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Inhabiting the Body:

Exploring the Link between Embodiment and Identity in Community Adolescents

Lore Vankerckhoven^{1,2*}

Laurence Claes^{1,2,3}

Leni Raemen^{1,2}

Janne Vanderhaegen^{1,2}

Steven Eggermont^{1,2}

Koen Luyckx^{1,2,4}

¹*Faculty of Psychology and Educational Sciences, KU Leuven, Leuven, Belgium*

²*Child & Youth Institute, KU Leuven, Leuven, Belgium*

³*Faculty of Medicine and Health Sciences (CAPRI), University of Antwerp, Antwerp, Belgium*

⁴*UNIBS, University of the Free State, Bloemfontein, South Africa*

* Corresponding author: University of Leuven, Tiensestraat 102, 3000 Leuven, Belgium;

E-mail address: lore.vankerckhoven@kuleuven.be; Tel.: +32 16 71 04 21

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Declarations of interest

None

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Abstract

The intricate relationship between the body and identity has been highlighted in previous studies. However, a holistic approach to the body that focuses on embodiment is lacking in research examining body - identity linkages. The current study ($N = 917$ adolescents; 58% female; $M_{\text{age}} = 16.17$, range = 14-19 years) examined the psychometric properties of a Dutch translation of the Experience of Embodiment Scale (EES) and explored the link between embodiment and personal identity. First, confirmatory factor analysis revealed a second-order factor structure for the EES and adequate reliability coefficients were obtained. Metric invariance across gender was demonstrated for the first- and second-order factors. Second, path analysis demonstrated that experiencing embodiment was positively associated with adaptive identity work. Third, five identity statuses emerged using cluster analysis. Adolescents in statuses reflecting less adaptive identity functioning displayed lower levels of embodiment. The EES shows promising indications of reliability and factor structure for assessing adolescents' Experience of Embodiment, and the present study demonstrates that embodiment is meaningfully related to identity functioning. These findings support the call for the adoption of a positive psychology framework within this research field, with attention given to more broadly defined body-related concepts such as embodiment.

Keywords: embodiment; identity functioning; adolescence

1. Introduction

Adolescents' bodies undergo a range of physical changes and maturational processes at a time when social acceptance becomes critical for one's self-esteem (McElhaney et al., 2008). Adolescents are constantly exposed to appearance-related sociocultural norms and pressures communicated through media messages or social conversations with peers, conversations that are increasingly focused on appearance during this developmental stage (Wertheim & Paxton, 2012). These physical changes, combined with sociocultural influences, may lead to a heightened focus on the body and appearance. When young girls and boys are confronted with appearance ideals that differ from their own bodies, this heightened focus on the body may result in body dissatisfaction (Cash & Smolak, 2011). Body dissatisfaction is an important risk factor for both body-related and non-body-related health issues, such as eating disorder symptoms (Palmeroni et al., 2020) or depression (Bornioli et al., 2021). Although research on body dissatisfaction is crucial given its association with mental health outcomes, developmental researchers emphasize the importance of focusing not only on risk factors but also on protective factors, especially during a vulnerable period such as adolescence (Ialongo et al., 2015; Kusina & Exline, 2019). More specifically, body image researchers are calling for the adoption of adaptive body-related processes and a more fine-grained perspective on how individuals experience their bodies beyond appearance in order to broaden the scope of prevention programs and promote health (Piran, 2015). To extend the classic appearance-oriented perspective on the body, researchers have developed the broader construct of embodiment.

1.1 Inhabiting the body

The Developmental Theory of Embodiment (Piran, 2017) defines embodiment as the complex experience of inhabiting the body beyond appearance. From this perspective, the body is approached as a subjective site from which to engage with the world (Piran, 2016, 2017). The core construct has been labeled as Experience of Embodiment and addresses a breadth of experiences besides those captured by body image or other constructs. This range of experiences is clustered into five dimensions which range on a continuum from positive to negative. The first dimension reflects *Body Connection and Comfort versus Body Disconnection and Discomfort*, which addresses the quality of one's connection with one's body and the experience of one's body as a comfortable or problematic site from which one engages with the world. The second dimension reflects *Agency and Functionality versus Blocked Agency and Restraint*, which encompasses self-awareness of one's worth, leading to a sense of control over one's thoughts, actions, and their consequences. It involves acting with confidence and being driven by internal motivation. The third dimension reflects *Experience and Expression of*

Desire versus Disowning Desire, which addresses the quality of experiencing desires and responding to these desires in attuned ways. The fourth dimension reflects *Attuned Self-care versus Disrupted Attunement, Neglect, and Self-harm*, which addresses the level of attunement to one's internal needs (e.g., bodily, emotional, or relational needs) and the practice of self-care in light of these needs. The fifth and last dimension reflects *Inhabiting the Body as a Subjective Site versus as an Objectified Site*, which addresses the level of resilience toward pressures to adopt an external gaze and fit objectified expectations. Depending on the levels of positive and negative experiences in these five dimensions, people tend to differ in their overall Experience of Embodiment, being related to different levels of well-being (Piran, 2016, 2017). Although several studies have demonstrated an intricate link between body (dis)satisfaction and well-being in adolescents (Marta-Simões et al., 2020; Mond et al., 2011), research on the link with the broader concept of embodiment is smaller in scope (in all life stages) (Piran et al., 2020). Piran and colleagues (2020), for example, found strong correlations between the Experience of Embodiment and self-esteem in (emerging) adult women, and Gattario and colleagues (2020) found a positive association between embodiment and life satisfaction in (emerging) adults. Further, Kling and colleagues (2021) found that the EES predicted life satisfaction, self-esteem, and psychological distress above and beyond the variance accounted for by both body-esteem and internalization of appearance ideals in both young women and men. This research indicates that a comprehensive understanding of the quality of inhabiting the body may be important towards individuals' well-being, especially in adolescence, as the body is such a central aspect of adolescents' lives. During this developmental period, one dimension worthy of further investigation in relation to embodiment is identity, as identity formation also comes to the fore as a key developmental task during this life stage.

1.2 Identity and embodiment

Besides the importance of physical maturation processes, adolescents also go through psychological maturation processes and need to develop a personal identity. Personal identity formation is a central developmental task throughout the life span, but is most prominent during adolescence (Erikson, 1968). Adolescents experience an identity crisis wherein they are challenged to resolve life-defining questions. According to Erikson (1968), this identity crisis can be handled by adhering to a set of coherent ideals and future goals, indicative of *identity synthesis*. Alternatively, one can keep struggling with confused feelings in which a clear sense of purpose is lacking, indicative of *identity confusion*.

As an operationalization of Erikson's ideas on identity formation, Marcia (1966) proposed the identity status paradigm to identify behavioral markers of experienced identity synthesis or confusion. According to

Marcia, identity is composed of two decision-making processes: exploration (of different identity alternatives) and commitment (adhering to certain identity alternatives). Based on the combination of high or low levels of exploration and commitment, Marcia proposed four identity statuses: achievement (characterized by high commitment after high exploration), foreclosure (characterized by high commitment but without prior exploration), moratorium (high exploration and low commitment), and diffusion (low commitment and low exploration).

Currently, due to societal changes in industrialized societies (e.g., prolonged education) (Arnett, 2000), identity formation has been extended into emerging adulthood as young people have more opportunities to re-evaluate their prior identity choices. These societal changes lead to a dynamic rethinking of existing identity models, assessing identity as a continuous process. Extending Marcia's (1966) status paradigm, Luyckx and colleagues (2008) developed a dynamic process-oriented identity model with five identity processes instead of only two dimensions as proposed by Marcia. According to this model, one's identity search may start with a broad exploration of various identity alternatives (*exploration in breadth*), followed by adhering to some identity options (*commitment making*). Consequently, these identity options may be evaluated in light of one's personal values and standards (*exploration in depth*). As a result, individuals may identify with their commitments as they may feel convinced about their identity choices (*identification with commitment*). The process can cycle back to renewed exploration if the individual does not identify with the commitments. However, some individuals get stuck in their identity search as they continue to explore various identity options without engaging into long-term commitments. As such, this model distinguishes pro-active exploration (in breadth and in depth) from *ruminative exploration*, which hinders people from achieving a stable identity.

This dynamic process-oriented identity model does not only focus on these identity processes, but also on how the processes can be combined into identity types or statuses by performing person-centered analyses. This approach has already been used in community samples of high school and college students. Five to six identity statuses have been consistently identified: achievement, foreclosure, moratorium, carefree diffusion, troubled diffusion, and/or undifferentiated (Luyckx et al., 2008; Schwartz et al., 2011). Across studies, adolescents in the *achievement* status pro-actively explore various identity options and are able to commit to certain options and to identify with these commitments, without being inhibited by ruminative exploration (i.e., relatively high scores on pro-active exploration and commitment processes and low scores on ruminative exploration). Adolescents in the *foreclosure* status are also able to commit to identity choices and identify with these commitments, but without a prior process of exploring different alternatives (i.e., relatively low scores on

all three exploration processes and moderate to high scores on commitment processes). Adolescents in the *moratorium* status continue to explore different identity options, but without proceeding to make commitments or identify with choices (i.e., relatively high scores on all three exploration processes and moderate to low scores on the commitment processes). Adolescents in the *troubled diffusion* status ruminatively worry about identity issues, which prevents them from engaging in pro-active exploration and commitment processes (i.e., relatively low to moderate scores on pro-active exploration and commitment processes and high scores on ruminative exploration). Adolescents in the *carefree diffusion* status do not appear to be motivated to engage in identity development, nor are they concerned about it (i.e., low to moderate scores on ruminative exploration and low scores on other identity processes). Finally, adolescents in the *undifferentiated status* explore and commit to identity options to some extent, but still lack a strong sense of identity and are somewhat worried about it (i.e., relatively moderate scores on all five identity processes).

In line with Erikson's (1968) thesis on the intricate link between one's body and identity formation, studies have shown that adolescents with increased identity confusion and reduced identity synthesis were more vulnerable for body-related pathological symptoms. For example, studies with adolescent samples indicated that identity confusion appeared to increase vulnerability to body dissatisfaction and eating disorder symptoms (Verschuere et al., 2018) or non-suicidal self-injury (Gandhi et al., 2017), whereas identity synthesis appeared to protect against the development of these symptoms over time. Furthermore, studies with adolescents suggested that these pathological symptoms may, in turn, also affect one's identity (Verschuere et al., 2019). With regard to the dynamic process-oriented identity model, a study of adolescents and adults (range 11-57 years) showed that individuals with eating disorders engaged less in adaptive identity processes (i.e., commitment making, identification with commitment, and exploration in breadth) and engaged more in ruminative exploration as compared to community controls (Verschuere et al., 2017). Further, individuals with eating disorders and control participants were differently distributed among the identity statuses. More specifically, individuals with eating disorders were more likely to be situated in moratorium and diffusion, whereas community controls were more likely to be situated in achievement and foreclosure (Verschuere et al., 2017).

Although a growing body of research emphasizes the identity-body interplay, previous studies have mainly focused on negative body image or eating disorder symptoms. Researchers call for the adoption of a positive psychology framework within this research field, whereby attention is also given to positive and/or more broadly defined body-related concepts such as positive body image and embodiment (Piran, 2017; Tylka, 2018).

Few studies have already responded to this call by examining the link between identity formation and positive body image in adolescents. For example, a two-wave cross-lagged study with adolescents showed that relative increases in positive body image predicted relative increases in identity synthesis over time, providing evidence that positive body image appears to promote healthy identity development (Palmeroni et al., 2021). With regard to the dynamic process-oriented identity model, a three-wave longitudinal study demonstrated that adolescents in identity trajectory classes reflecting less adaptive identity functioning, such as moratorium and troubled diffusion, displayed lower levels of positive body image compared to adolescents in adaptive identity trajectory classes, such as achievement (Vankerckhoven et al., 2022).

Based on these findings, research needs to examine whether embodiment and identity are related, given that embodiment includes positive body image but also expands it by focusing not only on appearance but also on dimensions such as agency and functionality. Similar to the social-contextual embeddedness of identity (Erikson, 1968), the Developmental Theory of Embodiment (Piran, 2017) examines relations between social-contextual processes and one's embodied experiences. From this point of view, one's Experience of Embodiment can be challenged by different experiences across the lifespan in interaction with the social environment (Piran, 2017), such as identity formation. Relatedly, this developmental theory emphasizes that individual autonomy in one's identity work is crucial for embodiment and that experiencing embodiment, in turn, may be a starting point of further identity work (Wängqvist & Frisé, 2013).

In assessing this link between Experience of Embodiment and identity, research should aim at differentiating among the different domains of embodiment and their associations with identity as well. For example, the first domain of embodiment, positive body connection and comfort, overlaps to some extent with the adolescent concept of positive body image (Tylka & Wood-Barcalow, 2015). Previous research with adolescents suggested that especially lower levels of ruminative exploration were associated with higher levels of positive body image (Vankerckhoven et al., 2022). With regard to body un-encumbered adjustment, research indicated that general adjustment in adolescence is positively related to engagement in identity commitment processes but is negatively related to (especially ruminative) exploration processes (Rahiminezhad et al., 2017). With regard to agency and functionality, experiencing a sense of agency seemed to be positively related to both identity exploration and commitment making in previous research with emerging adults (Schwartz et al., 2016). The fourth domain of embodiment, attuned self-care, seems to be related to interoception. One theoretical account linked interoceptive deficits to dysfunctions in generating and maintaining a stable sense of self (Apps & Tsakiris, 2014). The negative pole of the self-care dimension regards disrupted attunement, neglect, and self-

harm, such as eating disorder symptoms or non-suicidal self-injury which are known to be negatively associated with identity synthesis and positively associated with identity confusion in adolescence (Gandhi et al., 2017; Verschuere et al., 2018). Finally, with regard to objectification, a longitudinal study demonstrated that adolescents who were situated in the carefree diffusion trajectory class reported the lowest levels of self-objectification (Vankerckhoven et al., 2022). Hence, adolescents who were not fully invested in their identity search seemed the least vulnerable to engage in a process of self-objectification.

1.3 The present study

To broaden our understanding of the identity-body interplay in adolescents, the current study: (1) examined the factor structure, reliability, and measurement invariance across gender of the Dutch translation of the Experience of Embodiment Scale, and examined associations with age, adjusted BMI, and other body-related questionnaires; and (2) explored the link between the Experience of Embodiment and its different domains and personal identity functioning (identity synthesis and confusion; identity dimensions; and identity statuses).

The EES has a second-order factor structure with a higher-order factor, representing Experience of Embodiment, and six specific factors, representing six domains of embodiment (positive body connection and comfort, body un-encumbered adjustment, agency and functionality, attuned self-care, resisting objectification, and experience and expression of sexual desire, respectively) (Piran et al., 2020). Based on the factor structure of the EES, it was expected that the Dutch translation would also have a second-order factor structure. In consultation with Piran (personal communication, August 25, 2020), given the younger age of the participants, the items measuring ‘experience and expression of sexual desire’ were excluded in the present study, and thus the EES (as included in the present study) was expected to have one higher-order factor, providing a global measure of Experience of Embodiment, and five specific factors measuring domains of embodiment. Given the lack of previous research regarding measurement invariance across gender, no concrete hypotheses could be forwarded. In addition, a positive association between embodiment and age was expected to occur (Piran, 2016; Tiggemann & McCourt, 2013). Further, drastic changes to one’s appearance are expected to affect one’s Experience of Embodiment (Piran, 2016), and thus the association between embodiment and adjusted body mass index (BMI) was explored. However, no concrete hypotheses were forwarded regarding this association. Finally, this study investigated the associations between the EES, general body dissatisfaction and male body dissatisfaction. The traditional perspective on body dissatisfaction focuses primarily on women’s physical features and the pursuit of the thin ideal (Tylka, 2012). Given that body-related problems are no longer a unique female concern (Daniels & Gillen, 2015), the male body attitudes scale was also included (Tylka et al., 2005),

which focuses on men's physical features and the pursuit of the muscular ideal. In this way, the current study broadened the traditional perspective on body dissatisfaction by taking into account both male and female body perfect ideals. Scores on the EES were expected to be negatively associated with scores on these two body dissatisfaction scales (Piran et al., 2020).

With regard to the link between embodiment and identity, given the lack of previous research, hypotheses were partially based on studies investigating identity in relation to other body-related variables. With regard to Experience of Embodiment, it was expected to be positively associated to identity synthesis and negatively to identity confusion (Palmeroni et al., 2021). Further, Experience of Embodiment was expected to be positively associated with pro-active exploration and commitment processes, and negatively with ruminative exploration (Vankerckhoven et al., 2022). Finally, regarding identity statuses, at least five identity statuses were expected to emerge: achievement, foreclosure, moratorium, troubled diffusion, and carefree diffusion (Luyckx et al., 2008; Schwartz et al., 2011). We hypothesized that adolescents in identity statuses characterized by high pro-active exploration and commitment levels (especially achievement) would score highest on Experience of Embodiment and that adolescents in troubled diffusion would score lowest on Experience of Embodiment (Vankerckhoven et al., 2022). With regard to the different domains of embodiment, we investigated if differential associations with identity could be found. Given limited previous research, hypotheses were formulated with caution. For example, regarding positive body connection and comfort and resisting objectification, the strongest negative associations were expected to occur with ruminative exploration and identity statuses characterized by low levels of ruminative exploration (i.e., achievement, foreclosure, carefree diffusion) (Tylka & Wood-Barcalow, 2015; Vankerckhoven et al., 2022). Regarding body un-encumbered adjustment, the strongest positive associations were expected to occur with identity commitment processes, identity synthesis, and statuses with high levels of commitment (i.e., achievement and foreclosure) (Rahiminezhad et al., 2017). Regarding agency and functionality, we expected positive associations with both pro-active exploration and commitment processes, identity synthesis and statuses which are characterized by higher levels of exploration and commitment making (especially achievement) (Schwartz et al., 2016).

2. Method

2.1 Participants

A total of 917 high school students participated in this study, with a mean age of 16.17 years ($SD = 1.28$; range 14-19) and a mean adjusted BMI of 102.90 ($SD = 16.47$; range 67.65-204.02). Initially, 923 students participated, but data from six students aged 13, 20, and 21 years were excluded to limit the age range. Of the

remaining 917 adolescents, 58.3% ($n=535$) identified as female, 39.4% as male ($n=361$), 0.4% ($n=4$) as non-binary, 0.3% ($n=3$) as gender fluid, 0.2% ($n=2$) as other, 0.9% ($n=8$) did not know how to identify their gender, 0.2% ($n=2$) did not want to disclose their gender, and 0.2% ($n=2$) did not answer the question. The latter 21 participants were not included in the analyses in which we examined gender differences or gender invariance of the EES, as these gender categories included too few participants.

2.2 Procedure

Analyses were conducted on baseline data from [\[anonymized\]](#), an ongoing three-wave longitudinal study in community adolescents. The first wave of this data-collection was carried out in three secondary schools in [\[anonymized\]](#) in April/May 2022, two to three months after the last lockdown due to the COVID-19 pandemic. The study was approved by the Social and Societal Ethics Committee of [\[anonymized\]](#). Prior to the data collection, all participants signed an informed consent form (after receiving parental consent which was required for participants under the age of 16 years). All students filled out the self-report questionnaires during school hours in the presence of our research team and returned their completed questionnaires in a sealed envelope. Participants who were absent from school at the time of data collection were invited by e-mail to complete the questionnaires online (Qualtrics). All participants received a cinema ticket for their participation.

2.3 Measures

2.3.1 Adjusted body mass index

Based on students' self-reported height and weight, their BMI (weight in kilogram/height*height in meters) was calculated. Given that the sample mainly included high school students under the age of 18 years, the adjusted BMI [(BMI/Percentile 50 of BMI for age and gender) x 100] was calculated based on the growth charts of a representative Flemish sample (Roelands & Hauspie, 2004), to account for age and gender in the interpretation of BMI-scores.

2.3.2 Embodiment

Embodiment was assessed by the Experience of Embodiment Scale for use with participants with a range of gender identities (EES; Piran et al., 2020; see p. 132). In consultation with Piran (personal communication, August 25, 2020), the EES used in this study did not include the four items of the experience and expression of sexual desire subscale, and replaced the first two items of the original scale that refer to one's connection with their body with one item ("I feel connected to my body")¹. The EES was translated from English to Dutch using the translation/back-translation procedure to ensure accuracy. The questionnaire, as

¹ Piran et al. are currently studying a more extensively revised Youth EES.

included in the present study, consists of 29 items divided over five subscales, i.e. positive body connection and comfort (n=6 items), body un-encumbered adjustment (n=6), agency and functionality (n=6), attuned self-care (n=7), and resisting objectification (n=4). All items were rated on a five-point rating scale, ranging from 1 (*completely disagree*) to 5 (*completely agree*). Example items are: 'I feel connected to my body' (positive body connection and comfort), 'I feel depressed/anxious/scared in my body' (body un-encumbered adjustment), 'I am comfortable voicing my views, opinions and beliefs' (agency and functionality), 'I take good care of, and am respectful of, my body' (attuned self-care), and 'I focus more on what my body can do than on its appearance' (resisting objectification).

2.3.3 Identity functioning

Identity was assessed using two questionnaires. First, participants completed the Dimensions of Identity Development Scale (DIDS), which was originally developed in Dutch and is a reliable and valid measure of identity in Belgian high school and college students (Luyckx et al., 2008). This questionnaire includes five subscales (exploration in breadth, exploration in depth, ruminative exploration, commitment making, and identification with commitment), each being measured by five items. All items were rated on a five-point rating scale, ranging from 1 (*completely disagree*) to 5 (*completely agree*). Example items are: 'I think about the direction I want to take in my life' (exploration in breadth), 'I think about the future plans I have made' (exploration in depth), 'I keep looking for the direction I want to take in my life' (ruminative exploration), 'I decided on the direction I want to follow in life' (commitment making), and 'My plans for the future offer me a sense of security' (identification with commitment). Cronbach's alpha's were .83, .72, .85, .91, and .86, respectively.

Second, participants completed the Erikson Psychosocial Stage Inventory (EPSI) to assess identity synthesis and confusion, which was developed and validated in adolescent samples (Rosenthal et al., 1981). The EPSI was translated from English to Dutch using the translation/back-translation procedure to ensure accuracy. Both scales consist of six items which were rated on a five-point rating scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Example items are: 'I know what kind of person I am' (identity synthesis), and 'I feel mixed up' (identity confusion). Cronbach's alpha's were .79 and .76, respectively.

2.3.4 Body dissatisfaction

The traditional perspective of body dissatisfaction was assessed using the body dissatisfaction subscale of the Dutch version of the Eating Disorder Inventory-3 (EDI-3; van Strien, 2014), which gives an indication of the degree to which an individual feels unsatisfied with his/her own body shape and believes that certain body

areas are too large or big. The EDI-3 can be administered to adolescents 13 years of age and older and is a valid and reliable measure of body dissatisfaction in non-clinical populations (Garner, 2004; van Strien & Ouwens, 2003). All 10 items were rated on a six-point Likert scale ranging from 1 (*never*) to 6 (*always*). An example item is: 'I think that my stomach is too big'. Cronbach's alpha was .89.

Male body dissatisfaction was evaluated by the muscularity and height subscales of the Male Body Attitudes Scale (MBAS; Tylka et al., 2005), which gives an indication of attitudes toward physical features and bodily concerns that are typical for men's bodies. The MBAS can be administered to adolescent males to assess body dissatisfaction (Sepúlveda et al., 2016) and was translated from English to Dutch using the translation/back-translation procedure to ensure accuracy. All 12 items were rated on a six-point Likert scale ranging from 1 (*never*) to 6 (*always*). Example items are 'I think I have too little muscle on my body' (muscularity) and 'I wish I were taller' (height). The current study focused on the total scale score of these two subscales and Cronbach's alpha was .87.

2.4 Statistical analyses

With respect to preliminary analyses, descriptive statistics (means, standard deviations, skewness and kurtosis) of the study variables were calculated, and Pearson correlation coefficients (also with age and adjusted BMI) were computed. To investigate gender differences, multivariate analyses of variance (MANOVAs) were conducted with gender as fixed factor and the study variables as dependent variables.

With respect to the first research objective, five competing CFA models (a one-factor model, a four-factor model, a five-factor model, a second-order factor model, and a bi-factor model) were compared to assess the factor structure of the Dutch translation of the EES. Model parameters were estimated with the Weighted Least Square Mean and Variance adjusted (WLSMV) estimation algorithm (MPLUS; Muthén & Muthén, 2017) for ordinal data (Li, 2016), given that it was used to validate the factor structure of the original EES (Piran et al., 2020). Model fit was evaluated using the Chi-square test of model fit, the Standardized Root Mean Square Residual (SRMR), the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), and the Tucker-Lewis Index (TLI). Adequate model fit was indicated by an SRMR value below .08, a RMSEA value below .10, a CFI value above .90, a TLI value above .90, and a χ^2 -value as small as possible. Given that the chi-square difference test cannot be used for model comparison with the WLSMV-estimator (Asparouhov & Muthén, 2010), the selection of the best model was based on goodness of fit indices and theoretical interpretability. First, a single factor model was fitted, testing whether the EES taps into a general Experience of Embodiment factor. Second, a five-factor model and, third, a more parsimonious four-factor model were fitted,

testing whether the EES taps into different uncorrelated embodiment domains. To fit the four-factor model, the ‘positive body connection and comfort’ subscale and the ‘body un-encumbered’ subscale were combined into one subscale, earlier called the ‘body-self connection’ scale. This qualitative dimension ‘body-self connection’ (Piran, 2016) has been divided into two factors in the EES: one with positively worded items, the positive body connection and comfort factor, and one with negatively worded items, the body un-encumbered adjustment factor. Fourth, a second-order model was fitted with five first-order domain-specific factors and one second-order general factor to test whether the EES taps into both five specific, correlated embodiment domains and an overarching Experience of Embodiment factor that captures the common variance among the first-order factors. Finally, a bi-factor model with five domain-specific first-order factors and one general first-order factor was fitted to test whether the EES items are influenced by both a general Experience of Embodiment factor and a specific embodiment domain unique to that item. Bi-factor models have been criticized for their tendency to overfit data (Reise et al., 2016), however, because all of the EES items were designed to measure an overarching embodiment factor, while certain items focus on domains of embodiment, a bi-factor model may be appropriate for the data. Given that the bi-factor model may be inappropriately favored by fit indices, the decision for the most appropriate CFA model was based not only on the best model fit, but also on theoretical considerations. To test for reliability of the EES, Cronbach’s alpha coefficients were calculated.

Measurement invariance of the EES was investigated for gender with a series of multigroup CFAs using the WLSMV estimation algorithm (Muthén & Muthén, 2017). First, configural, metric, and scalar invariance across gender was tested for the first-order factors. Based on these results, invariance of the second-order factor was evaluated. The invariance models were compared sequentially by evaluating two fit indices: Δ CFI and Δ SRMR. Additionally, associations between the EES and age; and the EES and adjusted BMI were explored using correlational analyses. Finally, correlational analyses between the EES and the body dissatisfaction scales were conducted. According to Cohen’s criteria (1988), the effect size was small if the correlation coefficient varied around 0.1, moderate if it varied around 0.3, and large if it varied around 0.5.

With respect to the second research objective, path analysis and cluster analysis were conducted to explore the associations between identity (identity synthesis and confusion, identity dimensions, and identity statuses) and Experience of Embodiment and its domains (i.e., positive body connection and comfort, body un-encumbered adjustment, agency and functionality, attuned self-care, and resisting objectification). Regarding identity synthesis/confusion and the identity dimensions, path analysis from a structural equation modeling approach was conducted. Conducting the analysis in a structural equation modeling framework provided the

ability to take interdependencies among the variables into account and to handle missing data using full information maximum likelihood (FIML). For estimating the models, maximum likelihood estimation with robust standard errors (MLR) was used to take into account non-normality. Four different path models were estimated. The first and second model included Experience of Embodiment as predictor of identity synthesis and confusion, and of the five identity dimensions, respectively. The third and fourth model included the five embodiment domains as predictors of identity synthesis and confusion and of the five identity dimensions, respectively. Control variables (gender/age/adjusted BMI) were included in the path models by regressing the study variables on these variables if significant associations emerged from preliminary analyses.

Regarding identity statuses, cluster analysis on the five identity processes was conducted using a two-step procedure (Gore, 2000). Prior to cluster analysis, univariate and multivariate outliers were removed. Based on previous research (Luyckx et al., 2008; Raemen et al., 2022; Schwartz et al., 2011), three- to six-cluster solutions were evaluated in terms of explanatory power, parsimony, and theoretical interpretability. At least 50% of the variance in the identity processes must be explained by the chosen cluster solution. First, a hierarchical cluster analysis was conducted using Ward's method based on squared Euclidean distances. Second, these initial cluster centers were used as non-random starting points in an iterative *k*-means clustering procedure. Subsequently, a univariate analysis of variance (ANOVA) with cluster membership as a between-subjects factor was used to examine cluster differences in Experience of Embodiment and a multivariate analysis of variance (MANOVA) with Tukey post-hoc tests was used to examine cluster differences in the five domains of embodiment.

3. Results

3.1 Preliminary analyses

Table 1 presents means, standard deviations, skewness, and kurtosis of the study variables. Positive body connection and comfort, attuned self-care, identity synthesis, and exploration in breadth were found to have a slightly left-skewed distribution, whereas all other study variables were found to have a nearly symmetrical distribution. Exploration in breadth and identity synthesis were found to have a slightly more heavy-tailed distribution to the normal distribution, whereas all other variables were found to have a slightly less heavy-tailed distribution to the normal distribution. Table 2 presents Pearson correlation coefficients among the study variables. All five embodiment domains and Experience of Embodiment were positively related to identity synthesis, commitment making, and identification with commitment. Attuned self-care was also positively related to exploration in depth, whereas agency and functionality was also positively related to both exploration

in breadth and in depth. All five embodiment domains and Experience of Embodiment were negatively related to identity confusion, ruminative exploration, body dissatisfaction, and male body dissatisfaction. Body un-encumbered adjustment was also negatively related to exploration in depth, whereas resisting objectification was negatively related to exploration in breadth and in depth. Finally, body dissatisfaction was negatively related to all study variables, except for positive associations with identity confusion, exploration in breadth and in depth, and ruminative exploration. With regard to male body dissatisfaction, negative associations with all study variables were found, except for positive associations with identity confusion and ruminative exploration.

Three one-way MANOVAs were conducted to examine gender differences. Gender differences emerged for all the embodiment domains (Wilk's $\Lambda = .76$; $F(5,876) = 56.82$; $p < .001$; $\eta^2 = 0.26$), with boys scoring higher than girls on all embodiment domains according to follow-up univariate analyses. Further, gender differences emerged for Experience of Embodiment, body dissatisfaction, and male body dissatisfaction (Wilk's $\Lambda = .63$; $F(3,872) = 169.23$; $p < .001$; $\eta^2 = 0.37$). Follow-up univariate analyses indicated that boys scored higher on Experience of Embodiment and male body dissatisfaction, whereas girls scored higher than boys on general body dissatisfaction. Additionally, gender differences emerged for identity variables (Wilk's $\Lambda = .86$; $F(7,872) = 20.11$; $p < .001$; $\eta^2 = 0.14$). Follow-up univariate analyses indicated that boys scored higher than girls on identity synthesis and identification with commitment, whereas girls scored higher than boys on identity confusion, exploration in depth, and ruminative exploration.

Further, age was positively associated with identity synthesis ($r = .07$, $p < .05$), commitment making ($r = .07$, $p < .05$), exploration in breadth ($r = .09$, $p < .01$) and in depth ($r = .12$, $p < .01$), ruminative exploration ($r = .11$, $p < .01$), and agency and functionality ($r = .07$, $p < .05$). Finally, adjusted BMI was positively associated with commitment making ($r = .08$, $p < .05$), identification with commitment ($r = .07$, $p < .05$), exploration in breadth ($r = .11$, $p < .01$) and in depth ($r = .10$, $p < .01$), and body dissatisfaction ($r = .29$, $p < .01$); and was negatively associated with positive body connection and comfort ($r = -.12$, $p < .01$), body un-encumbered adjustment ($r = -.14$, $p < .01$), attuned self-care ($r = -.09$, $p < .01$), and Experience of Embodiment ($r = -.10$, $p < .01$).

3.2 Measuring embodiment with the Experience of Embodiment Scale

Table 3 presents the results of the confirmatory factor analysis. Based on fit indices, the five-factor model (CFI = 0.943; TLI = 0.877; SRMR = 0.053; RMSEA = 0.089; $\chi^2 = 3032.640$), the second-order model (CFI = 0.942; TLI = 0.937; SRMR = 0.055; RMSEA = 0.090; $\chi^2 = 3095.356$), and the bi-factor model (CFI = 0.948; TLI = 0.939; SRMR = 0.051; RMSEA = 0.088; $\chi^2 = 2812.320$) had a good model fit. Based on the

modification indices and to further improve model fit, the highest error correlation among two similarly worded items from the same subscale (items 1 and 2 of the positive body connection and comfort subscale) was included in these models. However, a number of items failed to load strongly onto their domain-specific factor in the bifactor model, making the substantive meaning of the factors difficult to interpret theoretically. The five-factor model and the second-order model had similar fit indices and were both theoretically well interpretable. Thus, both the subscale scores representing domains of embodiment and a total score representing Experience of Embodiment were used in further analyses. The factor loadings of the EES are shown in Table 4.

With regard to the reliability of the EES, Cronbach's alpha for the total scale was .94 and Cronbach's alpha's for positive body connection and comfort, body un-encumbered adjustment, agency and functionality, attuned self-care, and resisting objectification were .92, .86, .78, .80, and .69, respectively. With regard to measurement invariance for gender, metric invariance was obtained for the first-order factors, meaning that factor loadings could be constrained equal across gender. Scalar invariance could not be obtained, meaning that at least some of the item intercepts seemed to differ between boys and girls. Given that the metric invariance model of the first-order factors served as the model in which configural invariance of the second-order factor is tested (Rudnev et al., 2018), metric invariance for the second-order factor was tested immediately after obtaining metric invariance for the first-order factors (and thus configural invariance for the second-order factor). Because scalar invariance could not be obtained for the first-order factors, it was not tested for the second-order factor. Metric invariance was also obtained for the second-order factor. Table 5 displays the goodness-of-fit statistics for measurement invariance of the EES across gender.

3.3 The link between embodiment and identity

3.3.1 Path analysis

First, the model with paths from Experience of Embodiment to identity synthesis and confusion provided an adequate fit ($\chi^2(4) = 11.80, p = .02$; CFI = 0.99; RMSEA = 0.05; SRMR = 0.02). With respect to the control variables, gender negatively predicted Experience of Embodiment ($\beta = -.46, p < .001$) and positively predicted identity synthesis ($\beta = .07, p < .01$). Age positively predicted identity synthesis ($\beta = .06, p < .05$). Adjusted BMI negatively predicted Experience of Embodiment ($\beta = -.11, p < .001$). With respect to the study variables, Experience of Embodiment positively predicted identity synthesis ($\beta = .74, p < .001$) and negatively predicted identity confusion ($\beta = -.71, p < .001$).

Second, the model with paths from Experience of Embodiment to the five identity dimensions provided an adequate fit ($\chi^2(5) = 12.64, p = .03$; CFI = 1.00; RMSEA = 0.04; SRMR = 0.02). With respect to the control

variables, gender negatively predicted Experience of Embodiment ($\beta = -.46, p < .001$) and positively predicted exploration in depth ($\beta = .11, p < .001$). Age positively predicted commitment making ($\beta = .09, p < .001$), exploration in breadth ($\beta = .10, p < .001$), exploration in depth ($\beta = .15, p < .001$), and ruminative exploration ($\beta = .11, p < .001$). Adjusted BMI negatively predicted Experience of Embodiment ($\beta = -.12, p < .001$) and positively predicted commitment making ($\beta = .10, p < .001$), identification with commitment ($\beta = .12, p < .001$), exploration in breadth ($\beta = .11, p < .05$), and exploration in depth ($\beta = .11, p < .001$). With respect to the study variables, Experience of Embodiment positively predicted commitment making ($\beta = .25, p < .001$) and identification with commitment ($\beta = .43, p < .001$) and negatively predicted ruminative exploration ($\beta = -.50, p < .001$).

Third, the model with paths from the five embodiment domains to identity synthesis and confusion provided an adequate fit ($\chi^2(9) = 21.44, p = .02$; CFI = 1.00; RMSEA = 0.04; SRMR = 0.01). Figure 2 provides a graphical depiction of this path model. With respect to the control variables, gender negatively predicted positive body connection and comfort ($\beta = -.41, p < .001$), body un-encumbered adjustment ($\beta = -.50, p < .001$), agency and functionality ($\beta = -.33, p < .001$), attuned self-care ($\beta = -.31, p < .001$), and resisting objectification ($\beta = -.33, p < .001$). Age positively predicted agency and functionality ($\beta = .07, p < .01$) and identity synthesis ($\beta = .06, p < .05$). Adjusted BMI negatively predicted positive body connection and comfort ($\beta = -.12, p < .001$), body un-encumbered adjustment ($\beta = -.14, p < .001$), and attuned self-care ($\beta = -.08, p < .01$). With respect to the study variables, positive body connection and comfort positively predicted identity synthesis; body un-encumbered adjustment negatively predicted identity confusion; agency and functionality positively predicted identity synthesis and negatively predicted identity confusion; and attuned self-care positively predicted identity synthesis and negatively predicted identity confusion.

Finally, the fourth model with paths from the five embodiment domains to the five identity dimensions also provided an adequate model fit ($\chi^2(10) = 22.92, p = .01$; CFI = 1.00; RMSEA = 0.04; SRMR = 0.02). Figure 3 provides a graphical depiction of this path model. With respect to the control variables, gender negatively predicted positive body connection and comfort ($\beta = -.41, p < .001$), body un-encumbered adjustment ($\beta = -.50, p < .001$), agency and functionality ($\beta = -.33, p < .001$), attuned self-care ($\beta = -.31, p < .001$), resisting objectification ($\beta = -.33, p < .001$), and ruminative exploration ($\beta = -.06, p < .05$). Age positively predicted agency and functionality ($\beta = .07, p < .01$), commitment making ($\beta = .08, p < .01$), exploration in breadth ($\beta = .09, p < .01$) and in depth ($\beta = .16, p < .001$), and ruminative exploration ($\beta = .11, p < .001$). Adjusted BMI negatively predicted positive body connection and comfort ($\beta = -.12, p < .001$), body un-encumbered adjustment

($\beta = -.14, p < .001$), attuned self-care ($\beta = -.09, p < .01$) and positively predicted commitment making ($\beta = .07, p < .05$), identification with commitment ($\beta = .08, p < .01$), and exploration in breadth ($\beta = .07, p < .05$). With respect to the study variables, positive body connection and comfort positively predicted exploration in depth; body un-encumbered adjustment negatively predicted exploration in breadth and in depth and ruminative exploration; agency and functionality positively predicted all commitment and pro-active exploration processes and negatively predicted ruminative exploration; and attuned self-care positively predicted identification with commitment and exploration in depth and negatively predicted ruminative exploration.

3.3.2 Cluster analysis

Prior to the cluster analysis, 13 univariate and multivariate (individuals with high Mahalanobis distance values) outliers were removed. Based on interpretability, parsimony, and explanatory power, five clusters were retained: achievement, foreclosure, moratorium, troubled diffusion, and carefree diffusion. The four-cluster solution did not explain enough variance in the identity processes and no additional meaningful cluster could be identified in the six-cluster solution. The preferred five-cluster solution explained between 51% and 65% of the variance in identity processes and is depicted in Figure 4 (the Y-axis represents z-scores: 0.2 *SD* is a small effect, 0.5 *SD* a medium effect, and 0.8 *SD* a large effect; Cohen, 1988).

Individuals in achievement (14%) scored relatively high on commitment and pro-active exploration processes and low on ruminative exploration. Individuals in foreclosure (28%) scored low on all three exploration processes combined with moderate scores on commitment processes. Individuals in moratorium (19%) scored moderate on commitment processes and moderate to high on all three exploration processes. Individuals in troubled diffusion (24%) scored low on commitment and pro-active exploration processes and scored high on ruminative exploration, whereas individuals in carefree diffusion (15%) displayed low scores on all identity dimensions. Further analyses indicated that the clusters did not differ on age ($F = 1.49, p = .19$) or adjusted BMI ($F = 1.01, p = .49$), but differed on gender ($\chi^2(8) = 51.70, p < 0.001$). Based on an inspection of the standardized residuals, boys were overrepresented in foreclosure (53% boys) and underrepresented in troubled diffusion (76% girls).

An ANOVA with cluster membership as a between-subjects factor pointed to significant cluster differences on Experience of Embodiment. As displayed in Table 6, post-hoc analyses indicated that adolescents in achievement and foreclosure reported the highest levels of Experience of Embodiment, whereas adolescents in troubled diffusion reported the lowest levels of Experience of Embodiment. Additionally, a MANOVA with cluster membership as a between-subjects factor also pointed to significant cluster differences on all the specific

embodiment domains. With regard to positive body connection and comfort, adolescents in achievement and foreclosure experienced the highest levels, whereas adolescents in troubled diffusion experienced the lowest levels. With regard to body un-encumbered adjustment, adolescents in achievement and foreclosure scored highest, however, adolescents in achievement did not differ significantly from adolescents in carefree diffusion. Adolescents in troubled diffusion scored lowest on body un-encumbered adjustment. With regard to agency and functionality, adolescents in achievement reported the highest levels, whereas adolescents in troubled diffusion reported the lowest levels. With regard to attuned self-care, adolescents in achievement and foreclosure scored highest, although adolescents in foreclosure did not significantly differ from adolescents in carefree diffusion and moratorium. Adolescents in troubled diffusion scored lowest on attuned self-care. Finally, with regard to resisting objectification, adolescents in troubled diffusion and moratorium reported the lowest levels, although adolescents in moratorium did not differ significantly from adolescents in achievement, foreclosure, and carefree diffusion.

4. Discussion

Previous research has demonstrated the intricate link between one's body and identity (Kling et al., 2018), however, previous studies have mainly focused on negative body image. To broaden the understanding of the link between identity and one's body, research has to attend to more broadly defined concepts such as embodiment. The current study examined the psychometric properties of the Dutch translation of the Experience of Embodiment Scale (Piran et al., 2020) and explored the link between embodiment and identity functioning. The EES has shown promising indications of reliability and factor structure in assessing adolescents' embodied experiences, providing valuable insights for future research and clinical practice focused on adolescents' embodied experiences. Additionally, in line with expectations, embodiment and identity (assessed at different levels) were found to be meaningfully related. These findings underscore the added value of embodiment in the study of the identity-body interplay in adolescents.

4.1 Measuring embodiment with the Experience of Embodiment Scale

As expected, the EES had a second-order factor structure in our sample of Dutch-speaking community adolescents. In terms of factor loadings, some items (items 6, 17, 19, 20, and 21) had lower factor loadings on their domain-specific factors (i.e., factor loadings around .50) compared to the other items, suggesting that these particular items may be somewhat less strongly correlated with their factor than other items of the scale. Items 6, 19, 20, and 21 focus on one's needs, feelings, or emotions (e.g., "I am aware of my needs"), and given the young age of our sample and the fact that adolescence is a turbulent time in which adolescents are still learning to regulate emotions and be in tune with their bodies (Young et al., 2019), it may be that the feelings or behaviors

expressed by these items are not as prevalent or consistent in our adolescent population. In line with this, item 17 ("I spend a lot of time/energy/money on activities that I hope will make me more beautiful to others") may not be as applicable to our adolescent sample due to rather limited financial resources or autonomy to engage in these behaviors. In terms of correlations between factors, the factors that include these items with the lowest factor loadings were less strongly correlated with each other (i.e., resisting objectification and agency and functionality; and resisting objectification and attuned self-care) compared to the other domain-specific factors which were all strongly correlated with each other. Further, notably high loadings of the specific factors 'positive body connection' and 'body un-encumbered adjustment' on the second-order factor were observed, as well as strong correlations between these two factors. This pattern of results suggests that, among Dutch adolescents, the constructs assessed by these factors may not be entirely distinct from the broader overall Experience of Embodiment (van Mierlo et al., 2008). The loadings of the remaining specific factors on the overall embodiment factor were also of considerable magnitude ($> .70$). Although high loadings of the specific factors on the general factor were expected, as this was also the case in the original validation of the English EES (Piran et al., 2020), these results suggest a possible empirical overlap between the specific dimensions and the general embodiment factor. It is possible that the differentiation between all these different bodily experiences intensifies with age, and that during adolescence, this differentiation remains relatively limited (Piran, 2017).

Both the five first-order factors and the second-order factor showed adequate to good reliability, indicating that both a total score and individual subscale scores can be calculated and used with confidence. Only the 'resisting objectification' subscale had an alpha value just below the .70 threshold, perhaps because this subscale consisted of only four items. Metric invariance for boys and girls was obtained for both the first- and second-order factors, suggesting that the concept of embodiment means the same for boys and girls. However, because scalar invariance was not obtained, boys and girls appear to respond differently to at least some items of the EES. Girls are known to struggle more with their maturing bodies than boys (Frisén et al., 2015), and thus it is possible that girls score lower on certain embodiment items, resulting in scalar non-invariance. Since scalar invariance was not obtained, caution is warranted when comparing mean scores of the EES between boys and girls.

Additionally, partially in line with expectations, age was only positively associated with the 'agency and functionality' dimension of embodiment. Agency and functionality is an important dimension when it comes to identity formation (Gattario & Frisén, 2019). Hence, the positive association between age and the dimension 'agency and functionality' could be expected given that age is also positively associated with establishing a

stable sense of self (Luyckx et al., 2013). The finding that no other embodiment dimensions were associated with age may be explained by the smaller age range (14-19 years), as there may be more differentiation in terms of bodily experiences and experiencing embodiment between pre-adolescents and late adolescents or emerging adults (Piran, 2016). Adolescents with higher BMIs felt less connected to their bodies, took less care of their bodies, had more difficulty adjusting to their maturing bodies, and generally experienced lower levels of embodiment. This suggests that having a higher BMI, and possibly the experienced stigma associated with it, may indeed affect one's Experience of Embodiment (Piran, 2016). Previous studies in both clinical and non-clinical samples of adults with obesity have shown that negative psychological outcomes, such as low self-esteem and body dissatisfaction, are associated with the experience of weight-related stigma, rather than being overweight itself (Puhl & Heuer, 2010). Similarly, in a sample of adolescent girls, previous research showed that weight-related teasing and stigmatization influenced body image over time (Thompson et al., 1995). Consistent with these findings, it is possible that weight-related stigma had an impact on the pattern of results regarding embodiment and BMI in the current study. Finally, in line with expectations, all embodiment domains and Experience of Embodiment showed negative associations with both body dissatisfaction scales.

4.2 Associations between embodiment and identity

Regarding the link between embodiment and identity, partially in line with hypotheses, path analysis indicated that Experience of Embodiment was positively associated with identity synthesis, commitment making, and identification with commitment, whereas it was negatively associated with identity confusion and ruminative exploration. This finding suggests that experiencing embodiment may indeed be associated with adaptive identity work (Wängqvist & Frisé, 2013). When adolescents experience a sense of comfort, acceptance, and agency in their developing bodies, this may foster a foundation of self-confidence to explore and integrate various roles and aspects of identity, facilitating the establishment of a stable personal identity. Furthermore, associations between embodiment (both Experience of Embodiment and the subdomains) and identity are presumably bidirectional, in line with previous research on body image and identity functioning (Palmeroni et al., 2020, 2021);. In general, the search for a personal identity may bring new and diverse experiences across different life domains, such as the social domain (e.g., feeling connected to oneself and others through social experiences) or the physical domain (e.g., being able to engage in sports or hobbies that are important one's identity thanks to one's body). Such experiences may contribute to positive feelings about the body and a sense of being at home in one's body. Additionally, an adaptive personal identity may help adolescents to navigate the

challenges of adolescence with greater resilience and self-compassion, which may contribute to positive experiences of embodiment.

Positive body connection and comfort was positively associated with identity synthesis and exploration in depth, possibly meaning that adolescents who feel connected to their bodies experience the body as a safe site from which to engage with the world, explore identity options in depth, and achieve identity synthesis (Piran, 2017). Body un-encumbered adjustment was negatively associated with identity confusion, exploration in breadth and in depth, and ruminative exploration, suggesting that adolescents who are not hindered by their developing bodies are less likely to explore identity options or to be confused about their identity search. Erikson (1968) described experiences of identity confusion or even identity loss when the body is undergoing rapid changes, which is the case during adolescence. This loss of identity is thought to be related to exploration which can contribute to a new personal identity (Kling et al., 2018). However, if one feels adapted to one's changing body, there may be less feelings of identity confusion and a reduced need to explore. Agency and functionality was positively associated with identity synthesis, commitment processes, and pro-active exploration processes, and was negatively associated with identity confusion and ruminative exploration. Experiencing agency and functionality in interactions with the world may thus be related to adaptive identity work. Attuned self-care was positively associated with identity synthesis, identification with commitment, and exploration in depth, and was negatively associated with identity confusion and ruminative exploration. Adolescents who are in tune with their needs and engage in meaningful pursuits may be more internally motivated to engage in behaviors that result in a strong sense of self (Piran, 2017; Schwartz et al., 2016). Although resisting objectification was related to some of the identity variables in the correlational analyses, these associations were no longer significant when resisting objectification was regressed on the identity variables using path analysis, probably because this controlled for other variables, such as gender or age.

4.3 Identity clusters in adolescence

In line with previous research (Luyckx et al., 2008; Raemen et al., 2022; Schwartz et al., 2011), five identity clusters were identified: achievement, foreclosure, moratorium, troubled diffusion, and carefree diffusion. Compared to previous studies, the percentage of adolescents included in troubled diffusion (24%) is higher than expected in the current study. This higher percentage of troubled diffused adolescents might be related to the timing of the data collection, which took place two to three months after the last lockdown due to the COVID-19 pandemic. A longitudinal study demonstrated that the impact of COVID-19 was positively related to increases over time in ruminative exploration, meaning that the stronger someone experienced an

impact of the pandemic, the more someone was likely to ruminate about the identity search (Vankerckhoven et al., 2022). For the present study, it is possible that many adolescents were still experiencing the effects of the pandemic a few months after the last lockdown and, as a result, were more ruminative about their life choices. Given that high levels of ruminative exploration characterize the troubled diffusion status, this might explain the higher percentage of troubled diffused adolescents in the current sample.

With respect to the five identity clusters, findings were consistent with previous research. First, adolescents in achievement were committed to life choices and identified with those commitments after pro-actively exploring various identity options. Based on their engagement in pro-active exploration and commitment processes and their resilience to rumination, achievement seemed most indicative of adaptive identity search (Schwartz et al., 2011). Second, adolescents in foreclosure also made commitments and identified with those choices, but to a smaller extent than adolescents in achievement. However, they did not explore identity alternatives prior to their commitments. Third, adolescents in moratorium were exploring different identity options in breadth and depth, while they seemed to worry about this identity search. In the current sample, these adolescents also made commitments to a moderate degree, but they had difficulties to identify with these commitments. Moratorium may reflect less adaptive identity functioning, as this cluster is associated with feelings of uncertainty and the lack of a strong identity foundation (Schwartz et al., 2016). Fourth, adolescents in troubled diffusion appeared to be hindered from engaging in pro-active exploration and commitment processes by their ruminative worries about their identity search. Troubled diffusion may represent the most maladaptive identity functioning, as this cluster is associated with confused and overwhelmed feelings (Schwartz et al., 2011). Finally, adolescents in carefree diffusion seemed unmotivated to engage in identity development, as indicated by their very limited engagement in commitment and, in particular, pro-active exploration processes. This carefree attitude was accompanied by little ruminative worries about their identity search.

Subsequent analyses indicated gender differences between the identity clusters, as girls were overrepresented in troubled diffusion and boys were overrepresented in foreclosure, consistent with previous research (Verschuere et al., 2017). The overrepresentation of girls in troubled diffusion confirms their more indecisive and ruminative nature compared to boys (Johnson & Whisman, 2013), whereas the overrepresentation of boys in foreclosure confirms that boys are more likely to make commitments than engage in pro-active identity work, which may be due to masculine traits (e.g., individuation, task-orientation) that may stimulate commitment making (Archer, 1989). Further, no age differences were found between the identity clusters. This finding might be explained by the limited age range and the younger age group, as there might be more

differentiation at a slightly older age (Luyckx et al., 2013). Finally, the identity clusters did not differ on adjusted BMI, suggesting that the evaluation of one's body (i.e., body image) might be a more important factor to identity functioning than BMI itself (Nelson et al., 2018).

4.4 Identity clusters and differences in Experience of Embodiment

As expected, adolescents in different identity clusters differed in their levels of Experience of Embodiment and embodiment domains. In line with hypotheses, adolescents in troubled diffusion showed the lowest levels of Experience of Embodiment compared to adolescents in other identity clusters, indicating that adolescents who lack a strong identity foundation are more likely to struggle with their bodily experiences. More specifically, troubled diffused adolescents reported the lowest levels of positive body connection and comfort. This embodiment domain is closely related to Erikson's description of identity as a sense of feeling at home in one's body (Erikson, 1968). From this perspective, it can be expected that one does not feel connected to or at home in one's body if one does not experience a solid identity. In line with this, troubled diffused adolescents who get stuck in ruminatively exploring different identity options were less likely to feel adjusted to their changing bodies. In the absence of an identity foundation, adolescents are unable to adapt to their changing bodies and reintegrate these new bodily experiences into an existing identity (Kling et al., 2018). Appreciating the body and its functions (i.e., experiencing agency and functionality) also seemed harder for adolescents in troubled diffusion. The ability to see the body as a necessary tool for achieving identity-relevant tasks seems important in this regard (Kling et al., 2018), and this may be more difficult for adolescents with a troubled-diffused identity. Further, adolescents in troubled diffusion reported the lowest levels of attunement to internal needs and practice of self-care in light of these needs (i.e., attuned self-care), indicating that adolescents who are lacking a personal identity may be more likely to turn to harmful behaviors (e.g., disordered eating, self-injury) as identity substitutes. Finally, troubled diffused adolescents showed the least resistance toward objectification. Because these adolescents lack a stable sense of identity, they may be more vulnerable to being guided by extrinsic goals and societal ideals, resulting in self-objectification (Duriez et al., 2012).

Adolescents in achievement were expected to report the highest levels of Experience of Embodiment and domains, given that achievement is considered the most adaptive and mature identity status (Schwartz et al., 2011). With regard to agency and functionality, adolescents in achievement indeed reported higher levels as compared to adolescents in other identity statuses. However, with regard to Experience of Embodiment, positive body connection and comfort, and attuned self-care, adolescents in achievement did not report different experiences than adolescents in foreclosure. Thus, in order to inhabit one's body, it seems especially important to

make commitments and experience a strong sense of self. With regard to body un-encumbered adjustment, adolescents in achievement behaved similarly not only to adolescents in foreclosure, but also to adolescents in carefree diffusion. Carefree-diffused adolescents are less concerned about their identity search. Their limited identity quest might make them more immune to sociocultural pressures regarding body-perfect ideals (Corning & Heibel, 2016; Vankerckhoven et al., 2022), which might explain why they are more likely to adapt to the changes in their bodies. Finally, with regard to resisting objectification, there appeared to be less differentiation among identity statuses, as adolescents in achievement did not differ from adolescents in foreclosure, moratorium, and carefree diffusion. Thus, it appears that adolescents in achievement or foreclosure may also engage in the process of self-objectification and turn to appearance ideals to derive a sense of identity. This finding is in line with a previous longitudinal study that demonstrated that adolescents in achievement may also identify with socially available identity building blocks, as they displayed less adaptive scores regarding body image and body-related variables than adolescents in carefree diffusion (Vankerckhoven et al., 2022). These findings highlight the need to also focus on the specific content of one's engagement in identity processes.

4.5 Practical implications

The present study has several implications. With regard to research developments, the present study confirms that researchers and clinicians can use the Dutch translation of the EES to examine embodied experiences in community boys and girls. Hopefully, this will contribute to the study of more broadly defined body-related concepts in relation to well-being. Although no strong conclusions can be drawn regarding clinical practice, the current findings may have several implications for the prevention and intervention of body-related symptoms and identity problems. First, the present study showed that Experience of Embodiment and all embodiment domains were negatively associated with body dissatisfaction. This finding suggests the importance of promoting positive ways of inhabiting the body in prevention or intervention programs, rather than focusing solely on reducing body dissatisfaction or risk factors. The Developmental Theory of Embodiment (Piran, 2017) can contribute greatly to the development of positive body image interventions and prevention programs by integrating social etiological and protective factors to prevent body dissatisfaction or eating disorders (Piran, 2015). Over the past decade, efforts in this direction have increased (e.g., Kusina & Exline, 2019), and the current findings can only confirm the importance of these efforts and welcome further progress. Second, the link between bodily experiences and identity functioning in adolescents is supported by the present study. On the one hand, as the current study demonstrated direct effects from embodiment to identity functioning, it seems important to inhabit the body to derive a strong sense of self, which supports Erikson's statement that feeling at

home in one's body is important towards achieving an optimal identity (Erikson, 1968). Because the EES provides information about specific domains of embodiment, it can inform prevention professionals and clinicians about possible components of interventions to promote adaptive identity formation and overall well-being, such as enhancing positive body connection, mindful body attunement, or agency (Piran et al., 2020). On the other hand, the current findings show that adolescents struggling with identity development report lower levels of embodiment, suggesting that experiencing a sense of self is crucial to inhabiting the body in a more positive way. Clinicians may target adolescents struggling with identity development as they may be more vulnerable to develop negative bodily experiences. Third, given that both embodiment and identity are socially constructed (Erikson, 1968; Piran, 2017), it seems important for the immediate environment (i.e., parents, peers, and teachers) to encourage adolescents to explore and engage with different aspects of the self that are not solely related to appearance. In this way, adolescents may ultimately develop a more diverse and strong sense of self and experience the body as a safe and subjective site from which to engage with the world.

4.6 Limitations and suggestions for future research

Despite the strengths of the study, there are also some limitations. First, with regard to the EES, we could not examine the EES in its totality because the 'experience and expression of sexual desire' subscale was excluded from data collection. Future research could validate this scale in its totality and, given that we could not obtain scalar invariance, further examine why item intercepts may not be equivalent across gender. Additionally, the current study did not explicitly test convergent or divergent validity, test-retest reliability, or measurement invariance across age. These are important issues for validating the scale in Dutch adolescents and should be addressed in future research. Second, with regard to the link between embodiment and identity, the current study could not examine the directionality of effects between embodiment and identity because the study design was cross-sectional. Future longitudinal studies may provide greater insight into the developmental and possible bi-directional relations between adolescents' bodily experiences and identity functioning. Third, the current study used only self-report questionnaires. Although this is an adequate way to assess internal processes, self-reports may be influenced by memory bias or may lead to inaccurately high correlations between study variables due to shared method variance (Tylka, 2012). It is recommended that future studies additionally include alternative measures, such as multi-method or multi-informant approaches, to provide additional information. Fourth, a notable limitation of our study is the use of measures that have not been formally validated in Dutch adolescents (e.g., the EDI-3 and the MBAS). Although we calculated Cronbach's alpha coefficients to assess the internal consistency of the scales, we acknowledge that a comprehensive factor analysis is essential to thoroughly

examine the underlying factor structure of the questionnaires. Formal validation of questionnaires assessing body image (especially regarding the muscular ideal) in Dutch adolescents is recommended, as well as replication of our findings with formally validated measures. Fifth, as embodied experiences of living in the body may be salient to identity in a positive, negative, or mixed way, future research may benefit from investigating this interplay from a qualitative or narrative approach, as it would provide us with additional information about *how* the body is salient to identity (Kling et al., 2018; Piran, 2016). Finally, the current study only examined the relationship between embodiment and identity in community youth. Future research assessing these concepts in clinical samples is needed to further clarify how enhancing embodied experiences can prevent clinical symptomatology.

4.7 Conclusion

The current study was the first to examine the psychometric properties of the Experience of Embodiment Scale in Dutch community adolescents and to explore the link between embodiment and identity functioning. In conclusion, the present study provides promising evidence that the EES may be a reliable and valid measure for capturing body-related experiences in adolescent girls and boys. Furthermore, the current findings suggest that experiencing embodiment is positively related to adaptive identity work, and that adolescents in identity clusters reflecting less adaptive identity functioning (i.e., troubled diffusion) are more vulnerable to experience negative feelings related to inhabiting the body. Overall, this study suggests that embodiment may be related to identity functioning and acknowledges the added value of embodiment within this research field.

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Appendix

Tables

Table 1

Descriptive Statistics of the Study Variables

	<i>M (SD)</i>	Skewness	Kurtosis
PBCC	3.59 (.94)	-.59	-.24
BUA	3.43 (1.00)	-.29	-.88
AF	3.43 (.78)	-.42	-.07
ASC	3.67 (.76)	-.66	-.07
RO	2.86 (.85)	.06	-.58
EE	3.44 (.72)	-.48	-.22
ID synthesis	3.62 (.72)	-.55	.17
ID confusion	2.70 (.80)	.32	-.37
CM	3.28 (.95)	-.31	-.53
IC	3.35 (.81)	-.10	-.32
EB	3.65 (.76)	-.52	.41
ED	3.22 (.77)	-.27	-.07
RE	2.94 (.96)	.12	-.68
BD	3.02 (1.13)	.26	-.60
Male BD	5.52 (1.98)	.49	-.23

Note. PBCC = positive body connection and comfort; BUA = body un-encumbered adjustment; AF = agency and functionality; ASC = attuned self-care; RO = resisting objectification; EE = experience of embodiment; CM = commitment making; IC = identification with commitment; EB = exploration in breadth; ED = exploration in depth; RE = ruminative exploration; BD = body dissatisfaction.

Table 2

Pearson Correlation Coefficients Among the Study Variables

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. PBCC	.78**	.66**	.66**	.54**	.90**	.66**	-.61**	.21**	.36**	.01	.03	-.38**	-.73**	-.25**
2. BUA		.61**	.67**	.59**	.90**	.59**	-.66**	.18**	.33**	-.06	-.13**	-.46**	-.74**	-.24**
3. AF			.57**	.36**	.78**	.67**	-.60**	.35**	.48**	.15**	.13**	-.43**	-.50**	-.21**
4. ASC				.44**	.83**	.63**	-.61**	.20**	.38**	.01	.07*	-.43**	-.54**	-.22**
5. RO					.67**	.33**	-.41**	.07*	.20**	-.09**	-.11**	-.24**	-.52**	-.16**
6. EE						.71**	-.71**	.25**	.43**	.01	.00	-.48**	-.74**	-.27**
7. ID synthesis							-.67**	.43**	.57**	.17**	.22**	-.48**	-.45**	-.25**
8. ID confusion								-.38**	-.49**	.03	.00	.58**	.48**	.21**
9. CM									.67**	.30**	.39**	-.42**	-.10**	-.10**
10. IC										.32**	.40**	-.43**	-.25**	-.13**
11. EB											.54**	.18**	.07*	.03
12. ED												.08*	.07*	-.04
13. RE													.32**	.18**
14. BD														.21**
15. Male BD														-

Note. PBCC = positive body connection and comfort; BUA = body un-encumbered adjustment; AF = agency and functionality; ASC = attuned self-care; RO = resisting objectification; EE = experience of embodiment; CM = commitment making; IC = identification with commitment; EB = exploration in breadth; ED = exploration in depth; RE = ruminative exploration; BD = body dissatisfaction.

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

Table 3

Results of the Confirmatory Factor Analysis

Model	CFI	TLI	SRMR	χ^2	Df	RMSEA
One-factor model	0.864	0.853	0.08	6807.024	377	0.137
Four-factor model	0.895	0.885	0.068	5311.403	371	0.121
Five-factor model	0.906	0.896	0.063	4814.902	367	0.115
Five-factor model with highest error correlation	0.943	0.877	0.053	3032.640	366	0.089
Second-order factor model	0.906	0.898	0.064	4801.895	372	0.114
<i>Second-order factor model with highest error correlation</i>	<i>0.942</i>	<i>0.937</i>	<i>0.055</i>	<i>3095.356</i>	<i>371</i>	<i>0.090</i>
Bi-factor model	0.948	0.939	0.051	2812.320	348	0.088

Note. The second-order model with the highest error correlation was selected. CFI = Comparative Fit index; TLI = Tucker-Lewis Index; SRMR = Standardized Root Mean Square Residual; χ^2 = Chi-square test of model fit; Df = Degrees of Freedom; RMSEA = Root Mean Square Error of Approximation.

Table 4

EES and Factor Loadings

Items/first-order factors loading on...	Factor loadings
<i>Positive body connection and comfort (PBCC)</i>	
1. I feel connected to my body	.72
2. I feel “detached” and separate from my body (reversed)	.72
7. Generally I feel good and comfortable in my body	.91
8. I am proud of what my body can do	.82
10. I feel joy in my body	.92
22. I am comfortable with, and proud of, who I am	.89
<i>Body en-encumbered adjustment (BUA)</i>	
3. I feel depressed/anxious/scared in my body (reversed)	.86
6. My eating habits are a way for me to express my emotions or how I feel about myself (reversed)	.52
9. I feel dissatisfied, envious and frustrated when I compare my body to other girls (reversed)	.84
11. My body reduces my self-esteem (reversed)	.86
12. I sometimes tend to blame my body for difficulties I am having (reversed)	.70
25. My dissatisfaction with my body and appearance has had a negative effect on my social life (reversed)	.76
<i>Agency and Functionality (AF)</i>	

18. I am comfortable voicing my views, opinions and beliefs	.55
19. I find it difficult to express my emotions (reversed)	.48
23. I consider myself to be a powerful person	.81
24. I am aware of, and confident in, my strengths and abilities	.91
26. I have difficulty asserting myself with others in the world (reversed)	.54
27. I believe in my ability to accomplish what I hope for in the world	.72
<i>Attuned self-care (ASC)</i>	
13. I engage in potentially harmful or painful behaviors (reversed)	.71
14. I have an eating disorder (reversed)	.78
15. I take good care of, and am respectful of, my body	.84
16. I ignore the signs my body sends me (reversed)	.62
20. I am aware of my needs	.52
21. It is hard for me to identify my feelings (reversed)	.52
28. I make sure I listen to my body and its needs	.69
<i>Resisting objectification (RO)</i>	
4. I care more about how my body feels than about how it looks	.60
5. I focus more on what my body can do than on its appearance	.67
17. I spend a lot of time/energy/money engaging in activities that I hope will make me more beautiful to others (reversed)	.46
29. I constantly think about whether my body is considered attractive or beautiful to others (reversed)	.83
<i>Experience of Embodiment (EE)</i>	
Positive body connection and comfort	.97
Body un-encumbered adjustment	.94
Agency and functionality	.82
Attuned self-care	.84
Resisting objectification	.74

Table 5

Goodness-of-fit Indices for Testing Measurement Invariance Across Gender

	χ^2	Df	CFI	Δ CFI	SRMR	Δ SRMR	RMSEA
Configural first-order	4232.935	734	.898		.071		.104
Metric first-order	4182.588	763	.900	.002	.072	-.001	.101
Metric second-order	4642.622	168	.890	.010	.090	-.018	.098
Scalar first-order	6846.480	845	.825	.075	.081	-.009	.127

Note. χ^2 = Chi-square test of model fit; Df = Degrees of Freedom; CFI = Comparative Fit index; SRMR = Standardized Root Mean Square Residual; RMSEA = Root Mean Square Error of Approximation.

Table 6

ANOVA and MANOVA Results and Post-hoc Cluster Comparisons Based upon Tukey HSD Tests for the Five Identity Clusters

Variables	Clusters					F-value	η^2
	Achievement	Foreclosure	Moratorium	Carefree diffusion	Troubled diffusion		
EE	3.82 (.62) ^a	3.68 (.59) ^a	3.34 (.67) ^b	3.43 (.66) ^b	3.01 (.74) ^c	41.63***	.159
PBCC	3.95 (.88) ^a	3.86 (.77) ^a	3.50 (.93) ^b	3.50 (.90) ^b	3.14 (.98) ^c	25.58***	.104
BUA	3.80 (.97) ^{ab}	3.82 (.84) ^a	3.20 (.94) ^c	3.54 (.94) ^b	2.87 (.97) ^d	39.21***	.151
AF	3.99 (.56) ^a	3.57 (.65) ^b	3.48 (.76) ^b	3.26 (.75) ^c	2.98 (.79) ^d	45.01***	.169
ASC	4.01 (.68) ^a	3.86 (.63) ^{ab}	3.56 (.72) ^c	3.67 (.72) ^{bc}	3.30 (.82) ^d	26.73***	.108
RO	3.04 (.92) ^a	3.03 (.78) ^a	2.72 (.83) ^{bc}	2.97 (.84) ^{ab}	2.60 (.82) ^c	11.12***	.048

Note. Standard deviations are in parentheses. Cluster means differ significantly from one another if they have different superscripts; cluster means without superscripts do not differ from other cluster means for the respective variable. EE = Experience of Embodiment; PBCC = positive body connection and comfort; BUA = body un-encumbered adjustment; AF = agency and functionality; ASC = attuned self-care; RO = resisting objectification.

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

Figures

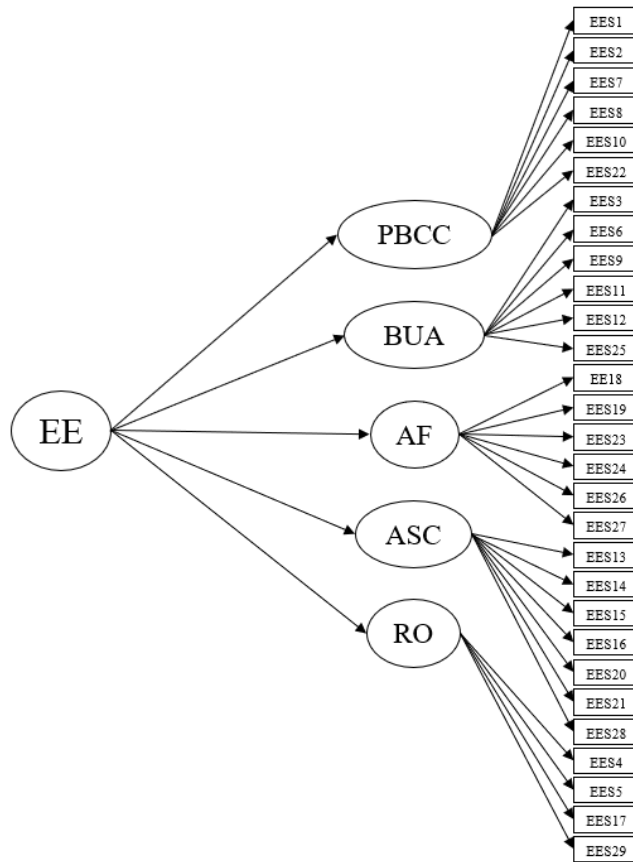


Figure 1. Second-order factor model of the Experience of Embodiment Scale. EE = Experience of Embodiment; PBCC = positive body connection and comfort; BUA = body un-encumbered adjustment; AF = agency and functionality; ASC = attuned self-care; RO = resisting objectification.

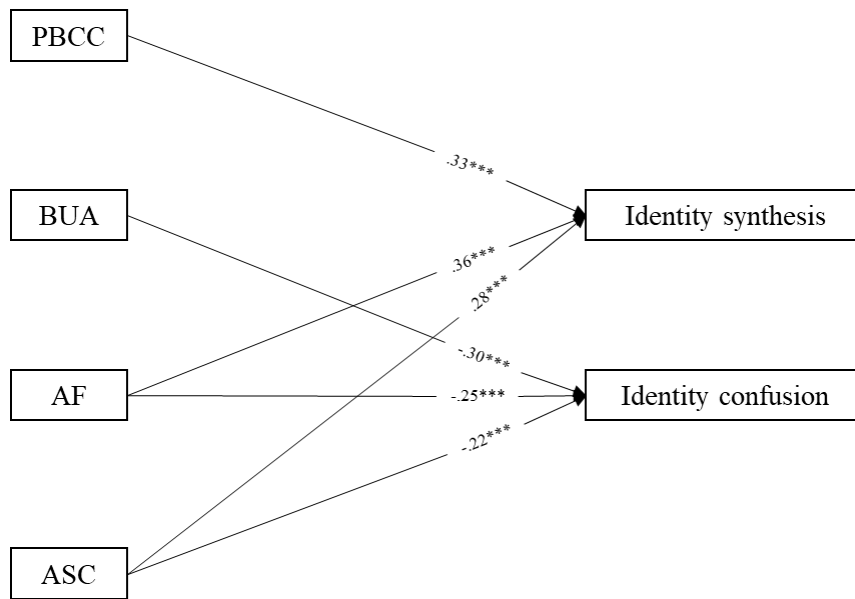


Figure 2. Path model with paths from the embodiment domains to identity synthesis and confusion. Only the significant paths are depicted. Associations with gender, age, and adjusted BMI are not shown. All coefficients are standardized. PBCC = positive body connection and comfort; BUA = body un-encumbered adjustment; AF = agency and functionality; ASC = attuned self-care. *** $p < .001$.

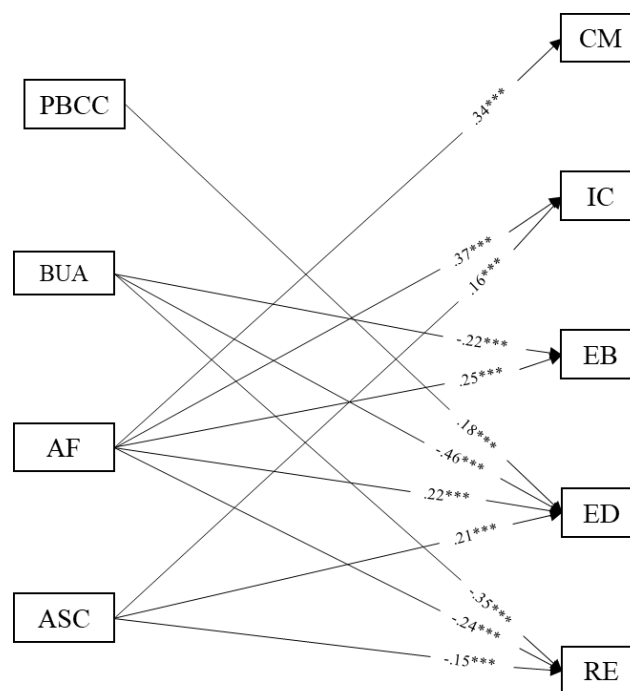


Figure 3. Path model with paths from the embodiment domains to the identity domains. Only the significant paths are depicted. Associations with gender, age, and adjusted BMI are not shown. All coefficients are standardized. PBCC = positive body connection and comfort; BUA = body un-encumbered adjustment; AF = agency and functionality; ASC = attuned self-care; CM = commitment making; IC = identification with commitment; EB = exploration in breadth; ED = exploration in depth; RE = ruminative exploration. *** $p < .001$.

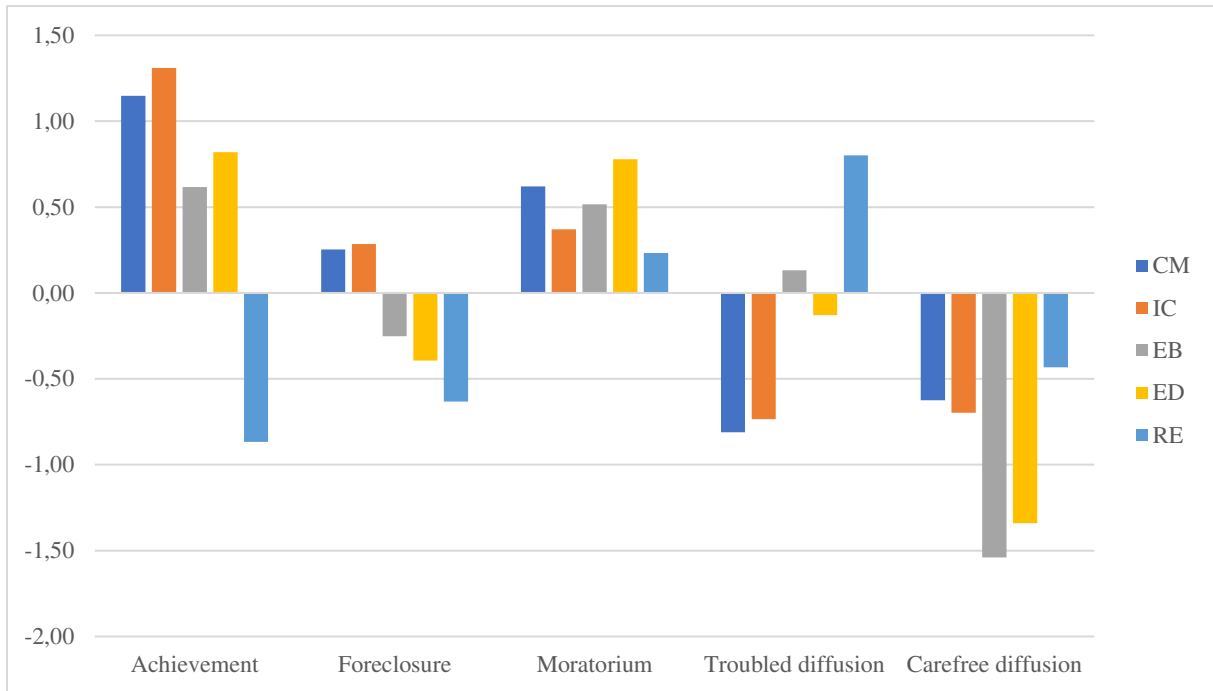


Figure 4. Final five cluster-solution for the identity processes. Z-scores for commitment making (CM), identification with commitment (IC), exploration in breadth (EB), exploration in depth (ED), and ruminative exploration (RE).

Experience of Embodiment Scale in English (Piran et al., 2020)

Directions for administration: Please choose the number from the following that best describes how you feel about each of the statements listed below. Indicate your response by selecting a number beside each statement: That is, “1” if you Strongly Disagree; “2” if you Somewhat Disagree; “3” if you Neither Agree nor Disagree; “4” if you Somewhat Agree; or “5” if you Strongly Agree. Please provide responses for how you currently feel (past four weeks).

Positive body connection and comfort (6 items)

1. I feel connected to my body
2. I feel “detached” and separate from my body
7. Generally I feel good and comfortable in my body
8. I am proud of what my body can do
10. I feel joy in my body
23. I am comfortable with, and proud of, who I am

Body un-encumbered adjustment (6 items)

3. I feel depressed/anxious/scared in my body
6. My eating habits are a way for me to express my emotions or how I feel about myself
9. I feel dissatisfied, envious and frustrated when I compare my body to other boys or girls
11. My body reduces my self-esteem
12. I sometimes tend to blame my body for difficulties I am having
26. My dissatisfaction with my body and appearance has had a negative effect on my social life

Agency and functionality (6 items)

19. I am comfortable voicing my views, opinions and beliefs
20. I find it difficult to express my emotions
24. I consider myself to be a powerful person
25. I am aware of, and confident in, my strengths and abilities
29. I have difficulty asserting myself with others in the world
30. I believe in my ability to accomplish what I hope for in the world

Experience and expression of sexual desire (3 items)

13. *I am comfortable with my sexual feelings*
27. *I am comfortable having sexual feelings*
28. *I feel that I cannot express what I want or need in a dating relationship or with friends*

Attuned self-care (7 items)

14. I engage in potentially harmful or painful behaviors (e.g., disordered eating, neglect of my physical safety or needs, drug use, excessive alcohol consumption)
15. I have an eating disorder
16. I take good care of, and am respectful of, my body
17. I ignore the signs my body sends me (e.g., of hunger, stress, fatigue, illness/injury)
21. I am aware of my needs
22. It is hard for me to identify my feelings

31. I make sure I listen to my body and its needs (e.g., rest when I am tired, eat when hungry, leave when I feel unsafe, relax when stressed)

Resisting objectification (4 items)

4. I care more about how my body feels than about how it looks

5. I focus more on what my body can do than on its appearance

18. I spend a lot of time/energy/money engaging in activities that I hope will make me more beautiful to others (e.g., exercise, clothing, make-up, hair, plastic surgery, skin bleaching)

32. I constantly think about whether my body is considered attractive or beautiful to others