

# Validation of the Multidimensional Assessment of Interoceptive Awareness Scale in a Sample of Transgender and Gender-Diverse Adults

Assessment  
2026, Vol. 33(1) 100–114  
© The Author(s) 2025  
Article reuse guidelines:  
sagepub.com/journals-permissions  
DOI: 10.1177/10731911241308085  
journals.sagepub.com/home/asm



Rachel E. Frietchen<sup>1</sup> , Marley G. Billman Miller<sup>1</sup>,  
Dominic M. Denning<sup>2</sup>, April R. Smith<sup>1</sup>, and Tiffany A. Brown<sup>1</sup>

## Abstract

The Multidimensional Assessment of Interoceptive Awareness (MAIA-2) is a leading assessment of interoception. We examined the factor structure and psychometric characteristics of the MAIA-2 and its associations with psychopathology in a sample of transgender and gender-diverse (TGD) adults. Participants ( $N = 301$ ) were recruited via Prolific Academic. Regression analyses were conducted to examine the association between the MAIA-2 subscales, disordered eating, and self-injurious thoughts and behaviors. The eight-factor MAIA-2 demonstrated good model fit after removing Item 2. The MAIA-2 subscales were significantly positively associated with body appreciation and body satisfaction and negatively associated with depression, anxiety, and stress. The MAIA-2 subscales also demonstrated several significant associations with disordered eating. Only Body Trust was significantly negatively associated with participants' perceived likelihood of making a future suicide attempt. This study provided preliminary evidence that the MAIA-2 is an adequate measure of interception in TGD samples.

## Keywords

transgender adults, gender diverse adults, interoception, eating disorders, suicidal thoughts and behaviors, non-suicidal self-injury

Interoception refers to one's ability to connect to, understand, and appropriately regulate internal physiological sensations and is negatively associated with a variety of mental health symptoms (Gibson, 2019). The Multidimensional Assessment of Interoceptive Awareness (MAIA) and the revised version with improved internal consistency (MAIA-2) are leading assessments of interoceptive awareness (Mehling et al., 2012, 2018). The MAIA-2 measures eight interoceptive domains and has been validated in a variety of community and clinical samples (e.g., participants hospitalized for major depressive disorder and eating disorders) as well as in several languages (e.g., English, Arabic, Japanese; Fekih-Romdhane et al., 2023; Mehling et al., 2012, 2018; Shoji et al., 2018). However, the factor structure of the MAIA-2 has not always replicated, and certain subscales have demonstrated poor reliability (Shoji et al., 2018; Todd et al., 2020). Notably, the psychometric properties of the MAIA-2 have not been examined in transgender and gender-diverse (TGD) people—an umbrella term that encompasses several gender identities including transgender men, transgender women, non-binary, genderqueer, and two-spirit people (Coleman

et al., 2022). However, TGD people are at elevated risk for body-focused discrimination (i.e., harassment, rejection, objectification, and discrimination based on body shape and appearance) and other experiences that could impact interoception (Perlson et al., 2021; Robles et al., 2021). As such, interoceptive experiences may be a useful construct to examine among TGD people, but to do so, the field needs a valid measure of interoceptive awareness for TGD people.

Interoception encompasses a variety of processes related to identifying and interpreting bodily sensations (Pollatos & Herbert, 2018). Our bodies send sensory signals (e.g., hunger, pain, and breathing cues) to inform us of our internal state and guide our decision-making (Petzschner et al., 2021). In other words, interoception is

---

<sup>1</sup>Auburn University, AL, USA

<sup>2</sup>University of Massachusetts Amherst, USA

## Corresponding Author:

Rachel E. Frietchen, Department of Psychological Sciences, Auburn University, 226 Thach Hall, Auburn, AL 36849-9027, USA.  
Email: ref0033@auburn.edu

critical for maintaining homeostasis (Chen et al., 2021; Petzschner et al., 2021). Therefore, if one is disconnected from their internal sensations, they may have impaired interoception, which is linked to a multitude of negative psychological outcomes, including suicidal thoughts and behaviors, nonsuicidal self-injury (NSSI), and eating disorders (Forrest & Smith, 2021; Khalsa et al., 2018; Perkins et al., 2021; Qu et al., 2023; Rogers et al., 2018, 2021).

TGD people experience several factors that could affect their risk for interoceptive impairment, including gender incongruence, discrimination, and victimization (Johns, 2019). Some TGD people may experience high levels of gender incongruence, a normative, non-pathological psychophysiological process that occurs when one's physical body does not align with one's gender identity or expression, and low levels of body connection, which may in turn affect how they feel about their bodies (Ashley, 2021). Gender incongruence may become amplified for TGD people encountering frequent/chronic minority stressors and exacerbate disrupted body trust and body connection (Ashley, 2021; Austin et al., 2022; Davies & Davies, 2020; Dewey et al., 2023; Dietz & Pearce, 2020; Mumford et al., 2023; Wolfe & Fogwell, 2022). Indeed, discrimination negatively affects facets of interoception among people with marginalized identities (Kinkel-Ram et al., 2023). For example, among Black Americans, discrimination was indirectly related to suicidal ideation through decreased bodily trust—a component of interoception (Kinkel-Ram et al., 2023).

Limited research has examined interoception in TGD samples; however, in one study, transgender men demonstrated altered neural activation in somatosensory and body-related brain areas when a body part was stimulated that was congruent (hands) versus incongruent (breasts) with their gender identity (Case et al., 2017). Furthermore, frequent experiences with identity-specific victimization and minority stressors (e.g., misgendering, stigma associated with gender expression) that often elicit body-focused distress may elevate risk for interoceptive deficits in TGD people (Johns, 2019; Perlson et al., 2021; Robles et al., 2021). Given these experiences, it is not surprising that some TGD people report interoceptive deficits and distress when noticing body sensations (Bluth et al., 2021; Gibson, 2019; Tilley et al., 2022). Although some research suggests that interoception might be affected by minority stress in TGD people, empirical work on this topic is limited given the lack of validated interoceptive measures in this population.

The Multidimensional Assessment of Interoceptive Awareness-2 (MAIA-2) is commonly used to assess interoception and has advantages (e.g., assesses multiple

distinctive interoceptive processes rather than using a unidimensional approach) over other interoception measures (Todd et al., 2022). The MAIA-2 consists of eight distinct but related interoceptive subscales: Noticing (i.e., noticing bodily sensations), Not-Distracting (i.e., not-distracting from uncomfortable bodily sensations), Not Worrying (i.e., not-worrying about uncomfortable bodily sensations), Attention Regulation (i.e., attending to bodily sensations), Emotional Awareness (i.e., connecting bodily sensations and emotions), Self-Regulation (i.e., using bodily sensations to calm one's self), Body Listening (i.e., listening to one's body), and Body Trust (i.e., trusting one's body; Mehling et al., 2012, 2018). These subscales are generally positively associated with hunger/satiety cues and mindfulness, and negatively related to anxiety, emotion regulation difficulties, and alexithymia (Brown et al., 2017; Fekih-Romdhane et al., 2023; Mehling et al., 2012; Teng et al., 2022). Several studies using factor analysis on the MAIA or MAIA-2 demonstrate acceptable model fit for the original eight-factor structure in children, adolescent, and adult samples (Brown et al., 2017; Fekih-Romdhane et al., 2023; Ferentzi et al., 2021; Fiskum et al., 2023; Jones et al., 2021; Lin et al., 2017; Mehling et al., 2012, 2018; Valenzuela-Moguillansky & Reyes-Reyes, 2015; Vinni et al., 2021).

Conversely, several studies using the MAIA or MAIA-2 revealed alternative factor structures. This has been particularly true in samples that differ from the demographic characteristics of the initial validation group (e.g., Malaysian adults, Japanese young adults), in which the eight-factor model yields poor model fit (Shoji et al., 2018; Todd et al., 2020). In addition, the Not Worrying and Not Distracting subscales commonly do not demonstrate acceptable fit indices, in a variety of samples including community adults, United States college students, Columbian college students, and Japanese young adults (Ferentzi et al., 2021; Montoya-Hurtado et al., 2023; Rogers et al., 2021; Shoji et al., 2018). Other subscales that yield questionable fit indices in some samples include Noticing and Body Listening in a sample of Portuguese college students and a sample of Chinese adults (Machorrinho et al., 2019; Teng et al., 2022). Several subscales (i.e., Noticing, Not Distracting, and Not Worrying) of the MAIA and MAIA-2 also demonstrate poor internal consistency, with several studies demonstrating a Cronbach alpha of below .70 for at least one subscale (e.g., Brown et al., 2017; Ferentzi et al., 2021; Jones et al., 2021; Lin et al., 2017; Shoji et al., 2018; Teng et al., 2022; Valenzuela-Moguillansky & Reyes-Reyes, 2015; Vinni et al., 2021). Given these mixed results, further studies are needed to examine the factor structure and psychometric properties of the MAIA-2 in relevant samples, such as TGD people.

Notably, dysregulation in specific facets of interoception appears to confer risk for disordered eating, NSSI, and suicidal thoughts and behaviors across a variety of samples (Brown et al., 2017; Forrest & Smith, 2021; Perkins et al., 2021; Qu et al., 2023; Rogers et al., 2018, 2021), and accruing evidence suggests these relations are relevant to TGD samples as well. For instance, TGD people noted that challenges they face (e.g., body-focused discrimination) impair acceptance of bodily sensations and body appreciation, which in turn related to disordered eating (Cusack, Levenson, & Galupo, 2022; Duffy et al., 2016; Pham et al., 2023). Lower body care (i.e., behaviors related to care for one's body), a concept related to interoception, was positively associated with NSSI in a TGD sample (Morris & Galupo, 2019). Furthermore, in an online TGD sample, participants that endorsed lifetime NSSI reported significantly lower body investment (Reisner & Juntunen, 2015). It is possible that certain facets of interoception may be adaptive and others maladaptive in their associations with suicidal thoughts and behaviors, NSSI, and eating disorders in TGD samples. However, the lack of validated measures of interoception in TGD people limits the field's ability to test for these associations.

In sum, given that the MAIA-2 factor structure varies in samples with different demographic characteristics than the initial validation samples, it is important to examine whether the proposed factor structure performs well in a TGD sample. Thus, the current study aimed to psychometrically examine the original eight-factor structure of the MAIA-2 as well as a reduced six-factor model used in past studies (removing the Not Distracting and Not Worrying subscales). Then, we sought to examine the association between the MAIA-2 subscales and disordered eating, NSSI, and suicidal thoughts and behaviors. Based on prior work (Shoji et al., 2018; Todd et al., 2020), we hypothesized that the original eight-factor structure for the MAIA-2 would yield poor model fit and that removing the Not-Worrying and Not-Distracting subscales would improve the model. Finally, we hypothesized that the MAIA-2 subscales would be negatively related to disordered eating, suicidal thoughts and behaviors, and NSSI in this sample.

## Method

### Participants and Procedures

We report how we determined our sample size, all data exclusions, and all measures in the study. Participants were recruited through Prolific Academic between July and November 2023 for a larger study examining gender minority stress and social determinants of mental health in TGD adults. To be eligible, participants needed to: (a) identify as transgender or gender diverse, (b) be 18

years or older, (c) live in the United States, and (d) speak English. Recruitment was stratified across transgender men, transgender women, and gender-diverse people. At least 300 participants were recruited given sample size considerations for factor analyses (Kyriazos, 2018). Of the 323 participants who enrolled in the study, 21 were excluded for identifying as cisgender ( $n = 7$  cisgender men,  $n = 14$  cisgender women). Given the challenges with data integrity using virtual crowdsourcing research platforms (see Palan & Schitter, 2018; Peer et al., 2017), and consistent with other research examining similar populations (see Denning et al., 2022), attention check items from Huang and colleagues (2015) were embedded throughout the survey to facilitate the detection of insufficient effort in responding. All non-cisgender participants provided sufficient effort in responding to survey items (i.e., responded at a rate of 2 seconds per item or more and responded correctly to at least four out of eight attention check items), consistent with previous studies (see Denning et al., in press). Upon further examination of the data, we identified a participant who completed the survey twice using the same IP address. We excluded the latter of the two responses from the analyses. Participants were compensated \$10 after completing the survey. All participants provided informed consent and study procedures were approved by the institutional review board at Auburn University. The code and de-identified data that support the findings of this study are available from the corresponding author (ref0033@auburn.edu) upon reasonable request.

Participants ( $n = 301$ ) in the present sample were on average young adults ( $M_{\text{age}} = 29.63$  years,  $SD = 9.09$ , range 18–62 years). Approximately half were assigned female at birth ( $n = 159$ , 52.82%) and comparable proportions identified as transgender women ( $n = 90$ , 29.90%), transgender men ( $n = 82$ , 27.24%), or gender-queer/nonconforming ( $n = 129$ , 42.72%). Most participants reported having some college education or more ( $n = 254$ , 84.39%) and were employed full- or part-time ( $n = 188$ , 62.46%) with an annual income less than \$31,000 ( $n = 193$ , 64.12%). Moreover, most participants identified at least one of their racial identities as White ( $n = 246$ , 81.40%) and did not identify as Hispanic or Latine ( $n = 262$ , 87.04%). Table 1 presents full sample characteristics.

### Measures

**Gender Identity.** Consistent with recommendations from the GenIUSS group (2015), we assessed gender identity using two items. Participants were first asked “what sex [they] were assigned at birth?” and responded with one of the following options: male, female, intersex, or other (please describe). Second, participants were asked “how

**Table 1.** Sample Characteristics (n = 301).

Variable	n (%) / M (SD)
<b>Age</b>	
Range (18–62)	29.63 (9.09)
<b>Sex</b>	
Male	135 (44.82)
Female	159 (52.82)
Intersex <sup>a</sup>	5 (1.66)
Other/prefer not to disclose <sup>a</sup>	2 (0.66)
<b>Gender</b>	
Man	9 (2.99)
Transgender man	73 (24.25)
Woman	7 (2.32)
Transgender woman	83 (27.57)
Genderqueer/gender nonconforming	76 (25.25)
I prefer to use a different term <sup>b</sup>	53 (17.60)
<b>Education</b>	
Less than high school	2 (0.66)
High school or GED equivalent	45 (14.95)
Some college	102 (33.77)
2-year degree	30 (9.93)
4-year degree	100 (33.11)
Graduate or professional degree	22 (7.31)
<b>Employment</b>	
Unemployed	87 (28.90)
Disabled	26 (8.64)
Part-time	84 (27.81)
Full-time	104 (34.55)
<b>Sexual orientation<sup>c</sup></b>	
Asexual	22 (7.31)
Bisexual/pansexual	166 (55.15)
Gay/lesbian	70 (23.26)
Heterosexual	17 (5.65)
Queer	22 (7.31)
Another term better describes me	14 (4.65)
<b>Race<sup>d</sup></b>	
Indigenous American or Alaska Native	11 (3.65)
Asian	29 (9.63)
Black/African American	35 (11.63)
Native Hawaiian or Other Pacific Islander	6 (1.99)
White	246 (81.40)
Another term better describes me	16 (5.32)
<b>Ethnicity</b>	
Hispanic/Latine	39 (12.96)
Not Hispanic/Latine	262 (87.04)
<b>Annual Income</b>	
\$ 0–\$30,000	193 (64.12)
\$31,000–\$60,000	65 (21.59)
\$61,000–\$90,000	28 (9.30)
\$91,000–\$120,000	8 (2.66)

<sup>a</sup>Of the five participants that endorsed intersex assigned at birth, two identified their current gender identity as a transgender man, two identified as a transgender woman, and one identified as genderqueer. Of the two participants that endorsed other or prefer not to disclose, one identified their current gender identity as genderqueer/gender nonconforming and one identified their current gender identity as agender. <sup>b</sup> Includes responses such as gender flux, nonbinary, abinary, transmasculine, agender, demigirl, genderfluid, two spirit, and genderfae. <sup>c</sup> Participants can endorse more than one sexual orientation, thus, frequencies add up to more than 100%. Participants that endorsed “another term describes me better” include identities such as aromantic, birelational, demisexual, omnisexual, panromantic, polysexual, and questioning. <sup>d</sup> Participants can endorse more than one race, thus frequencies add up to more than 100%. Participants that endorsed “another term describes me better” include identities such as multiracial/mixed, Romani, Sephardic Jew, Basque/Spanish, Middle Eastern, Mediterranean, and unsure of background (adopted).

do [they] identify [their] gender” and selected one of the following response options: man, transgender man, woman, transgender woman, genderqueer/gender-nonconforming or I prefer to use a different term (please describe). Participants were considered a gender minority if their sex assigned at birth was incongruent with their gender identity.

**Interoception.** The MAIA-2 (Mehling et al., 2018) is a revised and extended version of the original MAIA (Mehling et al., 2012) and was used to measure interoception. The MAIA-2 is comprised of 37 items that can be distilled into eight separate subscales: Noticing (*When I am tense, I notice where the tension is located in my body*); Not-Distracting (*When I feel unpleasant body sensations, I occupy myself with something else so I don't have to feel them, which is reversed scored*); Not-Worrying (*I can notice unpleasant body sensations without worrying about it*); Attention Regulation (*I can pay attention to my breath without being distracted by things happening around me*); Emotional Awareness (*I notice how my body changes when I am angry*); Self-Regulation (*When I bring awareness to my body, I feel a sense of calm*); Body Listening (*I listen for information from my body about my emotional state*); and Body Trust (*I am at home in my body*). Participants respond to each item on a scale from 0 (*never*) to 5 (*always*), with higher scores indicative of greater interoceptive awareness. Several items are reverse scored before items are averaged to generate subscale scores (see Supplemental Table S3).

**Measures Assessing Convergent Validity**

**Gender-Related Body Satisfaction.** To assess gender-related body satisfaction, the reverse-scored version of the 10-Item Likert-Type Scale for Body Dissatisfaction was used (PBS; Roden et al., 2023). This measure assesses dissatisfaction associated with height, weight, head hair, body hair, voice, jaw, hands, shoulders, legs, and face. Participants are asked to rate each attribute on a scale from 1 (*parts of your body that you are very satisfied with*) to 5 (*parts of your body that you feel very uncomfortable with, or experience dysphoria related to it*). Scores are then reverse scored and averaged across items so that higher scores reflect greater body satisfaction. This measure was derived from the Penn State Gender Health Clinic initial medical interview (Roden et al., 2023), which is utilized by a primary care physician upon evaluating adolescents and young adults for gender-affirming interventions at the facility. Internal consistency for the present study was adequate ( $\omega = .88$ , see Supplemental Table S1). This measure was selected for convergent validity, as it has been validated within a TGD sample and measures a similar construct (i.e., body perception,

body awareness) to other research examining the psychometric properties of the MAIA and the MAIA-2 (Ferentzi et al., 2021; Mehling et al., 2012; Valenzuela-Moguillansky & Reyes-Reyes, 2015).

**Body Appreciation.** The Body Appreciation Scale-2 (BAS-2; Tylka & Wood-Barcalow, 2015) was used to examine positive body image, which has been validated in TGD samples (Paquette et al., 2022; Swami et al., 2023). The BAS-2 is a 10-item revised version of the original BAS (Avalos et al., 2005) and participants respond on a scale from 1 (*never*) to 5 (*always*). Items are averaged to compute a composite score with higher scores indicating greater body appreciation. Internal consistency for the BAS-2 ( $\omega = .98$ ) was in the acceptable range (see Supplemental Table S1). This measure was selected for convergent validity, as it has been validated within a TGD sample and measures a similar construct (i.e., body perception, body awareness) to other research examining the psychometric properties of the MAIA and the MAIA-2 (Ferentzi et al., 2021; Mehling et al., 2012; Valenzuela-Moguillansky & Reyes-Reyes, 2015).

**Depression, Anxiety, and Stress Symptoms.** The Depression Anxiety Stress Scale (DASS-21; Lovibond & Lovibond, 1995) is a 21-item measure used to assess symptoms of various emotional disorders. Participants respond on a scale from 0 (*did not apply to me at all*) to 3 (*applied to me very much or most of the time*), with higher scores indicating greater pathology. Items are summed to create three subscales: Depression, Anxiety, and Stress. The DASS-21 has been previously validated in a sample of gender minority adults and demonstrated invariance with cisgender adults (Lindley & Bauerband, 2023). Internal consistency across subscales was adequate for the present study: Depression ( $\omega = .94$ ), Anxiety ( $\omega = .93$ ), and Stress ( $\omega = .89$ , see Supplemental Table S1). This measure was selected for convergent validity, as it has been validated within a TGD sample and measures similar constructs (i.e., anxiety, stress) to other research examining the psychometric properties of the MAIA and the MAIA-2 (Brown et al., 2017; Ferentzi et al., 2021; Machorrinho et al., 2019; Mehling et al., 2012; Shoji et al., 2018; Teng et al., 2022; Valenzuela-Moguillansky & Reyes-Reyes, 2015).

For the Depression subscale, 32.22% of participants ( $N = 97$ ) were within the “Normal” cutoff, 7.64% of participants ( $N = 23$ ) were within the “Mild” cutoff, 19.60% of participants ( $N = 59$ ) were within the “Moderate” cutoff, 10.96% of participants ( $N = 33$ ) were within the “Severe” cutoff, and 28.90% of participants ( $N = 87$ ) were within the “Extremely Severe” cutoff (Lovibond & Lovibond, 1995). For the Anxiety

subscale, 34.22% of participants ( $N = 103$ ) were within the “Normal” cutoff, 5.98% of participants ( $N = 18$ ) were within the “Mild” cutoff, 19.93% of participants ( $N = 60$ ) were within the “Moderate” cutoff, 10.63% of participants ( $N = 32$ ) were within the “Severe” cutoff, and 28.57% of participants ( $N = 86$ ) were within the “Extremely Severe” cutoff (Lovibond & Lovibond, 1995). For the Stress subscale, 39.87% of participants ( $N = 120$ ) were within the “Normal” cutoff, 12.96% of participants ( $N = 39$ ) were within the “Mild” cutoff, 21.26% of participants ( $N = 64$ ) were within the “Moderate” cutoff, 15.95% of participants ( $N = 48$ ) were within the “Severe” cutoff, and 9.30% of participants ( $N = 28$ ) were within the “Extremely Severe” cutoff (Lovibond & Lovibond, 1995).

### Criterion Measures

**Disordered Eating.** Eating disorder symptomatology was assessed using the Eating Pathology Symptom Inventory (EPSI; Forbush et al., 2013). The EPSI is a 45-item, multidimensional measure that captures Body Dissatisfaction, Binge Eating, Cognitive Restraint, Purging, Restriction, Excessive Exercise, Negative Attitudes Toward Obesity, and Muscle Building. Participants respond on a 5-point Likert-type scale that ranges from 1 (*never*) to 5 (*very often*). Scores are summed for each subscale with higher scores indicating greater eating pathology. While the EPSI has yet to be validated in gender minority populations, it has been used to examine eating pathology in a sample of gender minority individuals (Roberts et al., 2022). Internal consistency for each subscale was adequate: Body Dissatisfaction ( $\omega = .90$ ), Binge Eating ( $\omega = .89$ ), Cognitive Restraint ( $\omega = .76$ ), Purging ( $\omega = .88$ ), Restriction ( $\omega = .93$ ), Excessive Exercise ( $\omega = .93$ ), Negative Attitudes Toward Obesity ( $\omega = .95$ ), and Muscle Building ( $\omega = .92$ , see Supplemental Table S1).

**Suicidal Thoughts and Behaviors and Nonsuicidal Self-Injury.** The Deliberate Self-Harm Inventory (DSHI; Gratz, 2001) is a 17-item measure used to assess nonsuicidal self-injury (i.e., the intentional damage to bodily tissue without concurrent suicidal intent). The DSHI asks participants to endorse whether they have engaged in any of the 17 methods of NSSI identified in the inventory. If a method is endorsed, participants are then asked: (a) how old they were when they first engaged in NSSI, (b) how many times they have engaged in a behavior using that method, (c) how long they have engaged in that behavior, and (d) whether that behavior resulted in hospitalization or injury severe enough to require medical intervention. For the present study, items were framed for the 6 weeks prior to the assessment and lifetime.

Participants were also asked about their frequency of suicidal ideation, suicidal intent, and suicide attempts in the past 6 weeks and lifetime. Participants also reported their perceived likelihood of making a suicide attempt in the future. Participants were asked “how many times have you thought about suicide or killing yourself in [time-frame]” and “in [timeframe] how many times have you attempted suicide or hurt yourself with the intent to die.” Participants responded to both items with the frequency of their thoughts or behaviors. For participants that endorsed suicidal ideation in the past 6 weeks, they were also asked “in the past 6 weeks, when you’re having thoughts of suicide or hurting yourself with the intent to die, how strong is your intent to kill yourself on average?” Response options ranged from 0 (*no intent at all*) to 10 (*definite intent*). All participants were asked “how likely is it that you will attempt suicide someday (or again)?” Response options ranged from 1 (*never*) to 6 (*very likely*).

Although the DSHI has not been validated in a TGD sample, this assessment has been previously used in TGD samples to measure NSSI (Staples et al., 2018; Treharne et al., 2020). Approximately 24.58% of the sample ( $N = 74$ ) endorsed at least one instance of NSSI in the past 6 weeks ( $M = 2.24$ ,  $SD = 8.77$ , range = 0–84, skewness = 6.11, kurtosis = 42.34), 33.22% of the sample ( $N = 100$ ) endorsed at least one instance of SI in the past 6 weeks ( $M = 4.64$ ,  $SD = 14.26$ , range = 0–100, skewness = 4.66, kurtosis = 24.52), and 39.20% of the sample ( $N = 118$ ) endorsed making at least one suicide attempt in their lifetime ( $M = 1.44$ ,  $SD = 6.22$ , range = 0–100, skewness = 13.77, kurtosis = 213.56). For participants who endorsed past 6-week suicidal ideation ( $N = 100$ ), average suicidal intent was approximately 3.24 ( $SD = 2.78$ , range = 0–10, skewness = 0.77, kurtosis = -0.40). For the entire sample, the average perceived likelihood of a future suicide attempt was *Rather Unlikely* ( $M = 2.47$ ,  $SD = 1.26$ , range = 1–6, skewness = 0.88, kurtosis = 0.45).

### Data Analysis

Counts of missing data ranged from 2 (DASS-21 Depression) to 5 (BAS-2) in the dataset. Little’s missing completely at random (MCAR) test was not significant,  $\chi^2(33) = 25.56$ ,  $p = .820$ , indicating that data were consistent with MCAR. As such, full information maximum likelihood was used to allow partially missing data to contribute to the model (Enders & Bandalos, 2001). The MAIA-2 model fit was examined by conducting confirmatory factor analysis (CFA) with a weighted least square mean and variance-adjusted estimator in Mplus Version 8.6 software (Brown, 2015). A CFA was first conducted with all eight subscales and then rerun with the Not Worrying and Not Distracting subscales

removed. Model fit was determined by comparing the comparative fit index (CFI), Tucker–Lewis index (TLI), standardized root-mean square residual (SRMR), and the root-mean-square error of approximation (RMSEA) with 90% confidence intervals. Items with factor loadings below 0.60 and inter-item correlations below 0.30 were removed and the CFA was rerun without these items (Hair et al., 2010). Model fit was considered acceptable if the CFI and TLI were at least 0.90, the SRMR was no greater than 0.05, and the upper limit for the RMSEA was no greater than 0.08 (Hooper et al., 2008). A chi-square difference test was used to compare model fits between the eight-factor model and the six-factor models (Asparouhov et al., 2006).

Internal consistency was measured with the omega coefficient (Hayes & Coutts, 2020). Pearson correlations were used to examine relations between the MAIA-2 subscales and the convergent validity measures. Regression with maximum likelihood parameter estimates with robust errors was conducted in Mplus to investigate the associations between the MAIA-2 subscales, the EPSI subscales, perceived likelihood of making a future suicide attempt, and past 6-week average suicidal intent. This method is less sensitive to outliers and violations of normality assumptions (Yaffee, 2002). All MAIA-2 subscales were included in all models so that the effects of each MAIA-2 subscale could be interpreted while controlling for other subscales. Because the data for past 6-week NSSI frequency, past 6-week SI frequency, and lifetime suicide attempts were very positively skewed, had many observations with a count of zero, and had a variance greater than the mean for each count, a zero-inflated negative binomial regression was run to examine the impact of the MAIA-2 subscales on each count variable (Zeileis et al., 2008). To run this analysis, we used the `zeroinfl` function in the `pscl` package in R (Jackman, 2024; Zeileis et al., 2008). Benjamini–Hochberg procedure was used to adjust for multiple correlations with a false-positive rate of 0.05 and eight separate tests for each of the dependent variables (Benjamini & Hochberg, 1995). Multicollinearity was assessed through variance inflation factor (VIF) scores with a score of 10 indicative of high multicollinearity (Thompson et al., 2017), and the largest VIF score was 2.75 for Body Listening; thus, multicollinearity was not a confounding concern for the abovementioned analyses.

## Results

### Factor Structure for the MAIA-2

All items significantly loaded onto the MAIA-2 subscales. The smallest item loading was 0.53 for Item 2 (*I*

**Table 2.** Model Fit for MAIA-2 Versions.

Model	CFI	TLI	SRMR	RMSEA [90% CI]
Full 8-factor model	0.94	0.94	0.06	0.08 [0.07, 0.08]
Full (without Item 2) 8-factor model	0.95	0.95	0.05	0.07 [0.06, 0.07]
Reduced 6-factor model	0.96	0.95	0.05	0.08 [0.08, 0.09]

Note. The full model is a confirmatory factor analysis with all the MAIA-2 subscales (Noticing, Not Distracting, Not Worrying, Attention Regulation, Emotion Regulation, Self-Regulation, Body Listening, and Trust). For the second model fit, Item 2 (“I notice when I am uncomfortable in my body”) was removed. The third model was a confirmatory factor analysis with two of the MAIA-2 subscales (i.e., Not Distracting, Not Worrying) removed. CFI = comparative fit index. TLI = Tucker–Lewis index. SRMR = standardized root mean squared residual. RMSEA = root mean square error of approximation.

**Table 3.** Correlation Matrix of MAIA-2 Subscales and Convergent Validity Measures.

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. MAIA-2 Noticing	–	<b>.14</b>	.11	<b>.55</b>	<b>.60</b>	<b>.50</b>	<b>.56</b>	<b>.47</b>	<b>.22</b>	<b>-.23</b>	-.02	-.11	<b>.22</b>
2. MAIA-2 Not Distracting		–	<b>.17</b>	<b>.21</b>	<b>.13</b>	<b>.28</b>	<b>.28</b>	<b>.41</b>	<b>.39</b>	<b>-.36</b>	<b>-.34</b>	<b>-.40</b>	<b>.43</b>
3. MAIA-2 Not Worrying			–	<b>.31</b>	-.04	<b>.21</b>	<b>.08</b>	<b>.31</b>	<b>.31</b>	<b>-.27</b>	<b>-.32</b>	<b>-.33</b>	<b>.28</b>
4. MAIA-2 Attention Regulation				–	<b>.47</b>	<b>.61</b>	<b>.51</b>	<b>.52</b>	<b>.26</b>	<b>-.32</b>	<b>-.27</b>	<b>-.33</b>	<b>.26</b>
5. MAIA-2 Emotional Awareness					–	<b>.57</b>	<b>.69</b>	<b>.45</b>	<b>.19</b>	<b>-.15</b>	.04	-.06	<b>.36</b>
6. MAIA-2 Self-Regulation						–	<b>.68</b>	<b>.66</b>	<b>.35</b>	<b>-.39</b>	<b>-.20</b>	<b>-.32</b>	<b>.54</b>
7. MAIA-2 Body Listening							–	<b>.60</b>	<b>.24</b>	<b>-.24</b>	-.03	-.18	<b>.45</b>
8. MAIA-2 Body Trust								–	<b>.59</b>	<b>-.58</b>	<b>-.38</b>	<b>-.48</b>	<b>.78</b>
9. PBS									–	<b>-.44</b>	<b>-.32</b>	<b>-.36</b>	<b>.67</b>
10. DASS-21 Depression										–	<b>.58</b>	<b>.68</b>	<b>-.58</b>
11. DASS-21 Anxiety											–	<b>.73</b>	<b>-.30</b>
12. DASS-21 Stress												–	<b>-.42</b>
13. BAS-2													–

Note. MAIA-2 = Multidimensional Assessment of Interoceptive Awareness-2; PBS = Reverse-scored version of the 10-Item Likert-Type Scale for Body Dissatisfaction; DASS-21 = Depression, Anxiety, and Stress Scale; BAS-2 = Body Appreciation Scale-2. For ease of interpretation, correlations with  $p < .05$  are bolded.

notice when I am uncomfortable in my body) on the Noticing subscale. Even though the inter-item correlations between this item and others on the Noticing subscale were above 0.3 (ranged from 0.34 to 0.39), this item was removed for several reasons: (a) the factor loading was below the 0.6 threshold (Hair et al., 2010), (b) the inter-item correlations were close to .30, and (c) notably, none of the gender-diverse participants endorsed “Never” for Item 2 (Hair et al., 2010). Model fit for the CFA with the full MAIA-2 without Item 2 was acceptable. The smallest item loading was 0.63 for Item 4 on the Noticing subscale. Subscale correlations ranged from  $-0.04$  to  $0.69$  (see Table 2).

The model fit for the six-factor MAIA-2 was just outside the range of acceptability. The smallest item loading was 0.61 for Item 24 on the Emotional Awareness subscale. The chi-square difference test indicated that the eight-factor model provided significantly better fit to the data than the six-factor model,  $\Delta\chi^2(106) = 264.20, p < .01$ . Thus, for all subsequent analysis, the full MAIA-2 was used without Item 2 for the Noticing subscale.

### Internal Consistency and Convergent Validity

Internal consistencies for the MAIA-2 subscales were adequate ( $\omega = 0.70$ – $0.93$ ; see Supplemental Table S1). For convergent validity, the MAIA-2 subscales were significantly positively correlated with the BAS and the PBS. The MAIA-2 subscales were significantly negatively associated with the DASS-21 Depression, the DASS-21 Anxiety (except for Noticing, Emotional Awareness, and Body Listening), and the DASS-21 Stress (except for Noticing and Emotional Awareness). See Table 3.

### MAIA-2 Subscales, Disordered Eating, NSSI, and SI

Not Distracting was significantly negatively associated with Body Dissatisfaction, Binge Eating, and Restricting. Body Trust was significantly negatively correlated with Body Dissatisfaction, Cognitive Restraint, and Restricting. Body Listening was significantly positively associated with Body Dissatisfaction and Restricting. Attention Regulation was significantly negatively correlated with Binge Eating. No other

**Table 4.** Linear Multiple Regression of the MAIA-2 Subscales and EPSI Subscales.

Parameters	EPSI Body Dissatisfaction			EPSI Binge Eating			EPSI Cognitive Restraint			EPSI Purging		
	B	SE	p	B	SE	p	B	SE	p	B	SE	p
F-test	F(8, 289) = 18.20, p < .001 R <sup>2</sup> = .34			F(8, 289) = 6.43, p < .001 R <sup>2</sup> = .15			F(8, 289) = 3.75, p < .001 R <sup>2</sup> = .09			F(8, 289) = 2.35, p = .02 R <sup>2</sup> = .06		
Intercept	<b>0.67</b>	<b>0.05</b>	< <b>0.001</b>	<b>0.85</b>	<b>0.04</b>	< <b>0.001</b>	<b>0.91</b>	<b>0.03</b>	< <b>0.001</b>	<b>0.94</b>	<b>0.03</b>	< <b>0.001</b>
Noticing	0.04	0.06	0.55	0.05	0.07	0.47	0.01	0.07	0.90	0.11	0.07	0.10
Not Distracting	<b>-0.27</b>	<b>0.05</b>	< <b>0.001</b>	<b>-0.21</b>	<b>0.05</b>	< <b>0.001</b>	-0.11	0.06	0.06	-0.15	0.07	0.03
Not Worrying	-0.13	0.06	0.04	-0.11	0.06	0.07	0.04	0.06	0.54	-0.05	0.06	0.47
Attention Regulation	0.05	0.07	0.41	<b>-0.22</b>	<b>0.07</b>	<b>0.003</b>	0.04	0.08	0.59	-0.09	0.06	0.15
Emotion Awareness	-0.07	0.07	0.35	0.12	0.08	0.16	0.03	0.08	0.69	-0.09	0.06	0.16
Self-Regulation	0.02	0.08	0.81	0.19	0.09	0.03	0.16	0.10	0.10	0.11	0.08	0.17
Body Listening	<b>0.17</b>	<b>0.07</b>	<b>0.02</b>	-0.12	0.09	0.19	0.15	0.09	0.10	0.19	0.07	0.01
Body Trust	<b>-0.47</b>	<b>0.07</b>	< <b>0.001</b>	-0.12	0.08	0.14	<b>-0.36</b>	<b>0.07</b>	< <b>0.001</b>	-0.09	0.08	0.25

Parameters	EPSI Restricting			EPSI Excessive Exercise			EPSI Negative Attitudes Towards Obesity			EPSI Muscle Building		
	B	SE	p	B	SE	p	B	SE	p	B	SE	p
F-test	F(8, 289) = 7.18, p < .001 R <sup>2</sup> = .17			F(8, 289) = 3.49, p = .001 R <sup>2</sup> = .09			F(8, 289) = 1.43, p = .18 R <sup>2</sup> = .04			F(8, 289) = 1.47, p = .17 R <sup>2</sup> = .04		
Intercept	<b>0.83</b>	<b>0.04</b>	< <b>0.001</b>	<b>0.91</b>	<b>0.03</b>	< <b>0.001</b>	<b>0.96</b>	<b>0.02</b>	< <b>0.001</b>	<b>0.96</b>	<b>0.02</b>	< <b>0.001</b>
Noticing	0.08	0.08	0.31	-0.004	0.08	0.96	-0.06	0.08	0.40	0.15	0.08	0.06
Not Distracting	<b>-0.31</b>	<b>0.05</b>	< <b>0.001</b>	-0.16	0.06	0.01	-0.08	0.07	0.27	-0.09	0.06	0.14
Not Worrying	-0.07	0.06	0.26	-0.01	0.07	0.84	-0.09	0.06	0.17	-0.004	0.07	0.95
Attention Regulation	0.11	0.08	0.16	0.09	0.08	0.27	0.02	0.08	0.76	-0.05	0.08	0.53
Emotional Awareness	-0.11	0.08	0.18	-0.01	0.08	0.90	0.09	0.07	0.23	-0.06	0.8	0.43
Self-Regulation	-0.03	0.08	0.76	0.23	0.09	0.01	0.06	0.08	0.50	0.17	0.09	0.06
Body Listening	<b>0.19</b>	<b>0.07</b>	<b>0.01</b>	0.07	0.10	0.45	0.06	0.09	0.53	0.02	0.12	0.90
Body Trust	<b>-0.23</b>	<b>0.08</b>	<b>0.004</b>	-0.07	0.08	0.39	-0.12	0.08	0.11	-0.03	0.09	0.72

Note. EPSI = Eating Pathology Symptom Inventory. B = standardized beta. SE = standard error. For ease of interpretation, significant associations following the Benjamini–Hochberg correction are bolded.

associations between MAIA-2 subscales and EPSI subscales were significant after implementing the Benjamini–Hochberg procedure (see Table 4).

Only Body Trust was significantly negatively associated with perceived likelihood of making a future suicide attempt. No associations between the MAIA-2 subscales and past 6-week suicidal intent were significant. When running the zero-inflated negative binomial regressions using all eight subscales for each count outcome variable, the model failed to converge. Therefore, only the MAIA-2 subscales that were significantly correlated with the count outcome variable were entered in the model to prevent collinearity (see Supplemental Table S3). For the past 6-week suicidal ideation frequency, all MAIA-2 subscales except for Emotional Awareness were entered into the regression. For the past 6-week NSSI frequency, Not Distracting, Self-Regulation, and Body Trust were entered into the regression. For lifetime suicide attempt frequency, Not Distracting and Body Trust were entered

into the regression. No associations between the MAIA-2 subscales and past 6-week SI frequency, past 6-week NSSI frequency, and lifetime SA frequency were significant (see Table 5).

### Discussion

The present study examined the psychometric properties of the MAIA-2 within a sample of TGD adults, its correlations with like metrics of body appreciation, depression, anxiety, and stress, and its contemporaneous associations with disordered eating, suicidal thoughts and behaviors, and NSSI. Several factor structures were examined, and it was found that the original factor structure of the MAIA-2 with the removal of Item 2 for the Noticing subscale demonstrated better fit than the six-factor structure. Internal consistency scores for all MAIA-2 subscales were adequate, which diverged from some previous research finding poor

**Table 5.** Linear Multiple Regression of the MAIA-2 Subscales, Past 6-Week NSSI, Past 6-Week SI, Lifetime SA, Past 6-Week Suicidal Intent, and Perceived Likelihood of Making a Future Suicide Attempt.

Parameters	Past 6-Week NSSI Count model coefficients			Past 6-Week SI Count model coefficients			Lifetime SA Count model coefficients		
	B	SE	p	B	SE	p	B	SE	p
Intercept	<b>1.06</b>	<b>0.37</b>	<b>&lt;0.001</b>	<b>2.29</b>	<b>0.64</b>	<b>&lt;0.001</b>	<b>1.41</b>	<b>0.10</b>	<b>&lt;0.001</b>
Noticing	–	–	–	-0.30	0.18	0.10	–	–	–
Not Distracting	0.03	0.24	0.89	-0.21	0.25	0.41	-0.14	0.06	0.03
Not Worrying	–	–	–	0.25	0.17	0.12	–	–	–
Attention Regulation	–	–	–	0.32	0.23	0.18	–	–	–
Self-Regulation	0.34	0.25	0.17	0.41	0.28	0.14	–	–	–
Body Listening	–	–	–	-0.05	0.17	0.77	–	–	–
Body Trust	-0.48	0.23	0.04	-0.70	0.28	0.01	0.03	0.41	0.41
Log(theta)	<b>-2.33</b>	<b>0.15</b>	<b>&lt;0.001</b>	<b>-1.50</b>	<b>0.25</b>	<b>&lt;0.001</b>	–	–	–

Parameters	Zero-inflation model coefficients			Zero-inflation model coefficients			Zero-inflation model coefficients		
	B	SE	p	B	SE	p	B	SE	p
Intercept	-23.25	34.64	0.50	-4.22	1.87	0.02	-0.38	0.27	0.16
Noticing	–	–	–	-0.23	0.42	0.59	–	–	–
Not Distracting	5.50	7.27	0.46	-0.50	0.58	0.39	0.23	0.12	0.06
Not Worrying	–	–	–	0.70	0.36	0.06	–	–	–
Attention Regulation	–	–	–	-0.02	0.45	0.96	–	–	–
Self-Regulation	-2.36	2.10	0.26	0.97	0.74	0.19	–	–	–
Body Listening	–	–	–	-0.45	0.41	0.27	–	–	–
Body Trust	2.63	3.27	0.42	0.86	0.43	0.05	0.14	0.09	0.12

Parameters	Past 6-Week Suicidal Intent			Perceived Likelihood of Making a Future Suicide Attempt		
	B	SE	p	B	SE	p
F-test	$F(8, 90) = 0.89,$ $p = .53$ $R^2 = .07$			$F(8, 289) = 8.21,$ $p < .001$ $R^2 = .18$		
Intercept	<b>0.96</b>	<b>0.33</b>	<b>0.004</b>	<b>2</b>		
Noticing	-0.02	0.13	0.90	-0.06	0.07	0.46
Not Distracting	-0.03	0.13	0.82	-0.07	0.06	0.22
Not Worrying	-0.06	0.11	0.58	0.09	0.06	0.15
Attention Regulation	0.19	0.11	0.08	0.02	0.08	0.81
Emotion Awareness	0.08	0.15	0.61	0.11	0.08	0.16
Self-Regulation	0.20	0.18	0.26	0.07	0.08	0.42
Body Listening	-0.34	0.18	0.06	-0.01	0.09	0.89
Body Trust	-0.03	0.14	0.84	–		

Note. NSSI = nonsuicidal self-injury, SI = suicidal ideation, SA = suicide attempt. B = standardized beta. SE = standard error. For ease of interpretation, significant associations following the Benjamini–Hochberg correction are bolded.

consistency scores for Noticing, Not Distracting, and Not Worrying in cisgender samples (Ferentzi et al., 2021; Jones et al., 2021; Lin et al., 2017; Machorrinho et al., 2019; Rogers et al., 2021; Teng et al., 2022; Todd et al., 2020; Vinni et al., 2021). As anticipated, all MAIA-2 subscales were significantly positively correlated with body appreciation and body satisfaction. All were significantly negatively correlated with depressive symptoms, and most subscales were also significantly

negatively correlated with measures of anxiety and stress. Strong associations were found between MAIA-2 subscales and multiple facets of disordered eating and perceived likelihood of making a future suicide attempt. Taken together, these findings provide preliminary support for the MAIA-2 as a measure of interoceptive awareness in TGD people, though further examination of the individual items may be warranted to better assess relevance within this population.

The original factor structure of the MAIA-2 was found to have acceptable fit once Item 2 (“I notice when I am uncomfortable in my body”) of the Noticing subscale was removed. It is possible that this item does not adequately reflect interoceptive awareness in TGD folks and is perhaps instead capturing gender incongruence and/or body-focused discrimination experiences, which are common for TGD people, that induce bodily discomfort (Perlson et al., 2021; Robles et al., 2021). Interestingly, other subscales that have had questionable fit in cisgender samples (e.g., Body Listening, Not Worrying, & Not Distracting; Ferentzi et al., 2021; Jones et al., 2021; Lin et al., 2017; Machorrinho et al., 2019; Rogers et al., 2021; Teng et al., 2022; Vinni et al., 2021) appeared to have acceptable fit and internal consistency within our TGD sample. These discrepant psychometric findings call for further investigation of all MAIA-2 subscales within larger samples of TGD people to better probe how each of the interoceptive facets relate to mental health symptoms.

Analysis of convergent validity yielded strong positive correlations between the MAIA-2 subscales and measures of body appreciation and satisfaction in TGD individuals. This association with greater interoceptive awareness and greater body appreciation and satisfaction aligns with past research on the MAIA and body (dis)satisfaction (Brown et al., 2017). Strong associations with measures of body appreciation and functionality within this sample suggest that the MAIA-2 may be a useful psychometric tool for capturing body connection and trust among TGD people, though replication and further examination of the associations between the MAIA-2, body appreciation, and body satisfaction within TGD samples is warranted. Furthermore, strong negative associations with symptoms of depression, anxiety, and stress were found for most subscales, except for Noticing, Emotional Awareness, and Body Listening. Although these findings align with most past convergent validity studies of the MAIA-2 (Ferentzi et al., 2021; Mehling et al., 2012), there were some diverging results, such that Noticing, Emotional Awareness, and Body Listening were not significantly associated with anxiety (Brown et al., 2017).

Several significant associations were found between the MAIA-2 subscales and eating disorder symptoms while controlling for the other MAIA-2 subscales. In general, Not Distracting and Body Trust had the most robust associations with disordered eating, consistent with findings from a previous validation of the MAIA in a clinical eating disorder sample (Brown et al., 2017). In our study, TGD people who tended not to distract from uncomfortable bodily sensations reported lower symptoms of restricting, body dissatisfaction, and binge eating. Consistent with this, Brown and colleagues (2017)

found that people who reported a greater tendency towards distracting from uncomfortable bodily sensations were also more likely to report greater global disordered eating, dietary restraint, and eating/shape/weight concerns. In addition, Datta and Lock (2023) found that participants with anorexia nervosa reported significantly greater tendencies towards distracting from uncomfortable bodily sensations compared to a control group. In addition, in the present study, TGD people who tended to trust their bodily sensations reported lower symptoms of restricting, body dissatisfaction, and cognitive restraint. Consistent with this, past research in people with eating disorders supports that lower Body Trust was associated with greater global disordered eating, dietary restraint, and eating/shape/weight concerns (Brown et al., 2017) and that Body Trust scores were significantly worse (i.e., lower) in a sample of participants with anorexia nervosa or avoidant restrictive food intake disorder compared to a control group (Datta & Lock, 2023). In addition, these findings align with qualitative studies on disordered eating in TGD people that highlight how low body trust may relate to disordered eating (Cusack, Iampieri, & Galupo, 2022; Duffy et al., 2016; Pham et al., 2023). Indeed, body trust and body discomfort may be more complex for TGD people than cisgender people (Duffy et al., 2016).

Accordingly, processing gender dysphoria, normalizing gender diversity, and exploring gender expression were highlighted as helpful treatment targets for TGD people with disordered eating (Cusack, Iampieri, & Galupo, 2022; Cusack, Levenson, & Galupo, 2022). In addition, Body Listening and Attention Regulation were also associated with aspects of disordered eating in TGD people. Contrary to our predictions, those who tended to listen to their bodily sensations also reported higher symptoms of body dissatisfaction and restriction. Finally, those who generally attended to their bodily sensations reported lower symptoms of binge eating. Taken together, these findings support the connection between interoceptive deficits and eating disorder symptoms within TGD samples; however, the cross-sectional nature of this study limited our ability to examine temporal relations between interoception and disordered eating. Further research should aim to better assess the directionality of these associations via longitudinal data collection.

After adjusting for multiple comparisons, only Body Trust was negatively associated with perceived likelihood of making a future suicide attempt. No other associations between MAIA-2 subscales and self-injurious thoughts and behaviors were significant. These findings diverge from past literature that demonstrates support for a negative association between interoception and suicidal thoughts, lifetime suicide attempts, and NSSI

(DeVilleville et al., 2020; Duffy et al., 2021; Gioia et al., 2022; Hielscher & Zopf, 2021; Rogers et al., 2018; Smith et al., 2020). However, Body Trust has been associated with self-injurious behavior (Gioia et al., 2022; Velkoff & Smith, 2023). It is possible that interoceptive deficits are more associated with intensity of SI rather than SI frequency. This current study was unable to capture a holistic description of participants' experiences with SI, NSSI, and suicidal behavior, which may contribute to the lack of a significant association between the MAIA-2 subscales and self-injurious thoughts and behaviors. Further research should continue to examine the differential item function of the MAIA-2 within TGD samples using a prospective design (i.e., assessing frequency of self-injurious thoughts and behaviors after assessing interoception) to further our understanding of how these interoceptive facets relate to self-injurious thoughts and behavior.

This study was the first to our knowledge to examine the psychometric characteristics of the MAIA-2 in a TGD sample. The MAIA-2 is a widely used, multifaceted assessment of interoceptive awareness, but it is also relatively brief, syntactically simple, and easy to score. Results from this study provide preliminary support for the MAIA-2's validity and utility within TGD samples, though some considerations for improvement have also been identified (e.g., larger sample to test gender invariance, prospective study design). This study may serve as a starting point for future research aimed at assessing risk and preventive strategies for TGD mental health concerns stemming from disconnection from one's body. Our findings provide evidence of associations between interoceptive awareness and numerous disordered eating symptoms within a TGD sample, suggesting that early intervention targeting certain interoceptive deficits may alleviate some TGD people of these symptoms. Future research should continue to examine differences in how TGD people respond to bodily sensations and how interventions targeting mind-body connection (e.g., mindfulness) may be effective or distressing for this population.

This study had several notable strengths. First, our sample was comprised solely of non-cisgender people. Furthermore, data on socioeconomic status of our sample suggests that a diverse range of participants were included in our sample, supporting the generalizability of our findings. In addition, through stratified recruitment, our sample reflected roughly equal proportions of transgender women, transgender men, and gender-diverse people. Finally, participants reported a wide range of past 6-week NSSI frequency, past 6-week SI frequency, and lifetime SA frequency, allowing us to examine retrospective relationships between interoception and self-injurious thoughts and

behaviors across a broad spectrum of engagement in these behaviors.

Despite these strengths, this study should be considered in the context of its limitations. First, while our sample was relatively large in comparison to other gender minority samples, we still possessed a small sample in the context of psychometric research and were underpowered to compare gender identities within the sample. Within the heterogeneous umbrella term of "TGD," multiple unique gender identities are present, making it hard to generalize our findings to each unique subgroup. Thus, these findings should be interpreted with caution when examining one specific gender identity, and future research should aim to further examine the validity of the MAIA-2 in multiple gender minority subgroups. Gender identity was also self-reported via Prolific Academic, a platform in which participants complete surveys anonymously. Participants selected their gender identity based on the options provided to them. While a text box was given as an option for those who "prefer to choose a different term," it is possible that some participants may have felt inclined to choose one of the predetermined options instead of writing in their true gender identity. Ultimately, more flexible means of measuring gender identity are needed, and future research should aim to incorporate qualitative methods to better assess one's gender identity.

We were unable to collect information on participant geographical location. While we know all participants were U.S. residents, we are unable to further parse apart where participants were living, which may limit the generalizability of our findings. In addition, our sample was largely White and not Hispanic. Multiple body-focused discrimination experiences, including discrimination due to race, ethnicity, gender identity, and body size, are likely to impact bodily connection and trust (Kinkel-Ram et al., 2023). Our sample is also relatively young, and results may not generalize to older TGD adults. It is essential for future studies to examine how intersecting identities influence the associations between certain interoceptive deficits, disordered eating, NSSI, and suicidal thoughts and behaviors. In addition, we did not examine the impact of gender dysphoria on the association between interoception and disordered eating and self-injurious thoughts and behaviors. Gender dysphoria may help explain why some of the subscales were positively associated with disordered eating outcomes (Mirabella et al., 2024). Additional research on interoception and gender dysphoria may help parse apart which subscales are adaptive for reducing disordered eating symptoms. The original MAIA-2 was created for and validated within cisgender samples and thus may include language that is less applicable within TGD samples.

Qualitatively assessing how relevant the MAIA-2 subscale items are to TGD people may help to better assess interoceptive deficits within this population.

Other notable limitations include our convergent validity measures and our assessment method of suicidal thoughts and behaviors. For convergent validity, we selected measures that were specifically validated in TGD samples and were related to body awareness/functionality and anxiety, constructs commonly used in psychometric evaluations of the MAIA-2. However, the convergent validity measures in this study have not been used in other validation papers on the MAIA-2. In addition, our assessment method of suicidal thoughts and behaviors further limits our conclusions. Because we assessed lifetime suicide attempts, we are limited in our understanding of how interoception longitudinally predicts suicide attempts. It is also possible that suicidal behavior predicts deficits in interoceptive awareness, and our study is unable to parse apart the potential bidirectional association between these variables (Liu, 2019). We used single-item assessments for suicidal thoughts, suicidal intent, suicide attempts, and perceived likelihood of making a future suicide attempt. Single-item self-report measures can under-estimate or over-estimate participants' suicide risk (Ammerman et al., 2021; Millner et al., 2015). Furthermore, we did not assess several important aspects of suicidal thoughts (e.g., variability of suicidal thoughts, desire to make a suicide attempt, content of suicidal thoughts) that are predictive of suicidal behavior (Coppersmith et al., 2023; Wang et al., 2021). Because this study used online data collection, we relied solely on self-reports, which can also misclassify suicide risk. Additional research is needed on this topic that uses multi-item structured or semi-structured suicide risk assessments to comprehensively assess suicidal thoughts and behaviors to reduce potential misclassification.

## Conclusion

Overall, this study provides preliminary psychometric support for the MAIA-2 scale (without Item 2) in TGD samples. In addition, findings support that some interoceptive facets may be adaptive and some less so given their links with disordered eating, NSSI, and suicidal thoughts and behaviors. These results highlight the importance of a multidimensional approach to interoception and emphasize the need for further research on interoceptive experiences in TGD people.



## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This study was funded by internal developmental funds awarded to Dr. Tiffany Brown.

## ORCID iD

Rachel E. Frietchen  <https://orcid.org/0000-0002-5260-7037>  
Dominic M. Denning  <https://orcid.org/0000-0001-6875-646X>

## Supplemental Material

Supplemental material for this article is available online.

## References

- Ammerman, B. A., Burke, T. A., Jacobucci, R., & McClure, K. (2021). How we ask matters: The impact of question wording in single-item measurement of suicidal thoughts and behaviors. *Preventive Medicine, 152*, 106472.
- Ashley, F. (2021). The misuse of gender dysphoria: Toward greater conceptual clarity in transgender health. *Perspectives on Psychological Science, 16*(6), 1159–1164.
- Asparouhov, T., Muthén, B., & Muthén, B. O. (2006). Robust Chi square difference testing with mean and variance adjusted test statistics. *Matrix, 1*(5), 1–6.
- Austin, A., Papciak, R., & Lovins, L. (2022). Gender euphoria: A grounded theory exploration of experiencing gender affirmation. *Psychology & Sexuality, 13*(5), 1406–1426.
- Avalos, L., Tylka, T. L., & Wood-Barcalow, N. (2005). The body appreciation scale: Development and psychometric evaluation. *Body Image, 2*(3), 285–297.
- Benjamini, Y., & Hochberg, Y. (1995). Controlling the false discovery rate: A practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society: Series B (Methodological), 57*(1), 289–300.
- Bluth, K., Lathren, C., Clepper-Faith, M., Larson, L. M., Ogunbamowo, D. O., & Pflum, S. (2021). Improving mental health among transgender adolescents: Implementing mindful self-compassion for teens. *Journal of Adolescent Research, 38*(2), 271–302.
- Brown, T. A. (2015). *Confirmatory factor analysis for applied research*. Guilford Publications.
- Brown, T. A., Berner, L. A., Jones, M. D., Reilly, E. E., Cusack, A., Anderson, L. K., . . . Wierenga, C. E. (2017). Psychometric evaluation and norms for the Multidimensional Assessment of Interoceptive Awareness (MAIA) in a clinical eating disorders sample. *European Eating Disorders Review, 25*(5), 411–416.
- Case, L. K., Brang, D., Landazuri, R., Viswanathan, P., & Ramachandran, V. S. (2017). Altered white matter and sensory response to bodily sensation in female-to-male transgender individuals. *Archives of Sexual Behavior, 46*, 1223–1237.
- Chen, W. G., Schloesser, D., Arensdorf, A. M., Simmons, J. M., Cui, C., Valentino, R., . . . Langevin, H. M. (2021). The emerging science of interoception: Sensing, integrating,

- interpreting, and regulating signals within the self. *Trends in Neurosciences*, 44(1), 3–16.
- Coleman, E., Radix, A. E., Bouman, W. P., Brown, G. R., De Vries, A. L., Deutsch, M. B., . . . Arcelus, J. (2022). Standards of care for the health of transgender and gender diverse people, version 8. *International Journal of Transgender Health*, 23(Suppl. 1), S1–S259.
- Coppersmith, D. D., Ryan, O., Fortgang, R. G., Millner, A. J., Kleiman, E. M., & Nock, M. K. (2023). Mapping the timescale of suicidal thinking. *Proceedings of the National Academy of Sciences*, 120(17), Article e2215434120.
- Cusack, C. E., Iampieri, A. O., & Galupo, M. P. (2022). “I’m still not sure if the eating disorder is a result of gender dysphoria”: Trans and nonbinary individuals’ descriptions of their eating and body concerns in relation to their gender. *Psychology of Sexual Orientation and Gender Diversity*, 9(4), 422–433.
- Cusack, C. E., Levenson, N. H., & Galupo, M. P. (2022). “Anorexia wants to kill me, dysphoria wants me to live”: Centering transgender and nonbinary experiences in eating disorder treatment. *Journal of LGBTQ Issues in Counseling*, 16(3), 265–284.
- Datta, N., & Lock, J. D. (2023). Exploration of interoceptive capabilities in avoidant/restrictive food intake disorder and anorexia nervosa. *Journal of Eating Disorders*, 11(1), 189.
- Davies, R. D., & Davies, M. E. (2020). The (slow) depathologizing of gender incongruence. *The Journal of Nervous and Mental Disease*, 208(2), 152–154.
- Denning, D. M., Gebhardt, E. S., Alvarez, J. C., Defontes, C. G., & Brown, T. A. (in press). Confirmatory factor analysis and measurement invariance for the Emotion Regulation Questionnaire (ERQ) in sexual minority adults. *Journal of Emotion and Psychopathology*.
- Denning, D. M., Newlands, R. T., Gonzales, A., & Benuto, L. T. (2022). Borderline personality disorder symptoms in a community sample of sexually and gender diverse adults. *Journal of Personality Disorders*, 36(6), 701–716.
- DeVile, D. C., Kuplicki, R., Stewart, J. L., Paulus, M. P., & Khalsa, S. S. (2020). Diminished responses to bodily threat and blunted interoception in suicide attempters. *eLife*, 9, Article e51593.
- Dewey, J. M., Oppenheim, E. R., & Watson, D. P. (2023). (Dis)empowering trans people: Depathologization through treatment guidelines and provider decision-making. *Humanity & Society*, 47(3), 342–364.
- Dietz, C., & Pearce, R. (2020). Depathologising gender: Vulnerability in trans health law. In C. Dietz, M. Travis & M. Thomson (Eds.), *A jurisprudence of the body* (pp. 179–203). Palgrave Macmillan.
- Duffy, M. E., Henkel, K. E., & Earnshaw, V. A. (2016). Transgender clients’ experiences of eating disorder treatment. *Journal of LGBTQ Issues in Counseling*, 10(3), 136–149.
- Duffy, M. E., Smith, A. R., & Joiner, T. E. (2021). Interoceptive dysfunction indicates presence and severity of self-injurious behaviors in a clinically severe transdiagnostic sample. *Psychiatry Research*, 305, 114210.
- Enders, C. K., & Bandalos, D. L. (2001). The relative performance of full information maximum likelihood estimation for missing data in structural equation models. *Structural Equation Modeling*, 8(3), 430–457.
- Fekih-Romdhane, F., Malaeb, D., Fawaz, M., Chammas, N., Soufia, M., Obeid, S., & Hallit, S. (2023). Psychometric properties of an Arabic translation of the multidimensional assessment of interoceptive awareness (MAIA-2) questionnaire in a non-clinical sample of Arabic-speaking adults. *BMC Psychiatry*, 23(1), Article 577.
- Ferentzi, E., Olaru, G., Geiger, M., Vig, L., Köteles, F., & Wilhelm, O. (2021). Examining the factor structure and validity of the multidimensional assessment of interoceptive awareness. *Journal of Personality Assessment*, 103(5), 675–684.
- Fiskum, C., Eik-Nes, T. T., Abdollahpour Ranjbar, H., Andersen, J., & Habibi Asgarabad, M. (2023). Interoceptive awareness in a Norwegian population: Psychometric properties of the Multidimensional Assessment of Interoceptive Awareness (MAIA) 2. *BMC Psychiatry*, 23(1), Article 489.
- Forbush, K. T., Wildes, J. E., Pollack, L. O., Dunbar, D., Luo, J., Patterson, K., . . . Watson, D. (2013). Development and validation of the Eating Pathology Symptoms Inventory (EPSI). *Psychological Assessment*, 25(3), 859–878.
- Forrest, L. N., & Smith, A. R. (2021). A multi-measure examination of interoception in people with recent nonsuicidal self-injury. *Suicide and Life-Threatening Behavior*, 51(3), 492–503.
- Gibson, J. (2019). Mindfulness, interoception, and the body: A contemporary perspective. *Frontiers in Psychology*, 10, Article 475917.
- Gioia, A. N., Forrest, L. N., & Smith, A. R. (2022). Diminished body trust uniquely predicts suicidal ideation and nonsuicidal self-injury among people with recent self-injurious thoughts and behaviors. *Suicide and Life-Threatening Behavior*, 52(6), 1205–1216.
- Gratz, K. L. (2001). Measurement of deliberate self-harm: Preliminary data on the Deliberate Self-Harm Inventory. *Journal of Psychopathology and Behavioral Assessment*, 23, 253–263.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Confirmatory factor analysis. Multivariate data analysis* (pp. 600–638). Pearson Education.
- Hayes, A. F., & Coutts, J. J. (2020). Use omega rather than Cronbach’s alpha for estimating reliability. But. . . *Communication Methods and Measures*, 14(1), 1–24.
- Hielscher, E., & Zopf, R. (2021). Interoceptive abnormalities and suicidality: A systematic review. *Behavior Therapy*, 52(5), 1035–1054.
- Hooper, D., Coughlan, J., & Mullen, M. (2008). Evaluating model fit: A synthesis of the structural equation modelling literature. In *7th european conference on research methodology for business and management studies* (pp. 195–200). <https://doi.org/10.21427/D79B73>
- Huang, J. L., Bowling, N. A., Liu, M., & Li, Y. (2015). Detecting insufficient effort responding with an infrequency scale: Evaluating validity and participant reactions. *Journal of Business and Psychology*, 30, 299–311.
- Jackman, S. (2024). *pscl: Classes and methods for R developed in the political science computational laboratory* (R package version 1.5.9). University of Sydney.

- Johns, M. M. (2019). Transgender identity and experiences of violence victimization, substance use, suicide risk, and sexual risk behaviors among high school students—19 states and large urban school districts, 2017. *Morbidity and Mortality Weekly Report*, 68, 67–71.
- Jones, A., Silas, J., Todd, J., Stewart, A., Acree, M., Coulson, M., & Mehling, W. E. (2021). Exploring the Multidimensional Assessment of Interoceptive Awareness in youth aged 7–17 years. *Journal of Clinical Psychology*, 77(3), 661–682.
- Khalsa, S. S., Adolphs, R., Cameron, O. G., Critchley, H. D., Davenport, P. W., Feinstein, J. S., . . . Zucker, N. (2018). Interoception and mental health: A roadmap. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, 3(6), 501–513.
- Kinkel-Ram, S. S., Kunstman, J., Hunger, J. M., & Smith, A. (2023). Examining the relation between discrimination and suicide among Black Americans: The role of social pain minimization and decreased bodily trust. *Stigma and Health*, 8, 428–436.
- Kyriazos, T. A. (2018). Applied psychometrics: Sample size and sample power considerations in factor analysis (EFA, CFA) and SEM in general. *Psychology*, 9(08), 2207–2230.
- Lin, F. L., Hsu, C. C., Mehling, W., & Yeh, M. L. (2017). Translation and psychometric testing of the Chinese version of the multidimensional assessment of interoceptive awareness. *Journal of Nursing Research*, 25(1), 76–84.
- Lindley, L., & Bauerband, L. (2023). Measurement invariance of the Depression, Anxiety, and Stress Scale (DASS-21) across cisgender sexual minority and transgender and non-binary individuals. *Psychology of Sexual Orientation and Gender Diversity*, 10, 397–404.
- Liu, R. T. (2019). The psychological scars of suicide: Accounting for how risk for suicidal behavior is heightened by its past occurrence. *Neuroscience & Biobehavioral Reviews*, 99, 42–48.
- Lovibond, S. H., & Lovibond, P. F. (1995). *Depression anxiety stress scales*. Psychological Assessment.
- Machorrinho, J., Veiga, G., Fernandes, J., Mehling, W., & Marmeleira, J. (2019). Multidimensional assessment of interoceptive awareness: Psychometric properties of the Portuguese version. *Perceptual and Motor Skills*, 126(1), 87–105.
- Mehling, W. E., Acree, M., Stewart, A., Silas, J., & Jones, A. (2018). The Multidimensional Assessment of Interoceptive Awareness, version 2 (MAIA-2). *PLOS ONE*, 13(12), Article e0208034.
- Mehling, W. E., Price, C., Daubenmier, J. J., Acree, M., Bartmess, E., & Stewart, A. (2012). The Multidimensional Assessment of Interoceptive Awareness (MAIA). *PLOS ONE*, 7(11), Article e48230.
- Millner, A. J., Lee, M. D., & Nock, M. K. (2015). Single-item measurement of suicidal behaviors: Validity and consequences of misclassification. *PLOS ONE*, 10(10), Article e0141606.
- Mirabella, M., Carone, N., Franco, A., Rugo, M. A., Speranza, A. M., Mazzeschi, C., . . . Muzi, L. (2024). Emotional dysregulation and eating symptoms in gender dysphoria and eating disorders: The mediating role of body uneasiness. *Current Psychology*, 43, 17090–17104.
- Montoya-Hurtado, O. L., Gómez-Jaramillo, N., Criado-Gutiérrez, J. M., Pérez, J., Sancho-Sánchez, C., Sánchez-Barba, M., . . . Juárez-Vela, R. (2023). Exploring the link between interoceptive body awareness and suicidal orientation in university students: A cross-sectional study. *Behavioral Sciences*, 13(11), 945.
- Morris, E. R., & Galupo, M. P. (2019). “Attempting to dull the dysphoria”: Nonsuicidal self-injury among transgender individuals. *Psychology of Sexual Orientation and Gender Diversity*, 6(3), 296–307.
- Mumford, K., Fraser, L., & Knudson, G. (2023). What the past suggests about when a diagnostic label is oppressive. *AMA Journal of Ethics*, 25(6), 446–451.
- Palan, S., & Schitter, C. (2018). Prolific.ac—A subject pool for online experiments. *Journal of Behavioral and Experimental Finance*, 17, 22–27.
- Paquette, M. M., Dion, J., Bóthe, B., & Bergeron, S. (2022). Validation of the Body Appreciation Scale-2 in cisgender, heterosexual and sexual and gender minority adolescents and sexuality-related correlates. *Body Image*, 43, 193–204.
- Peer, E., Brandimarte, L., Samat, S., & Acquisti, A. (2017). Beyond the Turk: Alternative platforms for crowdsourcing behavioral research. *Journal of Experimental Social Psychology*, 70, 153–163.
- Perkins, N. M., Ortiz, S. N., Smith, A. R., & Brausch, A. M. (2021). Suicidal ideation and eating disorder symptoms in adolescents: The role of interoceptive deficits. *Behavior Therapy*, 52(5), 1093–1104.
- Perlson, J. E., Walters, O. C., & Keuroghlian, A. S. (2021). Envisioning a future for transgender and gender-diverse people beyond the DSM. *The British Journal of Psychiatry*, 219(3), 471–472.
- Petzschner, F. H., Garfinkel, S. N., Paulus, M. P., Koch, C., & Khalsa, S. S. (2021). Computational models of interoception and body regulation. *Trends in Neurosciences*, 44(1), 63–76.
- Pham, A. H., Eadeh, H. M., Garrison, M. M., & Ahrens, K. R. (2023). A longitudinal study on disordered eating in transgender and nonbinary adolescents. *Academic Pediatrics*, 23(6), 1247–1251.
- Pollatos, O., & Herbert, B. M. (2018). Interoception: Definitions, dimensions, neural substrates. In G. Hauke & A. Kritikos (Eds.), *Embodiment in psychotherapy: A practitioner’s guide* (pp. 15–27). Springer.
- Qu, D., Feng, Y., Wen, X., & Chen, R. (2023). The effect of interoceptive awareness as the underlying mechanism between anxiety and NSSI behaviors. *Journal of Affective Disorders Reports*, 13, 100598.
- Reisner, S. L., & Juntunen, C. L. (2015). Non-suicidal self-injury in a large online sample of transgender adults. *Professional Psychology: Research and Practice*, 46(1), 3–11.
- Roberts, S. R., Maheux, A. J., Watson, R. J., Puhl, R. M., & Choukas-Bradley, S. (2022). Sexual and gender minority (SGM) adolescents’ disordered eating: Exploring general and SGM-specific factors. *International Journal of Eating Disorders*, 55(7), 933–946.

- Robles, R., Real, T., & Reed, G. (2021). Depathologizing sexual orientation and transgender identities in psychiatric classifications. *Consortium Psychiatricum*, 2(2), 45–53.
- Roden, R., Billman, M., Mullins, R., Francesco, A., Tassi, C., & Essayli, J. (2023). Rural location of residence is not associated with use of telemedicine for initial medical contact for gender-related healthcare. *Journal of Adolescent Health*, 73(5), 940–945.
- Rogers, M. L., Duffy, M. E., Dougherty, S. P., & Joiner, T. E. (2021). Interoception, pain tolerance, and self-injurious behaviors: A multidimensional assessment. *Behavior Therapy*, 52(5), 1055–1066.
- Rogers, M. L., Hagan, C. R., & Joiner, T. E. (2018). Examination of interoception along the suicidality continuum. *Journal of Clinical Psychology*, 74(6), 1004–1016.
- Shoji, M., Mehling, W. E., Hautzinger, M., & Herbert, B. M. (2018). Investigating multidimensional interoceptive awareness in a Japanese population: Validation of the Japanese MAIA-J. *Frontiers in Psychology*, 9, Article 385678.
- Smith, A. R., Dodd, D. R., Ortiz, S., Forrest, L. N., & Witte, T. K. (2020). Interoceptive deficits differentiate suicide groups and associate with self-injurious thoughts and behaviors in a military sample. *Suicide and Life-Threatening Behavior*, 50(2), 472–489.
- Staples, J. M., Neilson, E. C., Bryan, A. E., & George, W. H. (2018). The role of distal minority stress and internalized transnegativity in suicidal ideation and nonsuicidal self-injury among transgender adults. *The Journal of Sex Research*, 55(4–5), 591–603.
- Swami, V., Tran, U. S., Stieger, S., Aavik, T., Ranjbar, H. A., Adebayo, S. O., . . . Lukács, A. (2023). Body appreciation around the world: Measurement invariance of the Body Appreciation Scale-2 (BAS-2) across 65 nations, 40 languages, gender identities, and age. *Body Image*, 46, 449–466.
- Teng, B., Wang, D., Su, C., Zhou, H., Wang, T., Mehling, W. E., & Hu, Y. (2022). The multidimensional assessment of interoceptive awareness, version 2: Translation and psychometric properties of the Chinese version. *Frontiers in Psychiatry*, 13, Article 970982.
- Thompson, C. G., Kim, R. S., Aloe, A. M., & Becker, B. J. (2017). Extracting the variance inflation factor and other multicollinearity diagnostics from typical regression results. *Basic and Applied Social Psychology*, 39(2), 81–90.
- Tilley, J. L., Molina, L., Luo, X., Natarajan, A., Casolaro, L., Gonzalez, A., & Mahaffey, B. (2022). Dialectical behaviour therapy (DBT) for high-risk transgender and gender diverse (TGD) youth: A qualitative study of youth and mental health providers' perspectives on intervention relevance. *Psychology and Psychotherapy: Theory, Research and Practice*, 95(4), 1056–1070.
- Todd, J., Barron, D., Aspell, J. E., Toh, E. K. L., Zahari, H. S., Khatib, N. A. M., & Swami, V. (2020). Translation and validation of a Bahasa Malaysia (Malay) version of the Multidimensional Assessment of Interoceptive Awareness (MAIA). *PLOS ONE*, 15(4), Article e0231048.
- Todd, J., Swami, V., Aspell, J. E., Furnham, A., Horne, G., & Stieger, S. (2022). Are some interoceptive sensibility components more central than others? Using item pool visualisation to understand the psychometric representation of interoception. *PLOS ONE*, 17(12), Article e0277894.
- Treharne, G. J., Riggs, D. W., Ellis, S. J., Flett, J. A., & Bartholomaeus, C. (2020). Suicidality, self-harm, and their correlates among transgender and cisgender people living in Aotearoa/New Zealand or Australia. *International Journal of Transgender Health*, 21(4), 440–454.
- Tylka, T. L., & Wood-Barcalow, N. L. (2015). The Body Appreciation Scale-2: Item refinement and psychometric evaluation. *Body Image*, 12, 53–67.
- Valenzuela-Moguillansky, C., & Reyes-Reyes, A. (2015). Psychometric properties of the multidimensional assessment of interoceptive awareness (MAIA) in a Chilean population. *Frontiers in Psychology*, 6, Article 132945.
- Velkoff, E. A., & Smith, A. R. (2023). Feeling the urge: Using ecological momentary assessment to test the relationship of interoception with disordered eating and nonsuicidal self-injury. *Journal of Psychopathology and Clinical Science*, 132(1), 78–90.
- Vinni, E., Karaivazolou, K., Tourkochristou, E., Gourzis, P., Thomopoulos, K., Jelastopoulou, E., & Triantos, C. (2021). Linguistic and cultural adaptation and psychometric validation of the Multidimensional Assessment of Interoceptive Awareness in Greek individuals. *Achaiki Iatriki*, 40, 191–197.
- Wang, S. B., Coppersmith, D. D., Kleiman, E. M., Bentley, K. H., Millner, A. J., Fortgang, R., & . . . Nock, M. K. (2021). A pilot study using frequent inpatient assessments of suicidal thinking to predict short-term postdischarge suicidal behavior. *JAMA Network Open*, 4(3), Article e210591.
- Wolfe, G., & Fogwell, N. (2022). DSM discrimination and the LGBT community: Using the history of diagnostic discrimination against sexual minorities to contextualize current issues in transgender and gender diverse mental healthcare. *Psychology from the Margins*, 4(1), 2.
- Yaffee, R. A. (2002). *Robust regression analysis: Some popular statistical package options* (pp. 1–12). Statistics, Social Science, and Mapping Group, Academic Computing Services, Information Technology Services.
- Zeileis, A., Kleiber, C., & Jackman, S. (2008). Regression models for count data in R. *Journal of Statistical Software*, 27(8), 1–25.