



Research paper

A feeling difficult to identify: Alexithymia is inversely associated with positive body image in adults from the United Kingdom

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ABSTRACT

Background: Research has increasingly examined the ways in which internal bodily experiences influence body image, including the relationship between alexithymia – the reduced ability to identify and describe one’s own emotional feelings and bodily sensations – and negative body image. However, relationships between facets of alexithymia and positive body image remain unexplored.

Methods: To bridge this gap in the literature, we assessed relationships between facets of alexithymia and multiple, core indices of positive body image in an online sample of adults from the United Kingdom. A total of 395 participants (226 women, 169 men) aged 18 to 84 years completed measures of alexithymia, body appreciation, functionality appreciation, body image flexibility, body acceptance by others, and positive rational acceptance.

Results: Once the effects of age had been accounted for, alexithymia was significantly and negatively associated with all five body image constructs in hierarchical multiple regressions. In the final models, the alexithymia facet of Difficulties Identifying Feeling emerged as a significant and negative predictor of all indices of positive body image.

Limitations: The use of cross-sectional data limits the causal conclusions that can be drawn.

Conclusions: These findings extend previous work by demonstrating the unique relationship between alexithymia and positive body image, providing important implications for body image research and practice.

1. Introduction

Research and research-informed practice on positive body image has experienced dramatic growth over the past decade (Andersen and Swami, 2021; for a review, see Tylka, 2019). The construct of *positive body image* has been defined as an “overarching love and respect for the body” (Tylka, 2018, p. 9) and involves an appreciation of the appearance and function of the body, being aware and attentive to the body’s needs, and the ability to process appearance-related messages in a self-protective manner (Cook-Cottone, 2015; Menzel and Levine, 2011; Wood-Barcalow et al., 2010). In this view, positive body image is theorised as a being an independent, multifaceted, and conceptually distinct construct from the continuum of negative body image (Tylka and Wood-Barcalow, 2015a; Webb et al., 2015). Moreover, facets of positive body image appear to be largely invariant across gender identities, with men generally having significantly greater positive body image than women, albeit with a small effect size (e.g., He et al., 2020).

Given that research supports positive body image indices being associated with additional variance in psychological well-being and adaptive eating behaviours (for reviews, see Tylka, 2018, 2019), promoting positive body image has become an important focus for intervention (Guest et al., 2019).

While body image is typically defined as the conscious, visual, and mental representation of one’s body Cash (2004), Cash and Smolak (2011) highlighted emotions as an additional core component of body image, as they are the evaluations of one’s experience of sensations within the body, “reflecting how good or bad something feels to us” (Fogel, 2011, p. 183). As such, positive body image is also likely to encompass affective components, with *appreciation of appearance and function* described as happiness, pride, and respect toward the body, and *attentiveness* and/or *attunement* being one’s ability to listen and respond to bodily experiences, such as emotion and internal bodily sensations (Menzel and Levine, 2011). *Body awareness* (i.e., the attitudinal focus and awareness of internal body sensations) constitutes adaptive and

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maladaptive interpretative and affective processes that are known to moderate body image experiences (for reviews, see [Badoud and Tsakiris, 2017](#); [Mehling et al., 2011](#)). For instance, evidence increasingly supports a relationship between *interoception* (i.e., the processing of stimuli originating from within the body) and facets of positive body image ([Daubermier, 2005](#); [Oswald et al., 2017](#); [Todd et al., 2019a, 2019b](#)). In particular, the interoceptive facet of body trust (i.e., the extent to which an individual experiences their body as a safe and trustworthy source of information) is reliably associated with indices of positive body image ([Todd et al., 2019a, 2020](#)).

These findings are, however, dependent on effective and adaptive emotion regulation and processing with regards to bodily experiences ([Herbert et al., 2011](#); [Badoud and Tsakiris, 2017](#)). For example, individuals with high body image flexibility are more likely to relate to aversive internal experiences of the body in an adaptive manner; that is, non-judgementally experiencing intrusive body- and appearance-related thoughts without ruminating on them, without impulsively acting on them, and continuing to pursue goals in other important domains without trying to suppress them via unhealthy coping strategies ([Rogers et al., 2018](#); [Sandoz et al., 2013](#)). However, individuals with altered emotion processing and/or regulation, such as alexithymia, are more likely to report greater disturbances to body image ([Hughes and Gullone, 2011](#)) and explicit body awareness, and engage in maladaptive coping strategies (i.e., [Bilotta et al., 2015](#); [Fuchs and Schlimme, 2009](#)).

Originally defined as “without words for feelings” ([Apfel and Sifneos, 1979](#), p. 180), *alexithymia* is a condition characterised by a reduced ability to identify and describe one’s own feelings and distinguish between emotional feelings and the bodily sensations. Contemporary research describes alexithymia as a continuum related to three state-dependent emotional identification and expression deficiencies: difficulty identifying feelings (DIF), difficulty describing feelings (DDF), and externally oriented thinking (EOT; [Preece et al., 2017](#); [Murphy et al., 2018](#)). Individuals high in alexithymia have an inability to cognitively process and verbalise their emotions and a weakened ability to symbolically fantasise and think ([Taylor et al., 1991](#)), resulting in an inability to regulate emotions and, in turn, present psychological and somatic symptoms ([De Barardis et al., 2007](#)). Studies have also suggested that men have significantly greater alexithymia compared to women: one meta-analysis indicated that men exhibited higher alexithymia scores compared to women, although the effect size was small (Hedges $d = 0.22$; [Levant et al., 2009](#)).

It is possible that alexithymia is associated with disturbances of embodiment and body image. For instance, evidence has shown that greater alexithymia is associated with difficulties integrating the subject body (i.e., one’s pre-reflective embodied sense of self without requiring explicit attention) and the object body (i.e., the physical body perceived by others and/or an object of conscious attention; [Pollatos and Herbert, 2018](#)). Furthermore, greater alexithymia is associated with deficits in interoceptive awareness and is, therefore, characterised by difficulties trusting the perceptions of one’s bodily experiences ([Brewer et al., 2016](#); [Critchley and Garfinkel, 2017](#); [Shah et al., 2016](#)). Additionally, recent research has established more direct associations between alexithymia and body image (for reviews, see [Nowakowski et al., 2013](#); [Westwood et al., 2017](#)). For instance, several studies have shown that alexithymia – and primarily DIF – is associated with greater body dissatisfaction ([Fenwick and Sullivan, 2011](#)), lower body esteem ([Keating et al., 2013](#); [Sasai et al., 2011](#)), dysmorphic body image concerns ([Gori et al., 2021](#)), and increased maladaptive body-related beliefs and behaviours ([De Barardis et al., 2005, 2007](#)). More specifically, research suggests that both DIF and DDF are associated with a greater tendency to feel fat in women, and that negative social comparisons increased the tendency to feel fat when participants were high in alexithymia ([Pink et al., 2021](#)).

These findings have been interpreted via emotion regulation and/or processing frameworks, such as the *process model of emotion regulation* ([Gross, 1998, 2001](#)), which suggests specific regulatory strategies are differentiated according to an emotional response and/or the appraisal

of an emotion (i.e., if the emotion is good or bad for one’s goals), with certain strategies being better suited for certain contexts and/or emotions than others ([Sheppes et al., 2015](#)). In the context of body image, [Cash and Pruzinsky \(2002\)](#) proposed that proximal events trigger affective experiences regarding one’s self-evaluation through appearance-schematic processes and are adjusted through self-regulatory actions. More specifically, individuals develop and employ strategies as means to adjust to and/or cope with the thoughts, feelings, and situations that arise from body image threat(s) and/or challenge(s) ([Cash & Pruzinsky, 2002](#)). In a seminal study, [Cash et al. \(2005\)](#) conceptualised three distinct styles of coping with body image threats: avoidance, appearance fixing, and positive rational acceptance, with the latter characterised as an adaptive response (e.g., reminding oneself of one’s good qualities) and is associated with indices of positive body image ([Swami et al., 2022](#)).

Yet, alexithymia is characterised by differential emotional processing of incoming information (i.e., experiencing emotions in an undifferentiated manner), altering the way in which an individual identifies, responds to, and interacts with the internal and external environment (i.e., decreased internal experiences, with greater attention focused externally; [Brewer et al., 2016](#); [Lane and Schwartz, 1987](#)). Furthermore, a mediation analysis identified certain dimensions of alexithymia, such as DIF, to present limited emotion regulation strategies ([da Silva et al., 2017](#)). Indeed, maladaptive coping strategies (i.e., the avoidance and/or suppression of unpleasant emotions and bodily sensations) are highly correlated with alexithymia ([Panayiotou et al., 2019](#)) and have been found to mediate the relationship between alexithymia and negative body and eating-related outcomes (for review, see [Morie and Ridout, 2018](#)).

1.1. The present study

To date, researchers have not examined associations between alexithymia and indices of positive body image. Based on the review above, it might seem intuitive to assume that a negative relationship should exist between alexithymia and positive body image (i.e., the obverse of the documented positive relationship between alexithymia and negative body image). Nevertheless, such a relationship – however intuitive – should not be assumed, particularly as recent research has suggested that positive and negative body image do not lie on opposite ends of the same continuum, but rather are distinct constructs with distinct relationships to hypothesised outcomes ([More et al., 2022](#)). In other words, there is a need to directly and empirically examine the putative associations between alexithymia and indices of positive body image, rather than assuming that such relationships do in fact exist. As an added constraint, the extant literature is limited by the reliance on samples of college-aged women, with very few studies including samples of men, and a paucity of research among non-clinical populations.

To fill these gaps in the literature, the present study aimed to explore the relationships between multiple facets of positive body image and alexithymia in an online, non-clinical sample of women and men from the United Kingdom. Given that the construct of positive body image itself is multifaceted, we selected a range of widely used and core facets of the construct (i.e., body appreciation, functionality appreciation, body image flexibility, body acceptance by others, positive rational acceptance; [Swami et al., 2020](#); [Webb et al., 2015](#)) using psychometrically-valid instruments. Here, we hypothesised that the alexithymia facets of DIF, DDF, and EOT would be negatively associated with all indices of positive body image. We expected that these relationships would remain significant after accounting for the independent effects of age, which may have an independent effect on positive body image outcomes (for a review, see [Tiggemann, 2015](#)).

2. Method

2.1. Participants

The sample initially consisted of 401 individuals, but we excluded 2 participants who were missing >80 % of data-points and, because of their small number, 4 participants who self-identified their gender as “other”. The final sample, therefore, consisted of 226 women and 169 men from the United Kingdom. Participants were aged between 18 and 84 years ($M = 39.81$, $SD = 13.70$), and the majority of participants reported their ethnicity/race as White/British White (88.6 %; Black/African/Caribbean/Black British = 4.1 %; Asian/British Asian = 3.8 %; mixed or multiple-ethnic groups = 3.3 %; other = 0.3 %). In terms of educational qualifications, 15.4 % had completed minimum secondary schooling, 28.6 % had completed A-Levels or further education equivalents, 41.3 % had an undergraduate degree, 12.7 % had a postgraduate degree, and 2.0 % had some other qualification. In terms of relationship status, 39 % were married, 28.4 % were partnered but married, 27.6 % considered themselves as single and/or unpartnered, 3.3 % were divorced, and 1.8 % reported some other status. The majority of the sample indicated not being D/deaf or disabled, or having a long-term health condition (85.1 %).

2.2. Measures

2.2.1. Alexithymia

We assessed alexithymia through the widely used Toronto Alexithymia Scale-20 (Bagby et al., 1994). This is a 20-item instrument that assesses three state-dependent emotional identification and expression deficiencies: the 7-item Difficulty Identifying Feelings subscale (DIF; the capacity to identify feelings and to distinguish between feelings and the bodily sensations of emotional arousal; sample item: “Being in touch with emotions is essential”), the 6-item Difficulty Describing Feelings subscale (DDF; one’s ability to communicate their feelings to other people; sample item: “I am often confused about what emotion I am feeling”), and the 8-item Externally Oriented Thinking subscale (EOT; a thinking style oriented toward concrete external details and events rather than inner experience and feelings; sample item: “I can feel close to someone, even in moments of silence”). Responses for all TAS-20 items were made on a 5-point scale ranging from *never* (1) to *always* (5). Scores on the TAS-20 have adequate levels of composite reliability and good convergent and discriminant validity (Bagby et al., 2020), including in adults from the United Kingdom (Mason et al., 2005). Subscale scores were computed as the mean of each subscale, with higher mean scores reflecting greater alexithymia. In the present study, composite reliability, as assessed using McDonald’s ω , was >0.78 for all TAS-20 subscales.

2.2.2. Body appreciation

Body appreciation was assessed using the 10-item Body Appreciation Scale-2 (BAS-2; Tylka and Wood-Barcalow, 2015b), which assesses body-related positive opinions and acceptance, respect for the body, and protection of body image from harmful appearance-related media (sample item: “I am comfortable in my body”). All items were rated on a 5-point scale, ranging from 1 (*never*) to 5 (*always*) and an overall score was computed as the mean of all items. Higher mean scores reflect greater body appreciation. Scores on the BAS-2 are invariant across gender and have adequate composite reliability and test-retest reliability, as well as good convergent, incremental, and discriminant validity in English-speaking samples (Tylka and Wood-Barcalow, 2015b). In the present study, McDonald’s ω for BAS-2 scores was 0.84 (95 % CI = 0.80, 0.88).

2.2.3. Functionality appreciation

Functionality appreciation was assessed using the 7-item Functionality Appreciation Scale (FAS; Alleva et al., 2017), which assesses the

extent to which one appreciates and respects the body for the function it is capable to perform (sample item: “I feel that my body does so much for me”). Items were rated on a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*) and an overall score was computed as the mean of all items, with higher mean scores reflecting greater functionality appreciation. Scores on the FAS have been shown to have adequate factorial validity, are invariant across gender, have adequate composite reliability and test-retest reliability, and good convergent, discriminant and incremental validity in English-speaking samples (Alleva et al., 2017). In the present study, McDonald’s ω for FAS scores was 0.87 (95 % CI = 0.85, 0.89).

2.2.4. Body acceptance by others

The degree to which participants perceive body acceptance by others was assessed using the 13-item Body Acceptance by Others Scale-2 (BAOS-2; Swami et al., 2021). This instrument assesses one’s perception that their body and its physical characteristics are valued, respected, and unconditionally accepted by important others (sample item: “I feel acceptance from importance others regarding my body”). Items were rated on a 5-point scale (1 = *never*, 5 = *always*) and an overall score was computed as the mean of all item, with higher scores reflecting greater body acceptance by others. Scores on the BAOS-2 have been shown to be unidimensional, have adequate composite reliability and test-retest reliability, are invariant across gender, and have good convergent, construct, discriminant, and incremental validity in English-speaking samples (Swami et al., 2021). In the present study, McDonald’s ω for BAOS-2 scores was 0.81 (95 % CI = 0.79, 0.83).

2.2.5. Body image flexibility

To measure body image flexibility, participants also completed the 12-item Body Image-Acceptance and Action Questionnaire (BI-AAQ; Sandoz et al., 2013). This scale measures the degree of negative-body related thoughts, behaviours, and affect that stifle growth when experiencing aversive body-related thoughts and feelings (sample item: “I care too much about my weight and body shape”). Webb et al. (2015) have suggested that this instrument can be conceptualised of body image flexibility if all items are reverse-scored. Items were rated on a 7-point scale, ranging from 1 (*Never true*) to 7 (*Always true*). An overall score for the BI-AAQ was computed as the mean of all reverse-coded items, so that higher scores reflect greater body image flexibility. BI-AAQ scores have been shown to have a one-dimensional factor structure, adequate composite reliability, adequate test-retest reliability up to three weeks, and adequate patterns of construct validity in English-speaking samples (Sandoz et al., 2013). In the present study, McDonald’s ω for BI-AAQ scores was 0.78 (95 % CI = 0.75, 0.81).

2.2.6. Positive rational acceptance

Participants were asked to complete the 11-item Positive Rational Acceptance (PRA) subscale of the Body Image Coping Strategies Inventory (BICSI; Cash et al., 2005). This subscale assesses the extent to which individuals rely on cognitive and behavioural activities that emphasise the use of positive self-care, rational self-talk, and acceptance of one’s experiences in the face of threats to body image (sample item: “I remind myself of my good qualities”). All items were rated on a 4-point scale, ranging from 1 (*definitely not like me*) to 4 (*definitely like me*). An overall score was computed as the mean of all 11 items, with higher scores reflecting greater positive rational acceptance. Scores on the BICSI have been shown to have adequate factorial and construct validity, as well as adequate internal consistency in English-speaking samples (Cash et al., 2005). In the present study, McDonald’s ω for PRA scores was 0.80 (0.78, 0.82).

2.2.7. Demographics

Participants were asked to provide their demographic details, consisting of age, gender identity, ethnicity/race, educational attainment, and relationship status. We also collected height and weight data,

however elected not to include these in analyses to avoid perpetuating weight stigma (for a discussion, see Calogero et al., 2016).

2.3. Procedures

The study was approved by the relevant university ethics committee (approval number: ETH2122-1822). Participants were recruited via the Prolific website (prolific.co), a crowd-working internet marketplace that allows scientists to recruit participants (Palan and Schitter, 2018). Prolific has been shown to produce better quality data than other similar platforms for online recruitment of participants (Peer et al., 2022). All data were collected on July 1 and 6, 2022. The project was advertised as a study on “attitudes and feelings toward your body” and included an estimated duration. We aimed to recruit a homogenous sample in terms of cultural and national identity. Potential respondents were therefore pre-screened to ensure that only participants who were of adult age, were citizens and residents of the United Kingdom, and who were fluent in English. In addition, academic Prolific ID codes were examined to ensure that no participant took the survey more than once. After providing digital informed consent, participants were asked to provide their demographic details before completing the scales described above, which were presented in a pre-randomised order for each participant. Participants completed the measures described above anonymously and received £1.95 in exchange for completion. All participants received debriefing information at the end of the survey, which included the study aims and hypotheses. All analyses were run using SPSS Statistics version 28.

3. Results

3.1. Descriptive statistics

Beyond the missing height and weight data, there were no missing data in the retained dataset. Descriptive statistics (*Ms* and *SDs*) for all variables are reported in Table 1.

3.2. Correlational analysis

Bivariate correlations between all variables were initially conducted separately for women and men. Based on Cohen (1992), values ≤ 0.10 were considered weak, ~ 0.30 were considered moderate, and ~ 0.50 were considered strong correlations. Because of the larger number of correlations, a Bonferroni correction was applied, such that $p = .05/10 = 0.005$. As can be seen in Table 1, for some variables, the pattern of correlations was the same for both women and men. Body appreciation and body image flexibility presented small-to-moderate negative correlations with each of the TAS-20 subscales and was most strongly

correlated with DIF. Meanwhile, positive rational acceptance presented a small negative correlation, but only with DIF. Lastly, we observed gender-specific effects where body acceptance by others presented a moderate negative correlation, but only among women, whereas functionality appreciation was significantly associated with all three TAS-20 subscales in women, but only with the DDF subscale in men. To examine if there were statistically significant differences in the pattern of the correlation coefficient across gender, Fischer’s *r*-to-*z* transformations were computed (see Table S1 in the Supplementary Materials). Despite the large number of comparisons, the only statistically significant difference observed were the correlation coefficients for body acceptance by others. We therefore chose to conduct further analyses by pooling the data across women and men. Overall, these findings suggest that there are reliable associations between facets of positive body image and alexithymia, particularly the facet of DIF, across women and men.

3.3. Multiple regressions

To assess which facets of alexithymia predicted indices of positive body image, five separate hierarchical multiple regression analyses were conducted, with body appreciation, functionality appreciation, body acceptance by others, body image flexibility, and positive rational acceptance, respectively, as the criterion variables. Age was included in a first step and the TAS-20 subscale scores entered as predictor variables in the second step. Variance inflation factors (VIFs) below 10 indicate that multicollinearity is not a limiting issue (Hair et al., 1995). In the present study, VIFs for all five regressions were < 2.49 . In the final models, all five criterion variables were significantly predicted by alexithymia in the second step, but only the DIF subscale emerged as a significant predictor. For body appreciation, the TAS-20 variables

Table 2

Results of the hierarchical multiple regression with body appreciation as the criterion.

	Variable	B	SE	β	<i>t</i>	<i>p</i>
Step 1	Age	0.007	0.003	0.112	2.228	.026
	<i>F</i> (1, 394) = 4.965, <i>p</i> .026	Adj. <i>R</i> ²	0.010			
Step 2	Age	−0.001	0.003	−0.010	−0.206	.837
	Difficulties	−0.057	0.099	−0.043	−0.582	.561
	Describing Feeling Difficulties	−0.583	0.110	−0.367	−5.291	<.001
	Identifying Feeling External Oriented Thinking	0.026	0.104	0.015	0.246	.806
	<i>F</i> (4, 394) = 17.115, <i>p</i> < .001	Adj. <i>R</i> ²	0.141			

Table 1

Bivariate correlations between variables for men in the top diagonal and women in the bottom diagonal, and gender group means and standard deviations.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) TAS-20 DDF	–	0.659*	0.620*	−0.251*	−0.160	−0.261*	−0.048	−0.085	−0.341*
(2) TAS-20 DIF	−0.753*	–	0.553*	−0.412*	−0.263*	−0.416*	−0.148	−0.231*	−0.287*
(3) TAS-20 EOT	0.642*	−591*	–	−0.257*	−0.049	−0.302*	−0.066	0.027	−0.169
(4) Body appreciation	−0.306*	−0.362*	−0.200*	–	0.605*	0.470*	0.524*	0.418*	0.173
(5) Functionality appreciation	−0.222*	−0.292*	−0.125	0.636*	–	−0.327*	0.430*	0.378*	0.051
(6) Body image flexibility	−0.424*	−485*	−0.241*	0.616*	0.416*	–	0.358*	0.161	0.235*
(7) Body acceptance by others	−0.247*	−0.361*	−0.216*	0.654*	0.459*	0.538*	–	0.325*	0.064
(8) Positive rational acceptance	−0.150	−0.185*	−0.094	0.632*	0.447*	0.375*	0.454*	–	0.060
(9) Age	−0.309*	−0.312*	−0.159	0.048	0.111	0.266*	0.064	0.113	–
<i>M</i> (men)	2.82	2.62	2.99	3.21	4.13	3.00	3.45	2.63	41.1
<i>SD</i> (men)	0.60	0.53	0.49	0.82	0.73	1.30	0.80	0.57	15.16
<i>M</i> (women)	2.96	2.69	2.98	3.04	4.07	3.69	3.56	2.60	38.84
<i>SD</i> (women)	0.67	0.55	0.53	0.88	0.643	1.46	0.90	0.53	12.44

Note: Men *n* = 169, women *n* = 226; TAS-20 = Toronto Alexithymia Scale-20, DDF = Difficulties Describing Feeling, DIF = Difficulties Identifying Feeling, EOT = External Oriented Thinking.

* Bonferroni-corrected $p < .005$.

accounted for an additional 5.8 % of the variance (see Table 2). Likewise, for functionality appreciation, TAS-20 variables accounted for an additional 4 % of the variance (see Table 3), 10.1 % added variance for body image flexibility (see Table 4), and 5.4 % of the added variance for body acceptance by others (see Table 5). While the regression with positive rational acceptance was significant, the TAS-20 variables accounted for only 2.7 % additional variance (see Table 6). Overall, these findings suggest that the alexithymia facet of DIF is reliably associated with facets of positive body image.

4. Discussion

The current study examined relationships between multiple facets of alexithymia and indices of positive body image. Overall, we identified significant predictive relationships between a facet of alexithymia and all five indices of positive body image. In particular the alexithymia facet of DIF emerged as a significant predictor of positive body image across our regression analyses and, after accounting for the effects of age, accounted for 5.8 % of the variance for body appreciation, 4 % for functionality appreciation, 10.1 % body image flexibility, 5.4 % for body acceptance by others, and 2.7 % for positive rational acceptance. These results suggest that alexithymia, and particularly the alexithymia facet of DIF, is reliably associated with multiple indices of positive body image. Moreover, with previous research tending to focus upon relationships with negative body image in college-aged women (e.g., Fenwick and Sullivan, 2011; Keating et al., 2013; Sasai et al., 2011), another unique contribution of this present study is in identifying robust relationships between alexithymia and positive body image in a more diverse sample of men and women of a wider age range.

We hypothesised that all TAS-20 subscales would be negatively associated with indices of positive body image. Correlational analysis supported this hypothesis; however, in the final regression models, only the TAS-20 DIF facet emerged as a significant predictor, while the DDF and EOT facets did not significantly predict any of the body image indices. It should be noted that this was despite DIF and DDF often correlating highly, with evidence suggesting verbalisation of feelings (i.e., the ability to find words for one’s feelings and to express them to others; DDF) requires the “inner language” that is identifying and attaching a label to that feeling (DIF; for a review, see Goerlich, 2018). Moreover, although the variance accounted for by DIF in the regression models varied markedly, it was notable that it accounted for almost a third of the variance in body image flexibility, suggestive of a relatively strong association. Overall, then, it may be concluded that individuals who score more highly on DIF may be less likely to engage in adaptive body image coping strategies, perceive lower body acceptance by others, and demonstrate lower body and functionality appreciation.

These findings both corroborate and extend the broader literature (De Barardis et al., 2005; Fenwick and Sullivan, 2011; Keating et al., 2013; Sasai et al., 2011) by identifying a negative relationship between alexithymia and positive body image. This may have important

Table 3
Results of the hierarchical multiple regression with functionality appreciation as the criterion.

	Variable	B	SE	β	<i>t</i>	<i>p</i>
Step 1	Age	0.004	0.003	0.084	1.671	.096
	$F(1, 394) = 2.791, p < .096$	Adj. R^2	0.005			
Step 2	Age	0.000	0.003	-0.008	-0.154	.878
	Difficulties	-0.053	0.081	-0.050	-0.651	.516
	Describing Feeling Difficulties	-0.399	0.091	-0.316	-4.401	<.001
	Identifying Feeling					
	External Oriented Thinking	0.161	0.086	0.121	1.879	.061
	$F(4, 394) = 9.251, p < .001$	Adj. R^2	0.077			

Table 4
Results of the hierarchical multiple regression with body image flexibility as the criterion.

	Variable	B	SE	β	<i>t</i>	<i>p</i>
Step 1	Age	0.027	0.005	0.261	5.359	<.001
	$F(1, 394) = 28.721, p < .001$	Adj. R^2	0.066			
Step 2	Age	0.013	0.005	0.124	2.618	.009
	Difficulties	-0.196	0.156	-0.088	-1.251	.212
	Describing Feeling Difficulties	-1.005	0.175	-0.379	-5.755	<.001
	Identifying Feeling					
	External Oriented Thinking	0.106	0.165	0.038	0.639	.523
	$F(4, 394) = 29.055, p < .001$	Adj. R^2	0.222			

Table 5
Results of the hierarchical multiple regression with body acceptance by others as the criterion.

	Variable	B	SE	β	<i>t</i>	<i>p</i>
Step 1	Age	0.004	0.003	0.058	1.145	.253
	$F(1, 394) = 1.310, p = .253$	Adj. R^2	0.001			
Step 2	Age	-0.001	0.004	-0.018	-0.352	.725
	Difficulties	0.099	0.111	0.069	0.895	.371
	Describing Feeling Difficulties	-0.536	0.124	-0.312	-4.328	<.001
	Identifying Feeling					
	External Oriented Thinking	-0.047	0.117	-0.026	-0.401	.688
	$F(4, 394) = 8.108, p < .001$	Adj. R^2	0.067			

Table 6
Results of the hierarchical multiple regression with positive rational acceptance as the criterion.

	Variable	B	SE	β	<i>t</i>	<i>p</i>
Step 1	Age	0.004	0.002	0.089	1.764	.079
	$F(1, 394) = 3.111, p = .079$	Adj. R^2	0.005			
Step 2	Age	0.001	0.002	0.028	0.539	.590
	Difficulties	0.004	0.066	0.004	0.053	.958
	Describing Feeling Difficulties	-0.267	0.814	-0.264	-3.607	<.001
	Identifying Feeling					
	External Oriented Thinking	0.119	0.070	0.111	1.699	.090
	$F(4, 394) = 5.301, p < .001$	Adj. R^2	0.042			

theoretical implications for scholarly understanding of positive body image. As Wood-Barcalow et al. (2010) have posited, body appreciation and functionality appreciation are expressed by listening to and ascertaining bodily cues in order to respond and care for the body (see also Daubenmier, 2005; Tylka and Wood-Barcalow, 2015a), which requires the ability to be in tune with one’s internal states. Research supports this notion, with dimensions of interoceptive awareness (i.e., body trust) predicting indices of positive body image (Todd et al., 2019a, 2020) and its outcomes (e.g., intuitive eating; Oswald et al., 2017). Alexithymia, however, predicts deficits in interoceptive awareness (Brewer et al., 2016; Critchley and Garfinkel, 2017; Shah et al., 2016) and experiences of a disembodied sense of self (Pollatos and Herbert, 2018). Taken together, this suggests that alexithymia may elicit difficulties with recognising and trusting the perceptions of the body, impairing body-self connections (i.e., seeing the body as being integral to expressing oneself) and therefore positive body image (Menzel and Levine, 2011).

Additionally, we found that DIF had a negative relationship with body image flexibility and positive rational acceptance. In the first instance, this finding supports alexithymia as being represented by lower adaptive attitudes, cognitions, and behaviours. In particular, the alexithymia facet of DIF is associated with lower adaptive coping strategies, such as avoiding and/or suppressing salient bodily sensations and/or experiences (da Silva et al., 2017; Panayiotou et al., 2015, 2019). In the context of body image, this association extends to alexithymia predicting the interoceptive facet of “non-distracting” (i.e., the tendency to ignore or distract oneself from present-moment bodily sensations and experiences; Edwards and Lowe, 2021; Mehling et al., 2018). With positive body image being an adaptive construct grounded in affect regulation and psychological flexibility (i.e., consciously attending to the present moment without defence, while persisting in value-oriented behaviour; Cash et al., 2005; Hayes et al., 2011; Webb et al., 2014), it may be suggested that alexithymia limit one’s repertoire of adaptive regulation and/or processing skills that are necessary for experiencing and/or expressing indices of positive body image (Darrow and Follette, 2014).

Although our correlational analyses suggested that relationships between alexithymia and positive body image were largely consistent across women and men, one contra-indicatory finding is perhaps worth highlighting. Specifically, we found that women (but not men) with higher levels of alexithymia were less likely to report body acceptance by others. According to Avalos and Tylka (2006), women who experience body acceptance by others are less likely to present appearance and/or body preoccupation and demonstrate greater attendance to bodily cues and honouring these signals. However, our results suggest alexithymia may potentially influence this process through a lack of sensitivity and/or taking account of other people’s emotions, attitudes, and perceptions (Moriguchi et al., 2006) – a cognitive skill known as *theory of mind* or *mentalizing* (Frith and Frith, 2003). In this view, the degree to which others’ positive opinions are internalised may be altered in this population. As such, another plausible explanation is the way in which alexithymia influences external information processing: it is possible that women with higher levels of alexithymia hold greater attention toward external/social stimuli and, therefore, internalise external information more readily (Brewer et al., 2016). Indeed, this may shape the influence of positive body orientation on body acceptance by others, as they may be more likely to internalise self-objectifying dialogue (Fredrickson and Roberts, 1997).

4.1. Limitations

Despite its novel findings, the limitations of this study should be acknowledged. While we had intended to investigate facets of alexithymia, it has been suggested that the TAS-20 may inaccurately capture universal alexithymia, by alternatively measuring concepts such as negative affect (Marchesi et al., 2014) and shame (Suslow et al., 2000). Future investigation is therefore encouraged to use the TAS-20 in combination with other measures of alexithymia, such as the Observer Alexithymia Scale (Haviland et al., 2001; Westwood et al., 2017). Similarly, alexithymia scores may be inflated by anxiety and/or depression, thus researchers should follow Bagby et al.’s (2020) recommendations of partialing the variance for negative affect when investigating alexithymia. Yet, negative affect was not included in the current analyses, therefore it is difficult to determine the extent to which the current negative correlations are subsequent to negative affect versus alexithymia. This study further lacked the inclusion of relevant measures that assess internal, sensory aspects of body image – in particular body awareness and/or responsiveness. Given the relationship between alexithymia and positive body image with body awareness and/or embodiment (Mehling et al., 2009; Piran, 2016), future work is advised to include measures such as the Body Responsiveness Scale (Daubnmier, 2005) and the Experience of Embodiment Scale (Piran et al., 2020).

Furthermore, it is plausible that the salience of preoccupations regarding appearance may have alternatively influenced lower levels of perceive body acceptance by others, rather than facets of alexithymia. This suggests the inclusion of additional measures such as the Objectified Body Consciousness Scale (McKinley and Hyde, 1996). Finally, our intention was to assess the relationship between alexithymia and positive body image in a non-clinical population. However, another limitation of the present work relates to exclusion criteria, as data regarding physical and/or mental health was not collected. It is, therefore, possible that our sample includes participants who have a mental health (e.g., eating disorders, depression) and/or neurodevelopmental condition (i.e., autism) which may impact scores for alexithymia and positive body image. Greater consideration for these issues may help future investigation and to better understand the role that alexithymia plays in shaping body image.

4.2. Conclusion

In summary, the present work identified unique relationships between facets of alexithymia and indices of positive body image in a population of community adult men and women. These results have theoretical implications by contributing to a more complex and rich understanding of body image with an internal point-of-view. Nevertheless, we acknowledge that our results are preliminary due its cross-sectional design; that is, they can only be inferred hypothetically at present. Additionally, longitudinal studies examining alexithymia are currently lacking (Badoud and Tsakiris, 2017; Westwood et al., 2017). We therefore consider this a timely opportunity for multidisciplinary researchers to acknowledge the idea that the extent to which internal bodily experiences is, in some way, related to positive body image. This may be established both quantitatively, such as examining the causal relationship between alexithymia and body image, and qualitatively, by better understanding the lived experiences of alexithymic individuals in relation their bodies. This increased understanding does not only entail conceptual advances, but potentially presents clinical implications (e.g., Mehling et al., 2011; Norman et al., 2019). For instance, it may be that existing interventions aimed at promoting positive body image in non-clinical populations may be less effective in individuals high in alexithymia. If this is the case, there may be value in examining the extent to which therapeutic interventions that are known to reduce alexithymia (e.g., see Cameron et al., 2014) could be adapted or combined with existing positive body image interventions.

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Phaedra Longhurst (MSc) contributed to the conceptualisation, study design, performed data analyses, interpretation of the findings, manuscript writing and edits. Professor Viren Swami (PhD) contributed to the study design, performed data analyses, interpretation of the findings, manuscript writing and edits, and supervision.

Declaration of competing interest

The authors declare no conflicts of interest.

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References

- Alleva, J.M., Tylka, T.L., Kroon, Van Diest, A.M., 2017. The functionality appreciation scale (FAS): development and psychometric evaluation in US community women and men. *Body Image* 23, 28–44. <https://doi.org/10.1016/j.bodyim.2017.07.008>.
- Andersen, N., Swami, V., 2021. Science mapping research on body image: a bibliometric review of publications in body image, 2004–2020. *Body Image* 38, 106–119. <https://doi.org/10.1016/j.bodyim.2021.03.015>.
- Apfel, R.J., Sifneos, P.E., 1979. Alexithymia: concept and measurement. *Psychother. Psychosom.* 32 (1), 180–191. <https://doi.org/10.1159/000287386>.
- Avalos, L.C., Tylka, T.L., 2006. Exploring a model of intuitive eating with college women. *J. Counsel. Psychol.* 53 (4), 486–497. <https://doi.org/10.1037/0022-0167.53.4.486>.
- Badoud, D., Tsakiris, M., 2017. From the body's viscera to the body's image: is there a link between interoception and body image concerns? *Neurosci. Biobehav. Rev.* 77, 237–246. <https://doi.org/10.1016/j.neubiorev.2017.03.017>.
- Bagby, R.M., Parker, J.D.A., Taylor, G.J., 1994. The twenty-item Toronto alexithymia Scale-I: item selection and cross-validation of the factor structure. *J. Psychosom. Res.* 38 (1), 23–32. [https://doi.org/10.1016/0022-3999\(94\)90005-1](https://doi.org/10.1016/0022-3999(94)90005-1).
- Bagby, R.M., Parker, J.D.A., Taylor, G.J., 2020. Twenty-five years with the 20-item Toronto alexithymia scale. *J. Psychosom. Res.* 131, 109940 <https://doi.org/10.1016/j.jpsychores.2020.109940>.
- Bilotta, E., Giacomantonio, M., Leone, L., Mancini, F., Coriale, G., 2015. Being alexithymic: necessity or convenience. Negative emotionality x avoidant coping interactions and alexithymia. *Psychol. Psychother.* 89 (3), 261–275. <https://doi.org/10.1111/papt.12079>.
- Brewer, R., Cook, R., Bird, G., 2016. Alexithymia: a general deficit of interoception. *Royal Soc. Open Sci.* 3 (10), 150664 <https://doi.org/10.1098/rsos.150664>.
- Calogero, R.M., Tylka, T.L., Mensinger, J.L., 2016. Scientific weightism: a view of mainstream weight stigma research through a feminist lens. In: Roberts, T.A., Curtin, N., Duncan, L.E., Cortina, L.M. (Eds.), *Feminist Perspectives on Building a Better Psychological Science of Gender*. Springer International Publishing/Springer Nature, New York, pp. 9–28.
- Cameron, K., Ogronczuk, J., Hadjipavlou, G., 2014. Changes in alexithymia following psychological intervention: a review. *Harv. Rev. Psychiatry* 22 (3), 162–178. <https://doi.org/10.1097/HRP.0000000000000036>.
- Cash, T.F., 2004. Body image: past, present, and future. *Body Image* 1 (1), 1–5. [https://doi.org/10.1016/s1740-1445\(03\)00011-1](https://doi.org/10.1016/s1740-1445(03)00011-1).
- Cash, T.F., Pruzinsky, T., 2002. *Body image. In: A Handbook of Theory, Research, and Clinical Practice*. The Guilford Press.
- Cash, T.F., Santos, M.T., Williams, E.F., 2005. Coping with body image threats and challenges: validation of the body image coping strategies inventory. *J. Psychosom. Res.* 58 (2), 190–199. <https://doi.org/10.1016/j.jpsychores.2004.07.008>.
- Cash, T.F., Smolak, L., 2011. *Body Image: A Handbook of Science, Practice, and Prevention*, second ed. Guilford Press, New York.
- Cohen, J., 1992. A power primer. *Psychol. Bull.* 112 (1), 155–159. <https://doi.org/10.1038/0033-2090.112.1.155>.
- Cook-Cottone, C.P., 2015. Incorporating body image into the treatment of eating disorders: a model for attunement and mindful self-care. *Body Image* 14, 158–167. <https://doi.org/10.1016/j.bodyim.2015.03.004>.
- Critchley, H.D., Garfinkel, S.N., 2017. Interoception and emotion. *Cur. Opin. Psychol.* 17, 7–14. <https://doi.org/10.1016/j.copsyc.2017.04.020>.
- da Silva, A.N., Vasco, A.B., Watson, J.C., 2017. Alexithymia and emotional processing: A mediation model. *J. Clin. Psychol.* 73 (9), 1196–1205. <https://doi.org/10.1002/jclp.22422>.
- Darrow, S.M., Follette, W.C., 2014. A behaviour analytic interpretation of alexithymia. *J. Context. Behav. Sci.* 3 (2), 90–108. <https://doi.org/10.1016/j.jcbs.2014.03.002>.
- Daubenmier, J.J., 2005. The relationship of yoga, body awareness, and body responsiveness to self-objectification and disordered eating. *Psychol. Women. Quart.* 29 (2), 207–219. <https://doi.org/10.1111/2Fj.1471-6402.2005.00183.x>.
- De Barardis, D., Campanella, D., Gambi, F., Spede, G., Carano, A., Pelusi, L., La Rovere, R., Di Matteo, D., Salini, G., Cotellessa, C., Salerno, R.M., Ferro, F.M., 2005. Alexithymia and body image disturbances in women with premenstrual dysphoric disorder. *J. Psychosom. Obstet. Gynaecol.* 26 (4), 257–264. <https://doi.org/10.1080/0167482050010981>.
- De Barardis, D., Carano, A., Gambi, F., Campanella, D., Giannetti, P., Ceci, A., Mancini, E., La Rovere, R., Cicconetti, A., Penna, L., Matteo, D., Scorrano, B., Cotellessa, C., Salerno, R.M., Serroni, N., Ferro, F.M., 2007. Alexithymia and its relationships with body checking and body image in a non-clinical female sample. *Eat. Behav.* 8 (2), 296–304. <https://doi.org/10.1016/j.eatbeh.2006.11.005>.
- Edwards, D.J., Lowe, R., 2021. Associations between mental health, interoception, psychological flexibility, and self-as-context, as predictors for alexithymia: a deep artificial neural network approach. *Front. Psychol.* 12 <https://doi.org/10.3389/fpsyg.2021.637802>.
- Fenwick, A.S., Sullivan, K.A., 2011. Potential link between body dysmorphic disorder symptoms and alexithymia in an eating-disordered treating-seeking sample. *Psych. Res.* 189 (2) <https://doi.org/10.1016/j.psychres.2011.07.011>, 299–304.
- Fogel, A., 2011. Embodied awareness: neither implicit nor explicit, and not necessarily nonverbal. *Child. Dev. Pers.* 5 (3), 183–186. <https://doi.org/10.1111/j.1750-8606.2011.00177.x>.
- Fredrickson, B.L., Roberts, T.-A., 1997. Objectification theory: toward understanding women's lived experiences and mental health risks. *Psychol. Women. Quart.* 21 (2), 173–206. <https://doi.org/10.1111/j.1471-6402.1997.tb00108.x>.
- Frith, U., Frith, C.D., 2003. Development and neurophysiology of mentalizing. *Philos. Trans. R. Soc. B* 358 (1431), 459–473. <https://doi.org/10.1098/rstb.2002.1218>.
- Fuchs, T., Schlimme, J.E., 2009. Embodiment and psychopathology: a phenomenological perspective. *Cur. Opin. Psych.* 22 (6), 570–575. <https://doi.org/10.1097/ycp.0b013e3283318e5c>.
- Gross, J.J., 2001. Emotion regulation in adulthood: timing is everything. *Cur. Dir. Psychol. Sci.* 10 (6), 214–219. <https://doi.org/10.1111/2F1467-8721.00152>.
- Gross, J.J., 1998. The emerging field of emotion regulation: an integrative review. *Rev. Gen. Psychol.* 2 (3), 271–299. <https://doi.org/10.1037/2F1089-2680.2.3.271>.
- Goerlich, K.S., 2018. The multifaceted nature of alexithymia – A neuroscientific perspective. *Front. Psychol.* 9 <https://doi.org/10.3389/fpsyg.2018.01614>.
- Gori, A., Topino, E., Pucci, C., Griffiths, M.D., 2021. The relationship between alexithymia, dysmorphic concern, and exercise addiction: the moderating role of self-esteem. *J. Pers. Med.* 11 (11), 1111. <https://doi.org/10.3390/jpm11111111>.
- Guest, E., Costa, B., Williamson, H., Meyrick, J., Halliwell, E., Harcourt, D., 2019. The effectiveness of interventions aiming to promote positive body image in adults: a systematic review. *Body Image* 30, 10–25. <https://doi.org/10.1016/j.bodyim.2019.04.002>.
- Hair, J.F., Anderson, R.E., Tatham, R.L., Black, W.C., 1995. *Multivariate data analysis*. Prentice-Hall, London.
- Haviland, M., Warren, L.W., Riggs, M., Gallacher, M., 2001. Psychometric properties of the observer alexithymia scale in a clinical sample. *J. Pers. Assess.* 77 (1), 176–186. https://doi.org/10.1207/S15327752JPA7701_12.
- Hayes, S.C., Villate, M., Levin, M., Hildebrandt, M., 2011. Open, aware, and active: contextual approaches as an emerging trend in the behavioural and cognitive therapies. *Ann. Rev. Clin. Psychol.* 7, 141–168. <https://doi.org/10.1146/annurev-clinpsy-032210-104449>.
- He, J., Sun, S., Zickgraf, H.F., Lin, Z., Fan, X., 2020. Meta-analysis of gender differences in body appreciation. *Body Image* 33, 90–100. <https://doi.org/10.1016/j.bodyim.2020.02.011>.
- Herbert, B., Herbert, C., Pollatos, O., 2011. On the relationship between interoceptive awareness and alexithymia: is interoceptive awareness related to emotional awareness? *J. Pers.* 79 (5), 1149–1175. <https://doi.org/10.1111/j.1467-6494.2011.00717.x>.
- Hughes, E.K., Gullone, E., 2011. Emotion regulation moderates relationships between body image concerns and psychological symptomatology. *Body Image* 8 (3), 224–231. <https://doi.org/10.1016/j.bodyim.2011.04.001>.
- Keating, L., Tasca, G.A., Hill, R., 2013. Structural relationships among attachment insecurity, alexithymia, and body esteem in women with eating disorders. *Eat. Behav.* 14 (3), 366–373. <https://doi.org/10.1016/j.eatbeh.2013.06.013>.
- Lane, R.D., Schwartz, G.E., 1987. Levels of emotional awareness: a cognitive-developmental theory and its application to psychopathology. *Am. J. Psych.* 144 (2), 133–143.
- Levant, R.F., Hall, R.J., Williams, C.M., Hasan, N.T., 2009. Gender differences in alexithymia. *Psychol. Men. Masc.* 10 (3), 190–203.
- Marchesi, C., Osola, P., Tonna, M., Panfilis, C.D., 2014. The TAS-20 more likely measures negative affect rather than alexithymia itself in patients with major depression, panic disorder, eating disorders and substance use disorders. *Comp. Psych.* 55 (4), 972–978. <https://doi.org/10.1016/j.comppsy.2013.12.008>.
- Mason, O., Tyson, M., Jones, C., Potts, S., 2005. Alexithymia: its prevalence and correlates in a british undergraduate sample. *Psychol. Psychother.* 78 (1), 113–125. <https://doi.org/10.1348/147608304X21374>.
- McKinley, N.M., Hyde, J.S., 1996. The objectified body consciousness scale: development and validation. *Psychol. Women. Quart.* 20 (2), 181–215. <https://psycnet.apa.org/doi/10.1111/j.1471-6402.1996.tb00467.x>.
- 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), e0208034. <https://doi.org/10.1371/journal.pone.0208034>.
- Mehling, W.E., Gopisetty, V., Daubenmier, J., Price, C.J., Hecht, F.M., Stewart, A., 2009. Body awareness: construct and self-report measures. *PLoS ONE* 4 (5), e5614. <https://doi.org/10.1371/journal.pone.0005614>.
- Mehling, W.E., Wrubel, K., Daubenmier, J.J., Price, C.J., Kerr, C.E., Silow, T., Gopisetty, V., Stewart, A.L., 2011. Body awareness: a phenomenological inquiry into the common ground of mind-body therapies. *Philos. Ethics Humanit. Med.* 6, 6. <https://doi.org/10.1186/1747-5341-6-6>.
- Menzel, J.E., Levine, M.P., 2011. *Embodying experiences and the promotion of positive body image: the example of competitive athletics*. In: Calogero, R.M., Tantleff-Dunn, S., Thompson, J.K. (Eds.), *Self-Objectification in Women: Causes, Consequences and Counteractions*. American Psychological Association, Washington, DC, pp. 163–186.
- More, K.R., Hayes, N.L., Phillips, L.A., 2022. Contrasting constructs or continuum? Examining the dimensionality of body appreciation and body dissatisfaction. *Psychol. Health*. <https://doi.org/10.1080/08870446.2022.2055025>. Advance online publication.
- Morie, K., Ridout, N., 2018. Alexithymia and maladaptive regulatory behaviours in substance use disorders and eating disorders. In: Luminet, O., Taylor, G.J. (Eds.), *Alexithymia: Advances in Research, Theory, and Clinical Practice*. Cambridge University Press, Cambridge, pp. 158–173.
- Moriguchi, Y., Ohnishi, T., Lane, R.T., Maeda, M., Mori, T., Nemoto, K., Matsuda, H., Komaki, G., 2006. Impaired self-awareness and theory of mind: an fMRI study of mentalizing in alexithymia. *Neuroim. Neuroim.* 32 (3), 1472–1482. <https://doi.org/10.1016/j.neuroimage.2006.04.186>.

- Murphy, J., Brewer, R., Hobson, H., Catmur, C., Bird, G., 2018. Is alexithymia characterised by impaired interoception? Further evidence, the importance of control variables, and the problems with the heartbeat counting task. *Bio. Psychol.* 136, 189–197. <https://doi.org/10.1016/j.biopsycho.2018.05.010>.
- Norman, H., Marzano, L., Coulson, M., Oskis, A., 2019. Effects of mindfulness-based interventions on alexithymia: a systematic review. *Evid. Ment. Health* 22 (1), 36–43. <https://doi.org/10.1136/ebmental-2018-300029>.
- Nowakowski, M.E., McFarlane, T., Cassin, S., 2013. Alexithymia and eating disorders: a critical review of the literature. *J. Eat. Disord.* 1, 21. <https://doi.org/10.1186/2050-2974-1-21>.
- Oswald, A., Chapman, J., Wilson, C., 2017. Do interoceptive awareness and interoceptive responsiveness mediate the relationship between body appreciation and intuitive eating in young women? *Appetite* 109, 66–72. <https://doi.org/10.1016/j.appet.2016.11.019>.
- Palan, S., Schitter, C., 2018. ProlificAc – a subject pool for online experiments. *J. Behav. Experim. Finan.* 17, 22–27. <https://doi.org/10.1016/j.jbef.2017.12.004>.
- Panayiotou, G., Leonidou, C., Constantinou, E., Hart, J., Rinehart, K.L., Sy, J.T., Bjorgvinsson, T., 2015. Do alexithymic individuals avoid their feelings? Experiential avoidance mediates the association between alexithymia, psychosomatic, and depressive symptoms in a community and a clinical sample. *Comp. Psych.* 56, 206–216. <https://doi.org/10.1016/j.comppsycho.2014.09.006>.
- Panayiotou, G., Panteli, M., Vlemincx, E., 2019. Adaptive and maladaptive emotion processing and regulation, and the case of alexithymia. *Cognit. Emot.* 35 (3), 488–499. <https://doi.org/10.1080/02699931.2019.1671322>.
- Peer, E., Rothschild, D., Gordon, A., Evernden, Z., Damer, E., 2022. Data quality of platforms and panels for online behavioral research. *Behav. Res. Methods* 54, 1643–1662. <https://doi.org/10.3758/s13428-021-01694-3>.
- Pink, A., Williams, C., Lee, M., Young, H.A., Harrison, S., Davies, A.E., Price, M., 2021. Manipulating the sensation of feeling fat: the role of alexithymia, interoceptive sensibility and perfectionism. *Physiol. Behav.* 239, 113501 <https://doi.org/10.1016/j.jphysbeh.2021.113501>.
- Piran, N., 2016. Embodied possibilities and disruptions: The emergence of the Experience of Embodiment construct from qualitative studies with girls and women. *Body Image* 18, 43–60. <https://doi.org/10.1016/j.bodyim.2016.04.007>.
- Piran, N., Teall, T.L., Counsell, A., 2020. The experience of embodiment scale: Development and psychometric evaluation. *Body Image* 34, 117–134. <https://doi.org/10.1016/j.bodyim.2020.05.007>.
- Pollatos, O., Herbert, B.M., 2018. Alexithymia and body awareness. In: Luminet, O., Bagby, R.M., Taylor, G.J. (Eds.), *Alexithymia: Advances in Research, Theory and Clinical Practice*. Cambridge University Press, Cambridge, pp. 321–333.
- Preece, D., Bercerra, R., Allan, A., Robinson, K., Dandy, J., 2017. Establishing the theoretical components of alexithymia via factor analysis: introduction and validation of the attention-appraisal model of alexithymia. *Pers. Individ. Diff.* 119, 341–352. <https://doi.org/10.1016/j.paid.2017.08.003>.
- Rogers, C.B., Webb, J.B., Jafari, N., 2018. A systematic review of the roles of body image flexibility as correlate, moderator, mediator, and an intervention science (2011–2018). *Body Image* 27, 43–60. <https://doi.org/10.1016/j.bodyim.2018.08.003>.
- Sandoz, E.K., Wilson, K.G., Merwin, R.M., Kellum, K.K., 2013. Assessment of body image flexibility: the body image-acceptance and action questionnaire. *J. Context. Behav. Sci.* 2 (1–2), 39–48. <https://doi.org/10.1016/j.jcbs.2013.03.002>.
- Sasai, K., Tanaka, K., Hishimoto, A., 2011. Alexithymia and its relationships with eating behaviour, self-esteem, and body esteem in college women. *Kobe. J. Med. Sci.* 56 (6), E231–E238.
- Shah, P., Hall, R., Catmur, C., Bird, G., 2016. Alexithymia, not autism, is associated with impaired interoception. *Cortex* 81, 215–220. <https://doi.org/10.1016/j.cortex.2016.03.021>.
- Sheppes, G., Suri, G., Gross, J.J., 2015. Emotion regulation and psychopathology. *Ann. Rev. Clin. Psychol.* 11, 379–405. <https://doi.org/10.1146/annurev-clinpsy-032814-112739>.
- Suslow, T., Donges, U.-S., Kersting, A., Arolt, V., 2000. 20-item Toronto alexithymia scale: do difficulties describing feelings assess proneness to shame instead of difficulties symbolising emotions? *Scand. J. Psychol.* 41 (4), 329–334. <https://doi.org/10.1111/1467-9450.00205>.
- Swami, V., Furnham, A., Horne, G., Stieger, S., 2020. Taking it apart and putting it back together again: using item pool visualisation to summarise complex data patterns in (positive) body image research. *Body Image* 34, 155–166. <https://doi.org/10.1016/j.bodyim.2020.05.004>.
- Swami, V., Robinson, C., Furnham, A., 2022. Positive rational acceptance of body image threats mediates the association between nature exposure and body appreciation. *Ecopsychol.* 14 (2), 118–125. <https://doi.org/10.1089/eco.2021.0029>.
- Swami, V., Todd, J., Stieger, S., Furnham, A., Horne, G., Tylka, T.L., 2021. Body acceptance by others: refinement of the construct, and development and psychometric evaluation of a revised measure – the body acceptance by others Scale-2. *Body Image* 36, 238–253. <https://doi.org/10.1016/j.bodyim.2020.11.007>.
- Taylor, G.J., Bagby, R.M., Parker, J.D., 1991. The alexithymia construct: a potential paradigm for psychosomatic medicine. *Psychosom.* 32 (2), 153–164. [https://doi.org/10.1016/s0033-3182\(91\)72086-0](https://doi.org/10.1016/s0033-3182(91)72086-0).
- Tiggemann, M., 2015. Considerations of positive body image across various social identities and special populations. *Body Image* 14, 168–176. <https://doi.org/10.1016/j.bodyim.2015.03.002>.
- Todd, J., Aspell, J.E., Barron, D., Swami, V., 2019a. An exploration of the associations between facets of interoceptive awareness and body image in adolescents. *Body Image* 31, 171–180. <https://doi.org/10.1016/j.bodyim.2019.10.004>.
- Todd, J., Aspell, J.E., Barron, D., Swami, V., 2019b. Multiple dimensions of interoceptive awareness are associated with facets of body image in British adults. *Body Image* 29, 6–16. <https://doi.org/10.1016/j.bodyim.2019.02.003>.
- Todd, J., Aspell, J.E., Barron, D., Toh, E.K.L., Zahari, H.S., Khatib, N.A.M., Laughton, R., Swami, V., 2020. Greater gastric interoception is associated with more positive body image: evidence from adults in Malaysia and the United Kingdom. *Body Image* 34, 101–111. <https://doi.org/10.1016/j.bodyim.2020.05.011>.
- Tylka, T.L., 2018. Overview of the field of positive body image. In: Daniels, E.A., Gillen, M.M., Markey, C.H. (Eds.), *Body Positive: Understanding and Improving Body Image in Science and Practice*. Cambridge University Press, Cambridge, pp. 6–33.
- Tylka, T.L., 2019. Focusing on the positive: an introduction to the volume. In: Tylka, T.L., Piran, N. (Eds.), *Handbook of Positive Body Image and Embodiment: Constructs, Protective Factors, and Interventions*. Oxford University Press, Oxford, pp. 22–32.
- Tylka, T.L., Wood-Barcalow, N.L., 2015a. What is and what is not positive body image? Conceptual foundations and construct definition. *Body Image* 14, 118–129. <https://doi.org/10.1016/j.bodyim.2015.04.001>.
- Tylka, T.L., Wood-Barcalow, N.L., 2015. The Body Appreciation Scale-2: item refinement and psychometric evaluation. *Body Image* 12, 53–67. <https://doi.org/10.1016/j.bodyim.2014.09.006>.
- Webb, J.B., Butler-Ajibad, P., Robinson, S.A., 2014. Considering an affect regulation framework for examining the association between body dissatisfaction and positive body image in black older adolescent females: Does body mass index matter? *Body Image* 11 (4), 426–437. <https://doi.org/10.1016/j.bodyim.2014.07.002>.
- Webb, J.B., Wood-Barcalow, N.L., Tylka, T.L., 2015. Assessing positive body image: contemporary approaches and future directions. *Body Image* 14, 130–145. <https://doi.org/10.1016/j.bodyim.2015.03.010>.
- Westwood, H., Kerr-Gaffney, J., Stahl, D., Tchanturia, K., 2017. Alexithymia in eating disorders: systematic review and meta-analyses of studies using the Toronto alexithymia scale. *J. Psychosom. Res.* 99, 66–81. <https://doi.org/10.1016/j.jpsychores.2017.06.007>.
- Wood-Barcalow, N.L., Tylka, T.L., Augustus-Horvath, C.L., 2010. “But I like my body”: positive body image characteristics and a holistic model for young-adult women. *Body Image* 7 (2), 106–116. <https://doi.org/10.1016/j.bodyim.2010.01.00>.