these findings motivated a revision of the MAIA (the MAIA-2; Mehling et al., 2018), which includes additional items for the Not-Distracting and Not-Worrying scales. We recommend that future researchers consider adapting the full set of MAIA-2 items for a younger sample, and conducting a further assessment of the psychometric properties in children and adolescents. Importantly, we recommend that researchers do not eliminate scales when using the MAIA-y solely based on internal consistency reliability estimates, as low internal consistency reliability does not necessarily preclude a scale's importance for associations with key outcome variables. Specifically, although showing relatively low reliability in the original MAIA (Mehling et al., 2012), the scales Not-distracting and Not-worrying have been valuable in discriminating between groups expected to differ due to known characteristics (Mehling et al., 2011, 2013).

The eight scales for MAIA, MAIA-2 and MAIA-y are meant to be scored as separate scales. The results from previous psychometric analyses have clearly shown that creating a summary score over all the eight scales is inferior to keeping the scales separate (Mehling et al., 2012). Moreover, researchers are free to select scales that are expected a priori to be relevant for their research questions. Longitudinal data have shown that the MAIA scales change differentially. For example, the regulatory dimensions of interoceptive awareness—and not the three less reliable scales—can be expected to change the most in studies of mind–body interventions (Bornemann et al., 2015; Mehling, 2016). Yet importantly, the Not-Distracting scale, even in the original unrevised and less reliable version, has shown to be of key importance in studies for the management of pain (Mehling et al., 2014) and depressive symptoms (Fissler et al., 2016). Therefore, for the current 32-item version of the MAIA-y, depending on the research question, researchers may choose to drop scales less relevant to their a priori hypotheses and research questions.

The present study also collected demographic information that contribute to the literature on trends for interoceptive dimensions across developmental years. The finding in our data of a negative linear trend for Trusting suggests that older youths lose trust in their own body experience, which may be related to puberty and the dramatic bodily changes in the teenage years (Ackard & Peterson, 2001). Interestingly, according to the present findings, age-related changes do not occur in all dimensions of interoceptive awareness, confirming the necessity to differentiate the measurement of these dimensions, as has been pointed out in prior studies (Bornemann et al., 2015; Mehling, 2016). For example, well-documented body-image changes in adolescence are closely associated with some aspects of interoceptive awareness assessed by the MAIA but not with others (Todd et al., 2019). Further, cortical activation associated with interoceptive processing is reliably increased in adolescents compared to both younger and older age groups (Li et al., 2017; May et al., 2014). There is also well-established evidence that suggests physiological and neural changes in adolescence are accompanied by similarly large changes in cognition (see, Kuhn, 2006, for a review). Taken together with our finding of an age-related loss of body trust, these findings suggest that further differentiated examinations into interoceptive awareness and its various dimensions in adolescence is needed.

4.1 | Limitations and future directions

The present study offered a preliminary assessment of convergent validity, as assessed by the Fornell–Larker criterion (1981), however further assessments of construct and discriminant validity are required. Specifically, MAIA-y scores should be compared with other scales (as extensively done in the original MAIA; Mehling et al., 2012) that have been validated in youth samples, such as the PROMIS paediatric measures for anxiety (PROMIS® Measures). The limited study budget did not allow for individual cognitive interviews, which we would recommend in addition to the focus group session for further item refinement in future work. As indicated above, a viable next step for the refinement of the MAIA-y would be to revise the additional items included in the MAIA-2 for a younger audience and then test the psychometric properties using an exploratory to confirmatory factor analysis approach.

5 | CONCLUSION

The development of measures of interoception, whether behavioural tests of interoceptive accuracy (e.g., heartbeat and/or respiratory load detection/discrimination; reviewed in Treves et al., 2019) and accuracy-related confidence (Garfinkel et al., 2015) or self-report on dimensions of interoceptive awareness, remains a key challenge for the scientific community, and a work in progress. The present study provides preliminary evidence that a youth-adapted version of the MAIA (the MAIA-y) is suitable for research use with children and adolescents. Specifically, our results indicate that an eight-factor structure has an acceptable fit. Our results also show that the factor structure is invariant across groups of children aged 7–10 and 11–17 years. However, further work is needed to address the low internal consistency reliability of three of the MAIA-y scales, and this study could perhaps be instigated by adapting the additional MAIA-2 items (Mehling et al., 2018) for a younger sample. Future studies should also seek to examine the convergent and construct validity and test–retest reliability of the MAIA-y.

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CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

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APPENDIX A: QUESTIONNAIRE ITEMS AND SCORING INSTRUCTIONS

Scoring Instructions: Take the average of the items on each scale.

Note: Reverse-score items 5, 6, and 7 on Not-Distracting, and items 8 and 9 on Not-Worrying.

1. Noticing: Awareness of uncomfortable, comfortable, and neutral body sensations

Q1_____ + Q2_____ + Q3_____ + Q4_____/4 = _________

2. Not-Distracting: Tendency not to ignore or distract oneself from sensations of pain or discomfort

Q5(**reverse**)_____ + Q6(**reverse**)_____ + Q7(**reverse**)_____/3 = _________

3. Not-Worrying: Tendency not to worry or experience emotional distress with sensations of pain or discomfort

Q8(**reverse**)_____ + Q9(**reverse**)_____ + Q10_____/3 = _________

4. Attention Regulation: Ability to sustain and control attention to body sensations

Q11___ + Q12___ + Q13___ + Q14___ + Q15___ + Q16____ + Q17___/7 = ______

5. Emotional Awareness: Awareness of the connection between body sensations and emotional states

Q18____ + Q19____ + Q20____ + Q21____ + Q22____/5 = _________

6. Self-Regulation: Ability to regulate distress by attention to body sensations

Q23____ + Q24____ + Q25____ + Q26____/4= _________

7. Body-Listening: Active listening to the body for insight

Q27____ + Q28____ + Q29____/3= _________

8. Trusting: Experience of one's body as safe and trustworthy

Q30____ + Q31____ + Q32____/3= _________

Below there are a list of sentences. How often do you do what the sentence says? Never? Always? Or somewhere in between? Choose a number between 0 (*never*) and 5 (*always*) to tell us how often you do what the sentence says.

		Never					**Always**
1.	When I am nervous I can tell where in my body the feelings come from.	0	1	2	3	4	5
2.	I can tell when I am uncomfortable in my body.	0	1	2	3	4	5
3.	I can tell where in my body I am comfortable.	0	1	2	3	4	5
4.	I can tell when my breathing changes, like if it slows down or speeds up.	0	1	2	3	4	5
5.	I ignore bad feelings in my body until they become very strong.	0	1	2	3	4	5
6.	I distract myself when I feel uncomfortable or feel pain.	0	1	2	3	4	5
7.	When I feel uncomfortable or feel pain, I try to get over it.	0	1	2	3	4	5
8.	When I feel pain in my body, I become upset.	0	1	2	3	4	5
9.	I get worried if I feel pain or if I feel uncomfortable.	0	1	2	3	4	5
10.	I can tell if I have a bad feeling in my body but I don't worry about it.	0	1	2	3	4	5
11.	I can focus on how I breathe without thinking about anything else.	0	1	2	3	4	5
12.	I can focus on the feelings in my body, even when there is a lot going on around me.	0	1	2	3	4	5
13.	When I am talking to someone, I can focus on the way I am standing or sitting.	0	1	2	3	4	5
14.	Even if I am distracted I can go back to thinking how my body feels.	0	1	2	3	4	5
15.	I can return my focus from thinking about things to feeling my body.	0	1	2	3	4	5
16.	I can pay attention to my whole body even when a part of it is in pain.	0	1	2	3	4	5
17.	I can focus on my entire body when I try.	0	1	2	3	4	5
18.	I can feel how my body changes when I am angry.	0	1	2	3	4	5
19.	When something is wrong in my life I can feel it in my body.	0	1	2	3	4	5
20.	After a peaceful moment, I can feel my body is different.	0	1	2	3	4	5
21.	I can feel that my breathing becomes free and easy when I am comfortable.	0	1	2	3	4	5
22.	I can feel how my body changes when I feel happy.	0	1	2	3	4	5
23.	I can feel calm even if there is a lot going on.	0	1	2	3	4	5
24.	When I focus on how I feel in my body, I calm down.	0	1	2	3	4	5

(Continues)

		Never					Always
25.	I can use my breath to help me calm down and relax.	0	1	2	3	4	5
26.	When I am thinking too much, I can calm my mind by focusing on my body/breathing.	0	1	2	3	4	5
27.	I listen for clues from my body about my emotions.	0	1	2	3	4	5
28.	When I am upset, I take time to check how my body feels.	0	1	2	3	4	5
29.	I listen to my body to help me choose what to do.	0	1	2	3	4	5
30.	I feel good in my body.	0	1	2	3	4	5
31.	I feel my body is a safe place.	0	1	2	3	4	5
32.	I trust the way my body feels.	0	1	2	3	4	5