



Ways of responding to body image threats: Development of the Body Image Flexibility and Inflexibility Scale for youth[☆]

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ARTICLE INFO

Keywords:

Body image
Body image flexibility
Body image inflexibility
Youth
Psychological flexibility

ABSTRACT

Body image flexibility shows promise for understanding positive body image in young people. However, its adaptive functions remain unclear due to the lack of youth-oriented models and existing focus on inflexibility in unidimensional measures. This study developed a measure of body image flexibility and inflexibility for youth by adapting the Multidimensional Psychological Flexibility Inventory (MPFI) with 724 male and female Australian high school and university students aged 11 to 30 years. The Body Image Flexibility and Inflexibility Scale (BIFIS) replicated the higher-order MPFI structure (flexibility and inflexibility), with modifications required to lower-order factors to achieve acceptable fit. The final model (24 items; two higher-order and eight lower-order factors) was invariant across gender and age cohorts. The higher-order body image flexibility and inflexibility factors were internally consistent, stable over one month, correlated in expected directions with adaptive and maladaptive body image and eating constructs and well-being, and explained adaptive outcomes beyond measures of body satisfaction and unidimensional body image flexibility. The BIFIS provides a way to measure how young people respond to body image threats and expands existing conceptual models by including adaptive and maladaptive processes. Future work could refine the items, further validate the factor structure, and consider more experiential measurement formats.

Introduction

Young people often experience difficulties liking and accepting their body (Nelson et al., 2018). Despite the importance of nourishing and taking care of the body for healthy development (Cook-Cottone, 2015), many young people engage in harmful behaviours to change their weight, shape, or muscularity (Neumark-Sztainer et al., 2011). Substantial theoretical and empirical work has been devoted to the prevention and treatment of these body image disturbances (Lewis-Smith et al., 2019). Cognitive behavioural approaches, which are the most extensively researched, have proven effective for reducing negative body image and its consequences (Alleva et al., 2015; Lewis-Smith et al., 2019). Yet, therapeutic effects tend to be modest and diminish over time, signifying the need for further investigation of ways to promote positive body image and enhance well-being (Kusina & Exline, 2019).

Recent innovations in cognitive behavioural approaches focus on how people relate to thoughts and emotions about their body through

processes such as acceptance, mindfulness, and psychological flexibility (Lewis-Smith et al., 2019). The distinction between *what* individuals think and feel about their body—and *how* they relate to these experiences—is significant because it suggests that the negative impacts of distressing thoughts and feelings can be altered without changing their content (Pfeiffer et al., 2020; Wade et al., 2009). Body image flexibility has been proposed as an adaptive response that involves being open to, and accepting, negative body image experiences while continuing to act in a way that is consistent with personal values (Sandoz et al., 2019).

Body image flexibility emerged from the broader psychological flexibility construct and has since been identified as a component of positive body image (Sandoz et al., 2019). Psychological flexibility is commonly operationalised as six interrelated skills (present moment awareness, acceptance, cognitive defusion, self-as-context, valuing, and committed action) as per the acceptance and commitment therapy (ACT) model (Hayes et al., 2006). These six ACT skills may also be applicable responses to body image threats and are distinct from other

[☆] The manuscript was written in partial fulfilment of the requirements for a Doctor of Philosophy in Clinical Psychology at the University of Canberra. This research was supported by an Australian Government Research Training Program stipend awarded to the first author at the University of Canberra.

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<https://doi.org/10.1016/j.jcbs.2023.08.007>

Received 30 April 2023; Received in revised form 18 August 2023; Accepted 27 August 2023

Available online 1 September 2023

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body image coping strategies in their focus on transforming the function of thoughts and feelings (Brichacek et al., 2021). For example, continuing to engage in meaningful activities even when feeling ashamed of one's body is an example of committed action and is functionally distinct from directly challenging negative body image thoughts or using avoidance to reduce feelings of shame (Webb et al., 2015). As such, body image flexibility may help people respond to body image threats and prevent dysfunctional coping strategies (Linardon et al., 2021).

Body image flexibility theory and research have predominantly focused on adults (Linardon et al., 2021; Sandoz et al., 2013). However, young people frequently experience body image threats (Brichacek et al., 2021), and body image attitudes and behaviours that develop in adolescence continue into adulthood (Wang et al., 2019). Furthermore, adolescence is marked by significant physical, cognitive, and social change (Paus, 2005) which may increase vulnerability to disordered eating and other dysfunctional behaviours to cope with body image concerns (Rodgers et al., 2020). Enhancing protective processes, such as body image flexibility, within these formative years could help prevent body image disturbances and promote more positive developmental trajectories (Webb et al., 2014).

Initial attempts to understand body image flexibility in youth focused on its role in affect regulation (Webb et al., 2014). For instance, adolescents in the U.S. who reported higher body image flexibility had lower body dissatisfaction and higher body appreciation; body image flexibility also mediated the inverse relationship between body dissatisfaction and appreciation (Webb et al., 2014). Similar results were found for high school and university students from Cyprus; body image flexibility correlated negatively with weight concerns, appearance investment, emotion regulation difficulties, and disordered eating, and correlated positively with self-esteem and self-compassion (Koushiou et al., 2020). Furthermore, body image flexibility moderated the detrimental effects of social media on body satisfaction among female adolescents in China, such that those reporting higher than average body image flexibility were protected against adverse effects (Wu et al., 2019). These relationships are consistent with the proposed function of body image flexibility in helping regulate negative affective experiences, suggesting further investigations of its protective effects are warranted.

As research interest in body image flexibility increases, the availability of youth-oriented measurement instruments is paramount. Existing measures, such as the Body Image Acceptance and Action Questionnaire (BI-AAQ; Sandoz et al., 2013) and Body Image Psychological Inflexibility Scale (Callaghan et al., 2015), were constructed and validated for adults based on a widely-used unidimensional measure of general psychological flexibility—the Acceptance and Action Questionnaire (Bond et al., 2011). To date, only a Greek translation of the BI-AAQ has been validated with adolescents (Koushiou et al., 2020). The BI-AAQ factor structure, internal consistency, and validity were supported in 85 high school and 240 college students, however no modifications were made to item content to account for developmental considerations.

The BI-AAQ has contributed significantly to current understandings of body image flexibility (Sandoz et al., 2019). However, its construct validity has been questioned due to its unidimensional conceptualisation (Webb et al., 2015); all 12 items are worded in the direction of inflexibility, then reverse-scored so that higher scores represent higher body image flexibility (Sandoz et al., 2013). A multidimensional conceptualisation could clarify whether adaptive body image flexibility skills are distinct from inflexibility, as predicted from a positive body image perspective (Sandoz et al., 2019; Tylka & Wood-Barcalow, 2015).

Comparable issues in research examining general psychological flexibility (Cherry et al., 2021) led to the development of the Multidimensional Psychological Flexibility Inventory (MPFI). The MPFI measures two higher-order flexibility and inflexibility dimensions, each comprising six subprocesses corresponding to the ACT model (Roloffs et al., 2016). The MPFI flexibility scale is associated with aspects of

positive well-being (e.g., adaptive affect regulation and coping, life satisfaction, feelings of vitality and peace of mind), whereas inflexibility has stronger associations with psychopathology (e.g., neuroticism, psychological distress, somatic anxiety, perceived stress; Rogge et al., 2019; Roloffs et al., 2016). This illustrates the potential advantages of a multidimensional approach for explaining functioning across the mental health spectrum, which might also be true for body image flexibility and inflexibility.

0.1. The present study

This study sought to develop and evaluate a contextually-sensitive measure of body image flexibility and inflexibility for youth (adolescents and young adults) by adapting an established multidimensional measure of psychological flexibility and inflexibility (the MPFI). Scale construction and evaluation followed the three stages outlined by Simms (2008) for establishing substantive, structural, and external validity. Substantive validity involved reviewing existing general and body image-specific psychological flexibility and inflexibility measures, adapting the MPFI items to a body image and youth context, and collecting feedback from young people and experts on the initial item pool. Structural validity included examining the factor structure and invariance across gender (male, female) and age cohorts (high school student, university student), along with internal consistency and test-retest reliability. Finally, external validity was evaluated by testing the following hypotheses to see if relationships with other constructs were theoretically consistent. **H1:** body image flexibility would correlate positively with other adaptive constructs (body satisfaction, body appreciation, positive coping, self-care, intuitive eating, and wellbeing) and negatively with maladaptive constructs (disordered eating) in males and females, whereas this pattern would be reversed for body image inflexibility. **H2:** the BI-AAQ, as a measure of unidimensional body image flexibility, would correlate more strongly with body image inflexibility than with body image flexibility in males and females, due to its inflexibility-oriented wording. **H3:** Body image flexibility and inflexibility would each explain variance in positive coping, self-care, intuitive and disordered eating, and well-being beyond measures of body satisfaction and unidimensional body image flexibility.

1. Method

1.1. Participants

Participants were part of a longitudinal study focused on positive body image and health. This study analysed data from 1010 high school and undergraduate university students aged up to 30 years, collected between January 2020 and December 2022, and one-month follow-up data from 255 university students. This age range was selected to examine youth collectively as the transitional stage from adolescence through to young adulthood (Australian Bureau of Statistics, 2013; Australian Institute of Health and Welfare, 2021). Equal sample sizes are recommended for comparison groups in confirmatory factor analysis (CFA; Brown, 2015), and since there were fewer participants who identified as male (compared to female) and fewer high school students (compared to university students), a random subset of female university students were selected so that the final sample ($N = 724$) was distributed evenly across gender (362 male, 362 female) and approximately evenly across age cohorts (306 high school, 418 university).

Participants were aged 11 to 30 years ($M = 17.64$, $SD = 3.85$). Participants identified as Australian, or Australian and one or more other ethnicity (85.9%), including 2.9% who identified as Australian Aboriginal or Torres Strait Islander. The remaining participants (14.1%) identified with other ethnicities (e.g., Asian, African, European). Most participants (88.4%) reported having negative thoughts or feelings about their body in the past four weeks, with 29.4% experiencing these on more than half the days. Of those reporting negative body image

thoughts and feelings, 77.5% found them upsetting, with 18.2% saying they were quite or extremely upset. The follow-up sample comprised 67 (26.3%) male and 188 (73.7%) female university students aged 17 to 30 years ($M = 20.09$, $SD = 3.03$). Ethnicity distributions, and the frequency and impact of negative body image experiences, were similar to the full sample.

1.2. Measures

1.2.1. Multidimensional body image flexibility and inflexibility

An initial 36-item pool was developed for the Body Image Flexibility and Inflexibility Scale (BIFIS). With author permission, we adapted the MPFI short form (MPFI-24; Rolffs et al., 2016) to a body image context for youth, as previous research has found adult psychological flexibility measures to be translatable for children and adolescents (Barr, 2022; Greco et al., 2008). The 12 psychological flexibility and 12 psychological inflexibility items were reworded to refer to “body image” and complex or abstract terms (e.g., stalled out) were replaced with developmentally appropriate language (e.g., got in the way of). Items that could not be reasonably adapted were rewritten whilst retaining their underlying meaning.

To help ensure construct coverage, 12 additional items were created (one for each of the six flexibility and six inflexibility subprocesses) based on young people’s descriptions of body image flexibility reported in a previous qualitative study (Brichacek et al., 2021). Item modifications were made by the first author and then reviewed by the co-authors. The MPFI-24 response scale descriptions (1 = *never true* to 6 = *always true*) were changed, as we believed rating level of agreement (1 = *strongly disagree* to 6 = *strongly agree*) would be clearer for young people. The instructions were also adapted to extend the reference period from two to four weeks, contextualise the measure as ways of responding to body image threats, and include two items asking about the frequency and impact of negative body image thoughts and feelings in the past four weeks (see Supplementary file). This initial 36-item version was provided to eight young people, two postgraduate clinical psychology students, and two research experts in body image and/or ACT for content review and feedback, which led to minor changes to item wording to improve clarity within the developmental context.

1.2.2. Unidimensional body image flexibility

The 12-item BI-AAQ was used as a unidimensional reference measure of body image flexibility (Sandoz et al., 2013). Participants rated statements (e.g., Worrying about my weight makes it difficult for me to live a life that I value) on a seven-point Likert scale (from 1 = *never true* to 7 = *always true*). Item responses were reverse-scored and then summed so that higher values indicate greater body image flexibility. The BI-AAQ was internally consistent in the current study ($\omega = 0.95$).

1.2.3. Body satisfaction

The Embodied Image Scale (Abbott & Barber, 2010) was used to measure aesthetic satisfaction (3 items; e.g., I feel really good about the way I look) and functional satisfaction (3 items; e.g., I feel really good about what my body can do physically). Participants rated each statement on a five-point Likert scale (from 1 = *not at all true for me* to 5 = *very true for me*). Item responses were averaged to create composite scores for aesthetic and functional body image, with higher values indicating greater satisfaction. Internal consistency was excellent for both aesthetic ($\omega = 0.95$) and functional ($\omega = 0.94$) body satisfaction.

1.2.4. Body appreciation

The 10-item Body Appreciation Scale–2 for children (Halliwell et al., 2017) was used to measure attitudes of appreciation and respect for one’s body (e.g., I am comfortable in my body) as distinct from body satisfaction which involves liking or being happy with one’s body. Item responses, rated on a five-point verbal frequency scale (from 1 = *never* to 5 = *always*), were averaged, with higher scores representing greater

body appreciation. Internal consistency ($\omega = 0.95$) was excellent and replicated that of the original validation study (Halliwell et al., 2017).

1.2.5. Positive coping

Positive coping with body image threats was measured via the 12-item Positive Rational Acceptance Scale of the Body Image Coping Strategies Inventory (Cash et al., 2005). Participants indicated on a four-point Likert scale how well each statement (e.g., I remind myself that I will feel better after awhile) described their coping responses (from 0 = *definitely not like me* to 3 = *definitely like me*). Item responses were averaged, with higher scores indicating more positive coping. Internal consistency was excellent in our sample ($\omega = 0.89$).

1.2.6. Self-care

Six items from the Experience of Embodiment Scale for youth (Piran, 2019) were used to measure body-attuned self-care (one item, ‘I have an eating disorder’, was excluded due to sensitivity and content overlap with disordered eating measures). Participants rated agreement with each statement (e.g., I take good care of, and am respectful of, my body) on a five-point Likert scale (from 1 = *strongly disagree* to 5 = *strongly agree*). After reverse scoring negative items, a total score was created with higher values indicating greater self-care. The six items were internally consistent in the current study ($\omega = 0.79$).

1.2.7. Intuitive eating

The 23-item Intuitive Eating Scale 2 (IES-2; Tylka & Kroon Van Diest, 2013) was used to measure adaptive eating attitudes and behaviours. As the IES-2 was yet to be validated with youth at the time of the study, with the developer’s permission, minor modifications to wording were made to improve clarity based on feedback from two male adolescents. Participants rated their agreement with each statement (e.g., I trust my body to tell me when to stop eating) on a five-point Likert scale (from 1 = *strongly disagree* to 5 = *strongly agree*). Item responses were averaged to provide a total score, with higher values indicating a more intuitive approach to eating. Only the total score was used and was internally consistent ($\omega = 0.87$).

1.2.8. Well-being

Well-being was measured via the World Health Organization-Five Well-Being Index (World Health Organization, 1998). Participants rated their emotional state (e.g., I have felt cheerful and in good spirits) over the past two weeks using a five-point verbal frequency scale (from 0 = *at no time* to 5 = *all the time*). Item responses were summed, with higher values indicating better well-being. Internal consistency was supported in our sample ($\omega = 0.87$).

1.2.9. Disordered eating

Eight items comprising the child short-form Eating Disorder Examination Questionnaire (Kliem et al., 2017) were used to measure disordered eating (e.g., Have you been trying to cut down on food to control your weight or shape) over the past four weeks. Participants responded to each question on a seven-point scale (response labels were item-specific), and responses were averaged so that higher scores indicated greater eating pathology. The measure was internally consistent ($\omega = 0.93$) in the current sample.

1.3. Procedure

This study was approved by the Human Research Ethics Committee of the University of Canberra (2238) and New South Wales Department of Education (SERAP 2020218). Informed consent was obtained from all participants, after which they provided demographic information and completed the BIFIS and other body image and eating-related measures as an online Qualtrics survey (qualtrics.com.au). High school students were recruited from one independent and one government school in Australia, and surveys were completed during class time on school

electronic devices. The university sample were first-year psychology students who completed surveys in their own time and were offered one hour of research credit or entry into a prize-draw to win an AUD50 voucher. The survey took high school students around 30 minutes ($M = 31.8$, $SD = 11.5$) and university students around 25 minutes ($M = 24.7$, $SD = 16.8$). One month after the first survey, university students were emailed a link to the follow-up survey for which they were offered an additional hour of research credit or prize-draw entry. At follow-up, participants completed the BIFIS only.

1.4. Statistical analysis

Data were analysed using SPSS version 27 and JASP version 0.16. Structural validity was explored through CFA, with maximum likelihood estimation used to test four competing models based on previous MPFI research (Grégoire et al., 2020; Rolfs et al., 2016): (a) Unidimensional (all items load onto a single factor); (b) Multidimensional (two factors: body image flexibility and body image inflexibility); (c) Hierarchical unidimensional (12 lower-order factors load onto a single higher-order factor); and (d) Hierarchical multidimensional (12 lower-order factors load onto two higher-order factors). The metric of the latent variables was set to the first listed item/factor (see Fig. 1). The goodness of fit cut-offs were SRMR < 0.08 (< 0.10 acceptable fit), RMSEA < 0.06 (< 0.10 acceptable fit), and CFI/TLI > 0.95 (> 0.90 acceptable fit; Brown, 2015).

A stepwise procedure was used to assess equivalency of the factor structure, factor loadings, indicator intercepts, and indicator residual variances across gender and age cohorts (Brown, 2015). The model was considered to have invariant factor loadings if $\Delta CFI \geq -0.010$ and $\Delta SRMR \geq 0.030$ or $\Delta RMSEA \geq 0.015$. The model was considered to have invariant intercepts and residuals if $\Delta CFI \geq -0.010$ and $\Delta SRMR \geq 0.010$ or $\Delta RMSEA \geq 0.015$ (Chen, 2007). Other aspects of structural validity were informed by McDonald's omega coefficient (ω), correlation coefficients, and paired samples t -tests.

External validity was evaluated through bivariate correlations between the BIFIS and other adaptive and maladaptive constructs to test H1 and H2, and Fisher's r to z transformation used to compare the strength of correlations. Hierarchical multiple linear regression (MLR) analyses were used to examine H3. Covariates (gender and age cohort) were entered in Step 1¹; aesthetic and functional body satisfaction and unidimensional body image flexibility (BI-AAQ) entered as baseline predictors in Step 2; and the two BIFIS factors added in Step 3.

2. Results

2.1. Missing data and assumption testing

Although Little's MCAR tests indicated that not all data points were missing completely at random, the low frequency of missingness ($< 5\%$) was considered inconsequential for statistical analyses (Dong & Peng, 2013). As such, missing data was imputed using Expectation Maximisation where a participant had responded to at least half of items within the examined scale (the BIFIS was treated as a single scale for the imputation of missing values). Assumptions of normality, linearity, and absence of multicollinearity were met for all continuous variables. The overall sample size ($N = 724$) was assessed as being adequate for CFA with two or more factors of three indicators (Wolf et al., 2013). The hierarchical regression models had sufficient power to detect small effect sizes ($\alpha = 0.05$, $f^2 = 0.02$, power = .80; Faul et al., 2007).

¹ Incremental validity analyses were run with body mass index as an additional covariate. Results did not change significantly with its inclusion and, given the potential limitations of self-reported height and weight for calculating body mass index (particularly among youth; Sherry et al., 2007; Wang et al., 2002), it was excluded from the reported models.

2.2. Structural validity

2.2.1. Confirmatory factor analysis

Fit indices for the four models are presented in Table 1. Model 4 (hierarchical multidimensional) provided the best overall structure; however, it did not satisfy criteria for good (or acceptable) fit (i.e., CFI and TLI < 0.90). Inspection of parameter estimates, standardised residuals, and modification indices (MIs) identified several areas of misfit: inverse factor loading for lack of awareness on higher-order inflexibility; negative factor variances for values and lack of values; three items with one or more standardised residuals > 10 ; and six item cross-loadings and six correlated errors with MIs > 100 . As lack of awareness and avoidance (inflexibility) and awareness and acceptance (flexibility) are closely linked in ACT (Hayes et al., 2006), it was considered appropriate to combine items within related subfactors, while dropping inverse or cross-loading items. This resulted in four items being retained on a combined lack of awareness/avoidance subfactor (renamed *Active Avoidance*) and three on an awareness/acceptance subfactor (renamed *Mindful Acceptance*).

In addition, due to conceptual and statistical overlap, the values and committed action items were combined into a single index (renamed *Values Connection*), as were the lack of values and inaction items (renamed *Values Disconnection*). While MI's for correlated errors between opposing flexibility and inflexibility subfactors (e.g., cognitive fusion versus defusion) were also high, body image flexibility and inflexibility were proposed to be independent (supported by a small second-order correlation, $r = -.19$, $p < .001$), and thus it was deemed more appropriate to allow error variances of opposing subfactors to covary freely.

The resulting model showed improved fit with no localised areas of strain. However, as the measure was intended to be brief, the combined lower-order factors were reduced to three items each. At least one item from each MPFI subprocess was retained, along with the next best item based on factor loadings and construct coverage. The resulting 24-item model met criteria for acceptable (although still not good) fit; however, no further modifications were theoretically justified. Thus, Model 5 (24 items; two higher-order and eight lower-order factors) was selected as the final structure for invariance and psychometric testing (see Fig. 1). The proposed and final BIFIS items are listed in Table 2.

2.2.2. Measurement invariance and group differences

CFA fit indices were within the acceptable range for separate models assessing males and females, and high school and university students (see Table 3). Likewise, each step indicated invariance because the changes in fit indices were within the cut-offs suggested by Chen (2007). That is, fit was not significantly degraded when the model constrained factor loadings, intercepts, and residuals to be equal across groups², suggesting that the measurement model is invariant and scores can be meaningfully compared between males and females and between high school and university students.

Mean comparisons revealed no significant difference between females ($M = 4.11$, $SD = 0.79$) and males ($M = 4.17$, $SD = 0.89$) on body image flexibility, $t(722) = 0.96$, $p = .336$, $d = 0.07$. However, females ($M = 3.39$, $SD = 1.00$) scored significantly higher than males ($M = 2.40$, $SD = 0.98$) on body image inflexibility, $t(722) = -13.46$, $p < .001$, $d = 1.00$. The two age cohorts did not differ on body image flexibility, $t(722) = -1.50$, $p = .135$, $d = -0.11$, or inflexibility, $t(626.41) = 0.75$, $p = .454$, $d = 0.06$. Age effects were further explored in university and high school students separately. In university students, there was no

² The change in CFI for residual invariance between males and females exceeded the cutoff of 0.01 recommended by Chen (2007). However, this was not supplemented by a significant change in SRMR or RMSEA, and because equality of residuals is considered optional (Brown, 2015), gender invariance of the BIFIS was supported.

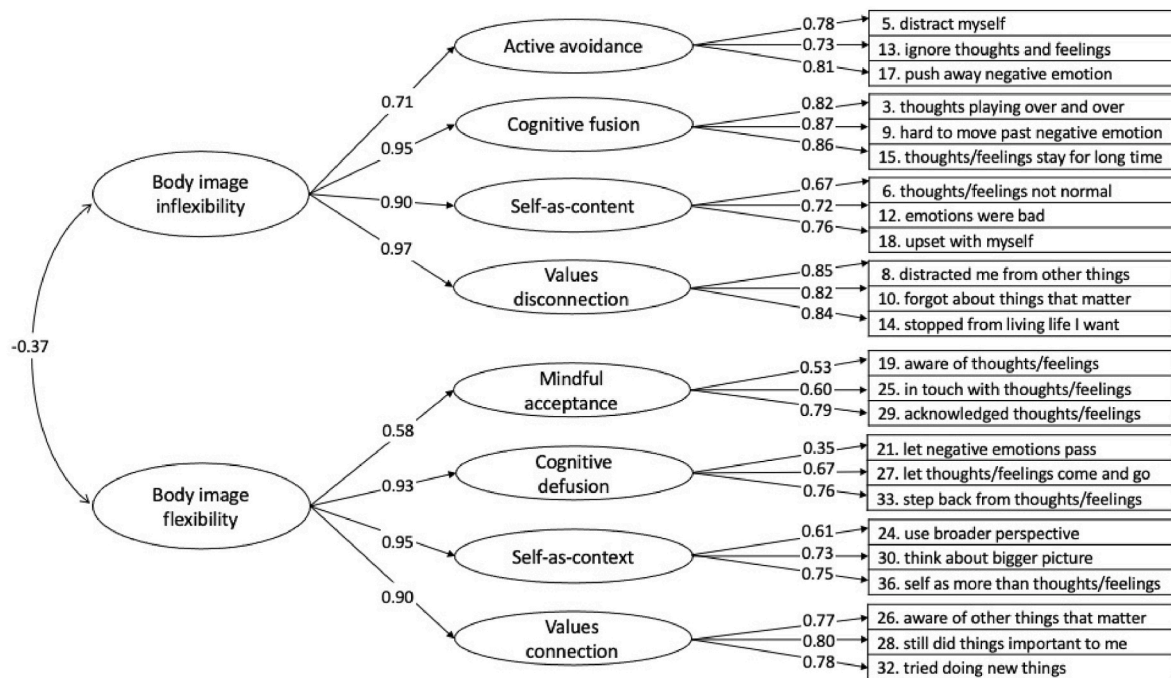


Fig. 1. Factor Structure and Standardised Loadings for Final Model (Model 5) Note. All factor loading ps significant at < 0.001.

Table 1 Goodness-of-fit indices for competing BIFIS structural models (N = 724).

Order	Model	Goodness-of-fit indices					
		χ^2 (df)	SRMR	RMSEA [90% CI]	CFI	TLI	
1	Unidimensional	7668.37 (594)*	0.16	0.13	[0.13–0.13]	0.55	0.52
2	Multidimensional	4795.52 (593)*	0.13	0.10	[0.10–0.10]	0.73	0.72
3	Hierarchical unidimensional	4458.46 (582)*	0.15	0.10	[0.09–0.10]	0.75	0.73
4	Hierarchical multidimensional (36 items; 2 higher-order, 12 lower-order factors)	3103.22 (581)*	0.13	0.08	[0.08–0.08]	0.84	0.83
5	Hierarchical multidimensional (24 items; 2 higher-order, 8 lower-order factors)	1055.95 (239)*	0.10	0.07	[0.07–0.07]	0.91	0.90

Note. BIFIS = Body Image Flexibility and Inflexibility Scale, SRMR = standardised root mean square residual, RMSEA = root mean square error of approximation, CFI = comparative fit index, TLI = Tucker-Lewis index.

* $p < .001$.

association between age and body image flexibility ($r = 0.04, p = .419$) or inflexibility ($r = -0.07, p = .132$). Similarly, age was not related to body image inflexibility in high school students ($r = -0.04, p = .475$); however, did show a small positive association with body image flexibility ($r = 0.18, p = .002$).

2.2.3. Internal consistency

Higher-order body image flexibility ($\omega = 0.87$; males: 0.88, females: 0.86) and inflexibility ($\omega = 0.93$; males: 0.92, females: 0.90) were internally consistent. Internal consistencies for the lower-order factors ranged from 0.65 to 0.89 (see Table 4, and Supplementary file for correlations). As this study aimed to assess body image flexibility and inflexibility, subsequent analyses were conducted for the higher-order factors only.

2.2.4. Test-retest reliability

Body image inflexibility scores measured at baseline and one-month follow-up were significantly positively correlated ($r = 0.73, p < .001$), and did not change over one month for males, $t(66) = -1.12, p = .268$, or for females, $t(187) = 1.82, p = .070$. Body image flexibility was less correlated across timepoints ($r = 0.55, p < .001$); however, there were no significant differences between scores over time for males, $t(66) = 0.22, p = .825$, or for females $t(187) = -0.93, p = .355$.

2.3. External validity

H1. Relationships with Other Adaptive and Maladaptive Constructs

Body image flexibility correlated positively with adaptive constructs, specifically body satisfaction, body appreciation, positive coping, self-care, intuitive eating, and well-being, and negatively with disordered eating (all $ps < .001$; see Table 5). Fisher’s z transformation indicated that relationships with aesthetic satisfaction, body appreciation, self-care, well-being, and disordered eating were weaker in males compared to females, such that body image flexibility was not significantly associated with aesthetic and functional satisfaction or disordered eating in males.

Body image inflexibility correlated negatively with all adaptive constructs and positively with disordered eating (all $ps < .001$; see Table 5). Relationships were weaker among males than females for positive coping, self-care, and disordered eating, and the relationship between body image inflexibility and positive coping was non-significant in males.

H2. Relationships with Unidimensional Body Image Flexibility

The BI-AAQ correlated positively with body image flexibility and negatively with inflexibility ($ps < .001$). Fisher’s z transformation indicated that the BI-AAQ had a significantly stronger correlation with

Table 2
Items for the Initial (12 factors, 36 items) and Final (8 factors, 24 items) Body Image Flexibility and Inflexibility Scale.

Initial factors and items	Final factor/ subfactor
Inflexibility	Body image inflexibility
Avoidance	
5 I tried to distract myself when I felt bad about my body.	Active avoidance
11 When I had a negative thought about my body, I tried to distract myself to make it go away.	–
17 When I had a negative emotion about my body, I tried to push it away.	Active avoidance
Lack of awareness	
1 I went about most days on “automatic” with little awareness of my thoughts and feelings about my body.	–
7 I went through most days without paying attention to my emotions about my body.	–
13 I tried to ignore my thoughts and feelings about my body.	Active avoidance
Cognitive Fusion	
3 Negative thoughts about my body kept playing over and over in my mind.	Cognitive fusion
9 When I had a negative emotion about my body, it was hard for me to move past it.	Cognitive fusion
15 Negative thoughts and feelings about my body tended to stay with me for a long time.	Cognitive fusion
Self-as-Content	
6 I believed some of my thoughts and feelings about my body were not normal.	Self-as-content
12 I thought some of my emotions about my body were bad and I shouldn't feel them.	Self-as-content
18 I got upset with myself for having negative thoughts and feelings about my body.	Self-as-content
Lack of values	
2 Negative emotions about my body made it hard for me to focus on the important things in my life.	–
8 Negative thoughts and feelings about my body distracted me from other things I care about.	Values disconnection
14 When I felt bad about my body, I forgot about the things that matter most to me.	Values disconnection
Inaction	
4 Negative thoughts and feelings about my body got in the way of my plans and activities.	–
10 Negative thoughts and feelings about my body stopped me from living the life I want.	Values disconnection
16 Negative emotions about my body stopped me from doing other important things.	–
Flexibility	Body image flexibility
Acceptance	
23 I allowed myself to have negative thoughts about my body instead of pushing them away.	–
29 I acknowledged my negative thoughts and feelings about my body rather than ignoring them.	Mindful acceptance
35 When I had negative emotions about my body, I let myself feel them.	–
Present moment awareness	
19 I was aware of my thoughts and feelings about my body.	Mindful acceptance
25 I was in touch with my thoughts and feelings about my body throughout the day.	Mindful acceptance
31 I tried to notice when I was having negative thoughts and feelings about my body.	–
Cognitive defusion	
21 I let negative emotions about my body pass without acting on them.	Cognitive defusion
27 I let negative thoughts and feelings about my body come and go without getting stuck on them.	Cognitive defusion
33 I was able to step back from my negative thoughts and feelings about my body.	Cognitive defusion
Self-as-context	
24 When I felt bad about my body, I tried to think about myself or the situation from a broader perspective.	Self-as-context
30 I got through feeling bad about my body by thinking about the bigger picture of my life.	Self-as-context
36 I saw myself as more than just my negative thoughts and feelings about my body.	Self-as-context

Table 2 (continued)

Initial factors and items	Final factor/ subfactor
Values	
20 I stayed focused on the things I care about in life, even when I felt bad about my body.	–
26 was aware of other things that mattered to me besides my thoughts and feelings about my body.	Values connection
32 I was in touch with what is important to me, even when I had negative thoughts and feelings about my body.	Values connection
Committed action	
22 I did things I enjoy, even when I felt bad about my body.	–
28 Even when I had negative thoughts and feelings about my body, I still did things that were important to me.	Values connection
34 I tried doing new things, even if it meant having negative emotions about my body.	–

Note. Item numbers are based on the order administered in the present study.

body image inflexibility than with body image flexibility in males ($z = 13.28, p < .001$) as well as in females ($z = 16.54, p < .001$).

H3. Incremental Validity

The BIFIS explained an additional 16.0% variance in positive coping, $\Delta F(2,711) = 82.44, p < .001$; 8.2% variance in self-care, $\Delta F(2,712) = 51.03, p < .001$; 4.5% variance in intuitive eating, $\Delta F(2,711) = 29.40, p < .001$; and 4.7% variance in well-being, $\Delta F(2,712) = 29.34, p < .001$, but did not significantly add to the prediction of disordered eating, $\Delta F(2,712) = 0.82, p = .441$. In the final models, body image flexibility was a significant predictor of all adaptive outcomes. Body image inflexibility also contributed uniquely to all adaptive outcomes except for positive coping (see Table 6).

3. Discussion

This study contributes to understanding body image flexibility and inflexibility by developing and evaluating a youth-oriented self-report instrument, the BIFIS. In so doing, the feasibility of a multidimensional approach was demonstrated. The best fitting structure distinguished body image flexibility and inflexibility as separate factors, each comprising four subfactors (see Fig. 1). Higher-order body image flexibility and inflexibility each explained variance in self-care, intuitive eating, and well-being beyond measures of body satisfaction and unidimensional body image flexibility, while body image flexibility also contributed to explaining positive coping. This suggests that a multidimensional conceptualisation can offer new insights into how young people respond to body image threats.

3.1. Structural validity

The BIFIS replicated the MPFI-24 higher-order factor structure by distinguishing body image flexibility and inflexibility as separate dimensions (Grégoire et al., 2020). However, clear distinctions between each of the 12 lower-order factors (e.g., values and committed action) were not evident, resulting in a final 24-item model containing eight lower-order factors. The lower-order factors that were combined within body image flexibility (awareness + acceptance and values + committed action) corresponded to the two sets that were combined within inflexibility (lack of awareness + avoidance and lack of values + inaction). Given that other studies have found the 12 MPFI and MPFI-24 factors to be robust (Seidler et al., 2020), this may indicate conceptual challenges in defining these processes in relation to body image, or that young people have less differentiated ways of responding to body image threats than adults (Gattario & Frisén, 2019). It is worth acknowledging, however, that other measures of general psychological flexibility and inflexibility have found the ACT processes to group into fewer than 12 factors (Francis et al., 2016; Thompson et al., 2018), and alternative frameworks have been proposed to highlight the overlap between

Table 3
Measurement invariance for the BIFIS by gender and age cohort.

Step	Goodness-of-fit indices					Change in fit indices		
	χ^2 (df)	SRMR	RMSEA	CFI	TLI	Δ SRMR	Δ RMSEA	Δ CFI
Gender								
Males (n = 362)	592.08 (239)	0.08	0.06	0.92	0.90			
Females (n = 362)	657.91 (239)	0.10	0.07	0.90	0.89			
1 Equal form	1249.98 (478)	0.09	0.07	0.91	0.90			
2 Equal loadings	1333.82 (500)	0.12	0.07	0.90	0.89	0.024	0.001	-0.007
3 Equal intercepts	1407.10 (514)	0.12	0.07	0.90	0.89	0.002	0.001	-0.007
4 Equal residuals	1542.41 (538)	0.12	0.07	0.88	0.88	0.001	0.003	-0.013
Age cohort								
High school students (n = 307)	585.03 (239)	0.12	0.07	0.91	0.90			
University students (n = 438)	754.85 (239)	0.10	0.07	0.91	0.89			
1 Equal form	1366.48 (478)	0.10	0.07	0.91	0.89			
2 Equal loadings	1405.13 (500)	0.11	0.07	0.90	0.89	0.008	-0.001	-0.002
3 Equal intercepts	1424.32 (514)	0.11	0.07	0.90	0.90	0.000	-0.001	-0.001
4 Equal residuals	1516.56 (538)	0.11	0.07	0.90	0.89	0.001	0.001	-0.007

Note. BIFIS = Body Image Flexibility and Inflexibility Scale, SRMR = standardised root mean square residual, RMSEA = root mean square error of approximation, CFI = comparative fit index.

Table 4
Factor names, descriptions, and internal consistency reliability for the BIFIS.

BIFIS factor/ subfactor	Description	No. Items	ω
Body image inflexibility	Resisting, or getting stuck in, negative body-related thoughts and feelings and disconnecting from important areas of life.	12	.93
Active avoidance	Attempting to avoid or escape from unwanted negative body image experiences.	3	.80
Cognitive fusion	Getting stuck in negative body-related thoughts and feelings. ^a	3	.89
Self-as-content	Making negative judgements of one's self based on the content of body image experiences. ^a	3	.76
Values disconnection	Disconnecting from meaningful areas of life when experiencing negative body-related thoughts and feelings. ^a	3	.87
Body image flexibility	Openly experiencing negative body image thoughts and feelings as they arise while connecting with a broader sense of self and personal values.	12	.87
Mindful acceptance	Tuning into body-related thoughts and feelings and making space for them. ^b	3	.68
Cognitive defusion	Allowing negative body-related thoughts and feelings to come and go freely.	3	.65
Self-as-context	Experiencing the self as more than one's negative body-related thoughts and feelings. ^b	3	.77
Values connection	Connecting to valued activities and important life domains, even when experiencing negative body-related thoughts and feelings. ^a	3	.83

Note.

BIFIS = Body Image Flexibility and Inflexibility Scale.

^a Adapted from MPFI factor definitions (Rolffs et al., 2016).

^b Adapted from Sandoz et al. (2019) construct definitions.

conceptually-related processes (e.g., Hayes et al., 2011). Thus, further investigation of the BIFIS factor structure would be valuable to ascertain if the modified model offers the best fitting solution.

Although the final BIFIS factor structure met the criteria for acceptable fit and was sufficiently reliable, there is scope for additional item sampling and refinement. For instance, consistent with the MPFI, some of the body image flexibility items also refer to an absence of inflexibility. It is possible that describing only positive elements could provide a purer measure of adaptive flexibility skills and thus strengthen factor internal consistency and test-retest reliability. Future work could employ item response theory to guide item selection and refinement and inform these aspects of structural validity (Simms, 2008).

The hierarchical model was invariant across gender and age cohorts,

indicating that the BIFIS can be meaningfully compared between these groups. Females reported considerably higher body image inflexibility than males, but comparable body image flexibility. Young females' greater inflexibility is consistent with that found for adult women compared to men (Linardon et al., 2021), and the tendency for adolescent girls to report more negative body image than boys (Lacroix et al., 2023). Similarity across high school and university students' body image flexibility and inflexibility could indicate stability in how young people respond to body image threats from adolescence into early adulthood. However, the present study was cross-sectional and the age cohorts covered a broad range, thereby limiting conclusions about developmental patterns. Longitudinal research is needed to better understand the development of positive body image in youth, and the potential role of body image flexibility skills in helping young people overcome negative body-related experiences (Brichacek et al., 2021).

3.2. External validity

Correlations between the higher-order BIFIS factors and adaptive and maladaptive constructs supported H1. Body image flexibility correlated positively with positive body image, intuitive eating, well-being, and lower disordered eating, whereas body image inflexibility correlated negatively with adaptive constructs and positively with disordered eating. These relationships were consistent across genders, albeit weaker for males than females, with body image flexibility and inflexibility not significantly related to some body image and eating-related constructs in males. Consistent with affect regulation theory (Webb et al., 2014), accepting, defusing, broadening self-perspective, and connecting with one's values when faced with negative body image thoughts and feelings may promote behaviours that are in tune with bodily needs and emotional well-being. On the other hand, body image inflexibility can maintain control strategies that undermine physical and psychological health.

The BI-AAQ correlated more strongly with body image inflexibility than body image flexibility, consistent with H2. Although conceptualised as a positive body image measure (Webb et al., 2015), the BI-AAQ may be better understood as a measure of body image inflexibility. This is important given the need for researchers to be intentional in the selection of body image measures (Thompson & Schaefer, 2019), in this case, whether they wish to assess body image inflexibility, body image flexibility, or both. Body image inflexibility related more strongly to most of the adaptive and maladaptive constructs examined than did body image flexibility. This contrasts with what is typically observed for the MPFI; psychological flexibility relates more strongly to indices of positive functioning than inflexibility (Barr, 2022; Rogge et al., 2019), suggesting that inflexible responses may have a more powerful influence

Table 5
Construct validity correlations for the BIFIS in females (n = 362) and males (n = 362).

	Body image flexibility			Fisher's test	Body image inflexibility			Fisher's test
	Females	Males	Overall		Females	Males	Overall	
BI-AAQ	.39*	.20*	.29*	2.80	-.66*	-.60*	-.68*	-1.33
Aesthetic satisfaction	.34*	.07	.20*	3.80 ^a	-.53*	-.41*	-.54*	-2.07
Functional satisfaction	.18 [^]	.09	.14*	1.23	-.28*	-.20*	-.31*	-1.14
Body appreciation	.49*	.11 [^]	.29*	5.69 ^a	-.57*	-.45*	-.56*	-2.18
Positive coping	.54*	.40*	.46*	2.42	-.30*	.03	-.14*	-4.54 ^a
Self-care	.53*	.29*	.41*	3.90 ^a	-.54*	-.37*	-.48*	-2.89 ^a
Intuitive eating	.39*	.26*	.32*	1.95	-.54*	-.43*	-.54*	-1.93
Well-being	.39*	.12 [^]	.25*	3.90 ^a	-.48*	-.37*	-.48*	-1.80
Disordered eating	-.35*	-.08	-.21*	-3.82 ^a	.60*	.40*	.60*	3.61 ^a

Note.
BIFIS = Body Image Flexibility and Inflexibility Scale, BI-AAQ = Body Image Acceptance and Action Questionnaire.
**p* < .001, [^]*p* < .05.

^a Significant gender difference (Bonferroni corrected at *p* < .005).

Table 6
Summary of incremental validity analyses for the BIFIS (n = 719).

Step/Variable	Positive coping	Self-care	Intuitive eating	Well-being	Disordered eating
	β	β	β	β	β
Step 1	R ² = .00	R ² = .03*	R ² = .08*	R ² = .08*	R ² = .16*
Gender ^a	-.02	-.17*	-.29*	-.27*	.41*
Age cohort ^b	.06	-.00	-.09 [^]	-.12 [^]	.06
Step 2	ΔR ² = .15*	ΔR ² = .31*	ΔR ² = .32*	ΔR ² = .30*	ΔR ² = .48*
Gender ^a	.11 [^]	.06	-.05	-.06 [^]	.13*
Age cohort ^b	.10 [^]	.05	-.04	-.07 [^]	-.01
AS	.36*	.23*	.26*	.34*	-.26*
FS	.07	.15*	.09 [^]	.24*	.04
BI-AAQ	.01	.35*	.38*	.11 [^]	-.58*
Step 3	ΔR ² = .16*	ΔR ² = .08*	ΔR ² = .05*	ΔR ² = .05*	ΔR ² = .00
Gender ^a	.06	.08*	-.02	-.02	.12*
Age cohort ^b	.07 [^]	.03	-.05	-.08 [^]	-.01
AS	.36*	.17*	.21*	.28*	-.25*
FS	.05	.15*	.09 [^]	.24*	.04
BI-AAQ	-.06	.17*	.23*	-.06	-.56*
BIFIS-Inflex	.09	-.21*	-.21*	-.26*	.04
BIFIS-Flex	.42*	.26*	.17*	.13*	.01

Note. AS = Aesthetic Satisfaction, FS = Functional Satisfaction, BI-AAQ = Body Image Acceptance and Action Questionnaire, BIFIS = Body Image Flexibility and Inflexibility Scale.

**p* < .001, [^]*p* < .05.

^a Reference group: male.

^b Reference group: high school.

in the body image and youth context. Body image flexibility was, however, more closely related to positive coping, and could therefore promote behaviours that buffer the detrimental effects of inflexibility. While the decision to focus on body image flexibility or inflexibility will depend on the research aims and context, including both dimensions can offer a more comprehensive assessment as they are related yet distinct constructs. Given the limited investigation of adaptive flexibility skills to date, ongoing conceptual and measurement developments may offer additional information about their unique effects.

Incremental validity of the BIFIS was partially supported (H3). Body image flexibility and inflexibility together explained 4.5% to 16% of variance in positive coping, self-care, intuitive eating, and well-being beyond measures of body satisfaction and unidimensional body image (in)flexibility; however, they did not explain additional variance in disordered eating. The finding that body image flexibility independently contributed to all adaptive outcomes illustrates the benefit of a multidimensional measure which assesses flexibility and inflexibility, particularly for outcomes that signify optimal functioning and thriving.

The results also suggest that there may be situations when one dimension (flexibility or inflexibility) or measure (BI-AAQ or BIFIS) is preferred. For example, body image flexibility contributed to positive coping, whereas neither body image inflexibility measure (BIFIS or BI-AAQ) were significant predictors. Conversely, the BIFIS factors did not explain disordered eating beyond the BI-AAQ suggesting that measuring inflexibility with weight and shape concerns may be more informative in this context (Sandoz et al., 2013).

3.3. Implications

A multidimensional conceptualisation of body image flexibility and inflexibility has implications for affect regulation theory. While existing research had related body image inflexibility to worse body image and eating outcomes for adolescents (Koushiou et al., 2020; Webb et al., 2014) and young adults (Tan et al., 2019), the current study examined the contribution of adaptive flexibility skills, defined as openly experiencing negative body image thoughts and feelings as they arise while connecting with a broader sense of self and personal values. Body image flexibility was positively associated with desirable outcomes consistent with improved affect regulation (e.g., positive coping, body-attuned self-care), even after accounting for body satisfaction and body image (in)flexibility.

Body image flexibility and inflexibility can further inform the design and evaluation of body image and eating disorder interventions. For instance, targeting adaptive flexibility skills (e.g., acceptance, thought defusion, broad self-perspective, values-based living) may be effective for universal prevention aimed at improving positive body image and well-being generally. On the other hand, interventions for young people with disordered eating might benefit from addressing inflexibility (e.g., avoiding, fusing with, or judging one's own body-related thoughts and feelings). Body image flexibility and inflexibility could also be explored as mediators of intervention outcomes to elucidate potential mechanisms of action (Linardon et al., 2021; Sundgot-Borgen et al., 2020).

3.4. Limitations and future directions

The present study provided an initial investigation of body image flexibility and inflexibility measurement in youth. Findings should be interpreted in the context of several limitations. Data were cross-sectional so conclusions about causality cannot be made. Participants were a convenience sample of high school and university students. Thus, replication in additional samples of adolescents and young adults, including those experiencing clinically elevated body image and eating problems, is recommended to support generalisability and measurement invariance. Participants who identified as non-binary or a gender other than male or female were also excluded from analyses due to small sample sizes, so the results may not extend to gender-diverse youth.

External validity was explored using a limited selection of adaptive and maladaptive constructs and only for the two higher-order BIFIS factors. Examining construct validity of the lower-order factors would be useful to delineate how specific aspects of flexibility and inflexibility function. Relationships between the BIFIS and general psychological flexibility and inflexibility, and with negative (e.g., body shame) and positive body image (e.g., body-related self-compassion), would also help to strengthen convergent and discriminant validity. While we sought to use body and eating-related measures appropriate for youth, not all had been validated across the full age range of our sample so the findings should be interpreted with caution.

The BIFIS is a psychometrically-sound and contextually-sensitive extension of the MPFI, theoretically grounded within ACT (Rolfes et al., 2016). However, the ACT model is only one of several potential frameworks for conceptualising psychological flexibility (Cherry et al., 2021). Exploration of other flexibility and inflexibility frameworks (e.g., Kashdan et al., 2020), and experiential measurement formats, such as asking young people to rate and describe their responses to personally relevant body image threats in real-time (Ullrich-French & Cox, 2022), would be valuable to improve construct conceptualisation and overcome the inherent limitations of self-recall. The BIFIS instructions could also be adjusted for more flexible use across research contexts. For instance, the option to specify alternative time intervals, nominate (or ask participants to self-nominate) specific threats or body image dimensions (e.g., appearance, muscularity, body functionality) would offer scope to explore more nuanced contextualisations of body image flexibility and inflexibility. If focusing on body functionality, researchers should consider expanding the definition (Alleva & Tylka, 2021), noting that any changes to the instructions used in this study (see Supplementary file) require psychometric evaluation.

Conflict of interest

We have no known conflicts of interest to disclose.

Declaration of competing interest

None.

Acknowledgements

We would like to acknowledge the study participants and participating high schools for their contribution to the research. We are also grateful to Jaci L. Rolfes, Ronald D. Rogge, and Kelly G. Wilson for their permission to adapt the Multidimensional Psychological Flexibility Inventory.

Data used in this study is available upon reasonable request.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jcbs.2023.08.007>.

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