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"Who does this body belong to?" The development and psychometric evaluation of the Body Experience during Pregnancy Scale

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ABSTRACT

Women's experiences of their bodies during pregnancy may reflect their reactions to concrete physical changes as well as self-representations during the transition to motherhood. However, adequate measures of the body experience during pregnancy are lacking. This study aims to evaluate the psychometric properties of a new measure, the Body Experience during Pregnancy Scale (BEPS). In Study 1, the BEPS was administered to 423 pregnant women. In Study 2, 373 pregnant women completed the BEPS, as well as questionnaires assessing body shame, disrupted body boundaries, and well-being. Three BEPS subscales emerged from Study 1: body agency, body estrangement, and body visibility. In Study 2, a confirmatory factor analysis replicated the scale's structure. The factors were significantly correlated with measures of body shame, disrupted body boundaries, and well-being. The results of the present analyses suggest that the BEPS has good psychometric properties, making it useful in future research.

1. Introduction

Pregnancy is a somatic experience, during which a woman faces many rapid and dramatic physical changes. Occurring in the context of her upcoming motherhood, this body experience may reflect both the woman's reactions to the concrete changes taking place inside her, as well as the formation of a new self-identity during her transition to motherhood (Bailey, 2001; Stern & Bruschweiler-Stern, 1998). While the body experience of pregnant women has yet to receive sufficient empirical examination, a few studies – mainly relying on qualitative interviews with pregnant women (for a review see Watson, Fuller-Tyszkiewicz, Broadbent, & Skouteris, 2015) – have revealed themes which seem to be shared by many women.

The first theme deals with women's feelings regarding the concrete changes that take place in the female pregnant body, both in terms of its appearance and functionality. Facing their transformed body size, shape, and weight, some pregnant women feel attractive during pregnancy (Bailey, 2001). Others, however, experience dissatisfaction with the appearance of their bodies (Hodgkinson, Smith, & Wittkowski, 2014; Johnson, Burrows, & Williamson, 2004) and express concerns related to their ability to return to pre-pregnancy shape and size (Earle, 2003; Watson et al., 2015). In addition, some women are filled with a new sense of meaning derived from their bodies' ability to create life and experience body satisfaction due to their evaluation of its functionality rather than its aesthetic qualities (Clark, Skouteris, Wertheim, Paxton, & Milgrom, 2009a; Watson et al., 2015). Recognizing their bodies' abilities and functionalities, women may perceive their bodies as feminine, potent, and powerful (Bailey, 2001). However, others report a sense of loss of control as a result of the enormous changes taking place in their bodies (Hodgkinson et al., 2014; Neiterman & Fox, 2017; Warren & Brewis, 2004). Thus, the second theme deals with sense of control, potency, and femininity.

The third theme reflects the fact that pregnancy is a unique experience in which women share their bodies with another organism. Women react to this condition with a variety of feelings, ranging from one of comfort and pride, to one of being invaded and penetrated (Hodgkinson et al., 2014; Raphael-Leff, 2001). A sense of disrupted body boundaries may impact some women who have reported feelings of confusion regarding their body boundaries and their bodies' separation from both the fetus and the outer world (Johnson et al., 2004; Schmied & Lupton, 2001). This sense of disruption is connected to a perception of the pregnant body as vulnerable and fragile (Davidson, 2001).

Finally, the literature reveals a fourth theme, referring to the public nature of pregnancy. That is, although pregnancy is a per-

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sonal experience, the fact that it is so visible can turn this essentially private experience into a very public one, attracting attention (Draper, 2003). Although some women enjoy this attention, others feel that their bodies have become "public property" (Johnson et al., 2004). Pregnant bodies are identified as "sexed" bodies, indicating that these women are not virgins (Nash, 2013). Thus, the appearance of the pregnant body may expose the woman's reproductive functioning (Johnston-Robledo, Sheffield, Voigt, & Wilcox-Constantine, 2007; Tiggemann & Lynch, 2001). In addition, the discrepancies between the social and/or personal "ideal look" and the perceived "actual look" of the pregnant women may be tolerated better by some women than by others, as they are viewed as reflecting the personal and social transformation that accompanies their transition to motherhood (Davies & Wardle, 1994).

The body experience during pregnancy is a specific and particular experience, and yet to date it has hardly been systematically studied. The lack of quantitative studies of the body experience during pregnancy may be attributed to the lack of adequate measures. While there are various measures of body image and/or body satisfaction, their applicability to women's experiences of their bodies during pregnancy is insufficient (see, for example, Fuller-Tyszkiewicz, Skouteris, Watson, & Hill, 2012). A few measures have been used to assess women's body images and/or attitudes during pregnancy, for example the Attitude to Body Image Scale (Strang & Sullivan, 1985), Body Attitudes Questionnaire (Ben-Tovim & Walker, 1991), Figure Rating Scale (Davies & Wardle, 1994), and the Body Image in Pregnancy Scale (Watson, Fuller-Tyszkiewicz, Broadbent, & Skouteris, 2017). These measures, however, are mostly limited to women's evaluations of their physical appearances, indicated by their ratings of their weight and perceived attractiveness. Although the Body Image in Pregnancy Scale (Watson et al., 2017) also refers to the perceived functionality of the pregnant body, these measures do not refer to women's psychological representations of their bodies. The purpose of this paper is therefore to describe the Body Experience during Pregnancy Scale (BEPS), a new measure of the psychological representations of the body experience during pregnancy, and to present the results of two studies assessing its psychometric properties. In these studies, we developed the BEPS, evaluated its structure (exploratory and confirmatory factor analyses), and the reliability (internal consistency) and validity (construct and incremental) of its scores.

2. Study 1

In this study, we aimed to develop a tool to measure the body experience of pregnancy. The purpose of Study 1 was to design the items that comprise this scale, to conduct an initial examination of its factor structure by exploratory factor analysis, and to estimate its internal consistency.

2.1. Method

2.1.1. Participants

A convenience sample of 423 pregnant women was recruited. The average age of the participants was 30.82 years (SD = 4.64, range 19–45). Their average number of years of education was 15.96 (SD = 2.44; range 8–25). Twenty-five percent (n = 105) of the participants reported that their income was similar to that of the average Israeli wage, 45.9% (n = 193) reported that it was below the average wage, and 29.1% (n = 122) reported that it was above the average wage. The vast majority of the sample, 97.4% (n = 406), reported that they were heterosexual, and 96.7% (n = 408) reported that they were currently in intimate relationships. Half of the women (n = 223, 52.8%) reported that they had children. At the time of questionnaire completion, 11.8% of the women were in their first trimesters of pregnancy (≤ 13 weeks), 28.2% were in their second trimesters (14–26 weeks), and 60% were in their third trimesters (≥ 27 weeks).

2.1.2. Measures

2.1.2.1. Socio-demographics and obstetric history. Participants completed a brief demographic questionnaire assessing age, education, sexual orientation, relational status, and number of children. They also provided information about their obstetric status, such as fertility treatment, pregnancy risk, and gestational week.

2.1.2.2. The Body Experience during Pregnancy Scale (BEPS). The BEPS was developed to assess the body experience during pregnancy. Item generation was based on a deductive approach (Hinkin, 1998). After reviewing the existing literature on the body experience during pregnancy, which was presented in the Introduction, the following themes were formulated: (1) sense of joy and attractiveness versus dissatisfaction; (2) sense of control, potency, and femininity versus a feeling of loss of control; (3) sense of invasion versus comfort and pleasure in the developing fetus; and (4) a sense of the pregnancy being a public versus a private experience. Based on the descriptions of the manifestations of the body experience during pregnancy, an initial pool of 39 items was created.

The aforementioned list of manifestations, along with the items, were presented to three professionals in the field of women's health. These professionals were asked to carefully read the items and indicate to what extent they thought each described an expression of the body experience during pregnancy (*not at all; to a certain extent; very much*). In addition, they were encouraged to suggest changes in the wording of the existing items and to make note of any items they felt were missing, or of any redundancies.

To examine whether the questionnaire would be clear to laypeople, it was also given to two pregnant women who were not familiar with this research study. These individuals were given the same instructions as the professionals, as well as to read the items and mark any item whose meaning they were not sure they understood. Subsequent to these two parallel processes, a few minor changes were made in the wording of the items, and nine items were omitted due to redundancy or lack of congruity with the theoretical conceptualizations. In its final version, the questionnaire included a total of 30 items. Respondents were asked to rate on a 4-point Likert-type scale the extent to which the item was relevant to them, during the last month (1 = *never*, 2 = *rarely*, 3 = *often*, and 4 = *always*).

2.1.3. Procedure

After receiving approval from Tel Aviv University Institutional Review Board, and obtaining informed consent from the participants, data were collected. Participants were recruited via social media (e.g., Facebook, online forums decimated for pregnancy and transition to motherhood). Pregnant women were asked to participate in a study that examines the implications of life experiences for pregnant women's perceptions of their bodies and selves. Each participant was given the opportunity to take part in a gift voucher lottery. Participants used Qualtrics Research Software to complete the questionnaires.

2.1.4. Data analysis

Missing data analysis indicated that, across variables, 0–6.4% of values were missing. Little's Missing Completely at Random (MCAR) model (Little, 1988), aimed at analyzing missing values, revealed that the data were missing completely at random, $\chi^2(738) = 782.99$, $p = .12$. Hence, missing data were replaced with maximum likelihood estimations based on all variables in the model, a procedure referred to as expectation maximization.

First, descriptive analyses of the items were examined. Since the items were normally distributed, The BEPS's structure was examined by exploratory factor analysis (EFA) with maximum-likelihood

estimation and oblimin rotation (Fabrigar, Wegener, MacCallum, & Strahan, 1999). The number of factors was determined by two criteria. First, based on Cattell's "scree test," the eigenvalues are computed and plotted in order of descending values. This graph is examined to determine the point at which the last significant drop in the magnitude of the eigenvalues is observed. The second criterion is parallel analysis, which has been found to be an accurate method for an exact number of factors. For this analysis, we used the guidelines and syntax provided by Hayton, Allen, and Scarpello (2004).

Based on the results of the EFA, mean scores were calculated for each factor. Cronbach's alpha assessed the BEPS's internal consistency. Pearson correlations assessed the direction and magnitude of the relations between the factors. The associations between the BEPS factors and obstetric variables were examined via Pearson correlations and *t*-tests.

2.2. Results

Means and standard deviations of the BEPS's items are presented in Table 1. Information provided by both scree plot and parallel analysis suggested that the scale had a three-factor structure. These three factors were included in the EFA with a maximum-likelihood estimation and oblimin rotation, accounting for 46.82% of the variance of the body experience during pregnancy. Factor 1, b̈ody agency,c̈omprised 12 items tapping feelings of attractiveness, femininity, pride, competence, and self-confidence in regard to the pregnant body. Factor 2, b̈ody estrangement,c̈omprised 11 items referring to the experience of sharing the body with the fetus, and it includes items that refer to feelings of control, ownership, and defined boundaries. Factor 3, b̈ody visibility,c̈omprised five items tapping the sense of one's body being stared at, touched, and/or evaluated. Two items did not load onto any factor (loading < |.35|); therefore, a second EFA with maximum-likelihood estimation and oblimin rotation was conducted after the omission of these two items. The second EFA yielded the same three factors (Factor 1, 12 items, Eigenvalue = 7.28; Factor 2, 11 items, Eigenvalue = 6.76; and Factor 3, five items, Eigenvalue = 2.83), explaining 48.75% of the variance of the body experience of pregnancy (see Table 1). To evaluate the reliability of the BEPS, its internal consistency was examined. The Cronbach's alphas (internal consistency estimates) of the subscales were .89 for Factor 1; .89 for Factor 2; and .65 for Factor 3). While the first two values are considered good to excellent for subscale with 11–12 items, the third value is considered fair to moderate for a subscale with five items (see Ponterotto & Ruckdeschel, 2007). Furthermore, average inter-item correlations were .39, .43, and .28, respectively, which fall in the range of .15–.50, as recommended by Clark and Watson (1995).

Based on these factors, three subscales were computed as the average score of each factor, after reversing the relevant items (marked in Table 1). Thus, the higher the Factor 1 score, the higher the sense of body agency; the higher the Factor 2 score, the higher the sense of one's body estrangement; and the higher the Factor 3 score, the higher the sense of body visibility. The correlations between the three factors were significant (body agency and body estrangement, $r = -.56$, $p < .001$; body agency and body visibility, $r = -.13$, $p = .006$; body estrangement and body visibility, $r = .38$, $p < .001$), and indicated the following: the higher the sense of agency, the lower the sense of estrangement and sense of body visibility; and the higher the sense of estrangement, the higher the sense of body visibility. A total BEPS score should not be calculated.

Further analyses indicated that there were small significant associations between education and body agency and body visibility ($r = -.12$, $p = .02$; $r = -.14$, $p = .01$, respectively) but not between education and body estrangement ($r = .05$, $p = .33$). Moreover, there were small significant associations between age and body estrangement and body visibility ($r = .12$, $p = .01$; $r = -.19$, $p < .01$, respectively) but not between age and body agency ($r = -.03$, $p = .58$).

With regard to obstetric variables, there were no significant associations between these subscales and gestational week (body agency: $r = .08$, $p = .09$; body estrangement: $r = .05$, $p = .31$; and body visibility: $r = .08$, $p = .11$). Body agency and body estrangement were not associated with fertility treatment, $t(421) = -1.87$, $p = .06$; $t(421) = 1.21$, $p = .22$, respectively, but body visibility was associated with fertility treatment, $t(420) = 2.05$, $p = .04$. That is, women who underwent fertility treatment reported lower levels of a sense of body visibility ($M = 1.80$, $SD = 0.48$) than did women who had not undergone fertility treatment ($M = 1.99$, $SD = 0.59$). None of the factors was related to high-risk pregnancy status, $t(419) = 0.19$, $p = .85$; $t(419) = 0.19$, $p = .85$; and $t(418) = 1.48$, $p = .14$, respectively. Finally, a series of *t*-tests indicated that body agency, $t(420) = 1.98$, $p = .005$, and body visibility, $t(419) = 2.92$, $p = .004$, differed according to parity. That is, the sense of body agency and body visibility were higher among women without children ($M = 2.76$, $SD = 0.58$; $M = 1.89$, $SD = 0.54$, respectively) than among those with children ($M = 2.65$, $SD = 0.58$; $M = 2.05$, $SD = 0.61$, respectively). Level of body estrangement was not related to parity, $t(420) = 1.23$, $p = .22$.

As indicated by these findings, the structure of this scale corresponds to the aspects that characterize the body experience, in accordance with its presentation in the literature.

3. Study 2

Study 1′s findings regarding the structure of the BEPS indicate that women's experiences of their bodies during pregnancy were complex and varied across three dimensions. More specifically, these experiences ranged from feelings of competence and confidence, and comfort and pleasure in carrying their fetuses, to body dissatisfaction, a sense of being invaded, and a feeling of being estranged from their bodies. In addition, women varied in the extent to which they experience their pregnancies as being visible to the public.

Study 2 was conducted to provide additional psychometric support for the BEPS. The first aim was to confirm its underlying factor structure by conducting a confirmatory factor analysis, and to examine the internal consistency of these factors. The second aim was to examine construct validity by assessing the BEPS's associations with sense of disrupted body boundaries, body shame, and well-being. The third aim was to examine incremental validity by determining whether the BEPS predicted unique variance in well-being beyond the contribution of disrupted body boundaries and body shame.

Positive body image and body satisfaction have been shown to be related to well-being among women in general (e.g., Alleva, Tylka, & Kroon Van Diest, 2017; Mond et al., 2013) and among pregnant women in particular (e.g., Fuller-Tyszkiewicz, Skouteris, Watson, & Hill, 2013). It was thus hypothesized that pregnant women who experienced high levels of body agency on the BEPS would report high levels of well-being. Conversely, tensions between acknowledging the physical changes as an indication of the developing fetus, and negative feelings that may be evoked as a result, may be related to feelings of confusion, anxiety, and dissatisfaction (e.g., Clark, Skouteris, Wertheim, Paxton, & Milgrom, 2009b). Therefore, feeling estranged from one's body may be related to distress. Furthermore, the sense of being invaded and penetrated by the fetus, and feelings of lack of control and estrangement from one's body, may be related to perceived disrupted body boundaries and body shame. Therefore, we hypothesized that the BEPS's scores would be related to well-established indices of well-being (i.e., positive affect, life satisfaction) and distress (i.e., depression, negative affect) such that body agency would be related

Table 1
Summary statistics of BEPS items and results of the exploratory factor analysis with oblimin rotation (Study 1).

	M	*SD*	Factor 1	Factor 2	Factor 3
24. I felt my body was pleasant and soft	2.68	0.97	**−.814**	.040	−.089
19. I felt connected to my body	2.87	0.83	**−.773**	−.069	.033
20. I felt attractive	2.31	0.93	**−.765**	.048	−.035
23. I felt my body was feminine	3.01	0.89	**−.714**	−.068	−.079
18. I felt I knew my body well	2.71	0.80	**−.698**	.108	.020
5. I felt proud of my body and its abilities	2.87	0.83	**−.692**	.064	.085
1. I loved my body	2.80	0.82	**−.680**	−.134	−.121
17. I felt my body was full of strength	2.21	0.81	**−.672**	−.071	.008
21. I relished the sense of my fetus inside me	3.16	0.90	**−.497**	−.094	−.002
8. I trusted my body to know what to do	3.26	0.79	**−.492**	−.101	−.332
2. I felt clumsy and awkward	2.65	0.82	**.448**[a]	.119	−.244
16. I felt that my body was exhausted	2.85	0.92	**.431**[a]	.105	−.231
9. I felt as if my body was enslaved by the fetus	1.75	0.88	−.034	**.848**	.129
7. I felt as if my body had been taken away from me	1.71	0.91	.080	**.830**	.108
3. I felt like my fetus invaded my body	1.86	0.90	−.022	**.760**	.080
6. I felt that my body was alien to me	1.89	0.88	.102	**.682**	−.039
22. I felt invisible inside my own body	1.46	0.77	.256	**.646**	.002
4. I felt like I was losing control of my body	2.13	0.93	.229	**.631**	−.035
12. I felt my body was betraying me	1.54	0.83	.287	**.608**	−.032
10. I felt that I was sharing my body with another	2.30	0.99	−.249	**.532**	−.133
11. I was uncomfortable inside my own body/skin	2.10	0.98	.351	**.518**	−.031
27. I was frightened by what was happening to my body	1.66	0.83	.241	**.483**	−.236
15. My body felt empty	1.17	0.45	−.089	**.454**	−.095
13. I felt that people were staring at my body	2.57	0.93	−.012	.109	**−.698**
25. I felt that my private experience had become public	2.06	0.95	−.035	−.023	**−.692**
26. I felt that people allowed themselves to touch my body as if it was partially theirs	1.85	0.95	−.096	.036	**−.650**
28. I felt that the fact that I had sex was registered on my body and well known to all	1.30	0.67	.044	−.045	**−.593**
14. My body looked different from how I expected it to look	2.07	0.95	.364	.090	**−.428**
Percent of variance			**31.81**	**11.01**	**5.93**
Eigenvalues			**7.28**	**6.76**	**2.83**

Note. Factor 1: Body agency; Factor 2: Body estrangement; Factor 3: Body visibility.
[a] Reversed items.

to higher well-being and lower distress and body estrangement would be related to lower well-being and higher distress. Furthermore, in order to demonstrate the scale scores' incremental validity, it is expected that these scores would account for variance in well-being and distress beyond the variance of body shame and disrupted boundaries.

3.1. Method

3.1.1. Participants

A convenience sample of 373 pregnant women was recruited. The average age of the participants was 30.58 years (*SD* = 4.74; range 19–46). Their average number of years of education was 15.81 (*SD* = 2.42; range 10–25). About a quarter of the participants (26.7%, *n* = 99) reported that their income was similar to that of the average Israeli wage, 43.4% (*n* = 161) reported that it was below the average wage, and 30% (*n* = 111) reported that it was above the average wage. The vast majority of the sample, 94.6% (*n* = 353), reported that they were heterosexual, and 97.6% (*n* = 364) reported they were currently in intimate relationships. More than half of the women (*n* = 214, 57.4%) reported that they had children. At the time of questionnaire completion, 9.7% of the women were in their first trimesters of pregnancy (≤ 13 weeks), 34.6% were in their second trimesters (14–26 weeks), and 55.8% were in their third trimesters (≥ 27 weeks). Additionally, 11% (*n* = 41) of the women conceived after fertility treatments, and 15.3% (*n* = 57) reported that their pregnancies were considered high-risk.

3.1.2. Measures

3.1.2.1. Socio-demographics and obstetric history. As described above in Study 1.

3.1.2.2. Body Experience during Pregnancy Scale (BEPS). This 28-item scale was previously described in Study 1.

3.1.2.3. Disrupted body boundaries. The sense of disrupted body boundaries was measured by the Sense of Body Boundaries Survey (BBS; Krzewska & Dolińska-Zygmunt, 2013), a 17-item self-report scale. It comprises two subscales: the Barrier subscale, which refers to the individual's physical separateness from his/her surroundings (e.g., M̈y feeling of physical separation from the environment is rather vague¨) and the Permeability subscale, which refers to the sense of body vulnerability (e.g., Ï feel that my body is susceptible to outer influences¨). Respondents were asked to indicate on a 5-point Likert scale the extent to which the statement described their body experience, with scores ranging from 1 (*definitely don't agree*) to 5 (*strongly agree*). Mean scores were used, with higher scores in the Barrier and Permeability subscales representing higher levels of disrupted body boundaries. Validity of subscale scores on the BBS was supported by their positive correlation with the Body Self Questionnaire (Obada, 2014). Reported internal consistency for scores on the BBS was .75 for the Barrier and .86 for the Permeability subscales. Two weeks and three months test-retest reliability were .83 and .68 respectively (Krzewska & Dolińska-Zygmunt, 2013). For the present study, Cronbach's alpha was .82 for the Barrier subscale and .82 for the Permeability subscale.

3.1.2.4. Body shame. Body shame was assessed with the Body Shame subscale of the Experience of Shame Scale (ESS; Andrews, Qian, & Valentine, 2002). It consists of four items which refer to feeling ashamed of one's body or parts of it (e.g., Ḧave you felt ashamed of your body or any part of it?¨). Respondents were asked to indicate on a 4-point Likert-type scale, ranging from 1 (*not at*

all) to 4 (*very much*) to what extent they experienced the feeling as described in each item over the last month. Mean scores were used, with higher scores representing higher levels of body shame. Validity of scores on the ESS was supported by their positive correlations with the Shame subscale of the Test of Self-Conscious Affect (Tangney, Wagner, & Gramzow, 1989). Reported internal consistency for the ESS Body Shame subscale was .90, and the 11-week test-retest reliability was .82 (Andrews et al., 2002). In the present study, Cronbach's alpha was .86.

3.1.2.5. Positive and negative affect. The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) consists of 20 items tapping various positive and negative emotions. Respondents are asked to rate the extent to which they felt a particular feeling over the previous two weeks on a Likert-type scale ranging from 1 (*not at all*) to 5 (*very often*). Two total scores are calculated, one for each subscale, by averaging the relevant items; the higher the scores, the higher the respondent's positive and negative affect (Watson, Clark, & Tellegen, 1988). Ben-Zur (2002) provided evidence for both structural validity (via exploratory factor analysis) and convergent validity (via significant correlations with anxiety, anger, and curiosity) of the Hebrew version, similar to the evidence found for such validity in the English-language version (Watson et al., 1988). In the present study, Cronbach's alpha was .74 for Positive Affect and .79 for Negative Affect.

3.1.2.6. Life satisfaction. The Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) consists of five items that assess a person's satisfaction with life in general. The respondents report to what extent they agree with each of these items on a 7-point Likert-type scale ranging from 1 (*very much opposed*) to 7 (*strongly agree*). A total score is obtained by averaging the answers: the higher the score, the higher the respondent's level of life satisfaction (Diener et al., 1985). Validity of the Hebrew version of the SWLS is supported by its significant correlations with other measures of well-being and life satisfaction (Anaby, Jarus, & Zumbo, 2010). In the present study, Cronbach's alpha was .83.

3.1.2.7. Depression. Depression was measured by the Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsky, 1987), a commonly-used measurement consisting of 10 items relating to symptoms of depression. The respondents are asked to rate to what extent each one characterizes their feelings over the past week, with four response options each rated 0–3. Following a reversal of relevant items, the sum of the answers indicates the intensity of depression, thus the range is 0–30 points, where higher scores indicate more depressive symptoms. (Cox et al., 1987). The scale's validity during pregnancy is supported by the correspondence of its scores with psychiatric diagnoses of depression (Murray & Cox, 1990). In the present study, Cronbach's alpha was .86.

3.1.2.8. Self-rated health. Health was assessed by a single-item scale: "How would you define your physical health status at present?Ŕespondents rated their health on a 5-point Likert-type scale ranging from 5 (*very good*) to 1 (*very bad*). The validity of self-rated health has been supported by studies demonstrating its predictive validity for 13-year mortality (see Idler & Benyamini, 1998).

3.1.3. Procedure

After receiving approval from Tel Aviv University Institutional Review Board, and obtaining informed consent from the participants, data were collected. Participants were recruited via social media (e.g., Facebook, online forums decimated for pregnancy and transition to motherhood), and were invited to participate in a study that examines the implications of life experiences for pregnant women's perceptions of their bodies and selves. Each participant was given the opportunity to take part in a gift voucher lottery. As this study was the first part of a longitudinal study, the women who agreed to participate in the follow-up, and/or who wanted to take part in a gift voucher lottery, were asked to provide their email addresses. Participants used Qualtrics Research Software to complete the questionnaires which were presented to the participants randomly.

3.1.4. Data analysis

Missing data analysis indicated that, across variables, 0–26% of values were missing, with the highest rates of missing values observed among the positive and negative affect and life satisfaction scores. Little (1988) Missing Completely at Random (MCAR) model, aimed at analyzing missing values, revealed that the data were missing completely at random, $\chi^2(1548) = 1550.46$, $p = .48$, that is, that the missingness pattern results from a process completely unrelated to the variables in the analyses, or from a completely random process (Newman, 2014). Hence, missing data were replaced with maximum likelihood estimations based on all variables in the model, a procedure referred to as expectations maximization (Arbuckle, 1996), which was identified as the most suitable to be used in cases where rates of construct-level missingness exceeds 10% (Newman, 2014).

All but two items ("My body felt empty," "I felt that the fact that I had sex was registered on my body and well known to all") were normally distributed (Skewness = −0.89 to 1.77; Kurtosis = −1.29 to 2.50). A series of *t*-tests was conducted to examine whether the scores of the BEPS factors were associated with parity. In addition, Pearson correlations were computed to examine the associations between participants' gestational week and the BEPS factors.

In line with the recommendation made by Fabrigar et al. (1999), a confirmatory factor analysis (CFA) was employed to confirm the underlying factor structure, obtained in Study 1, with the sample from Study 2. Data were analyzed using structural equation modeling (SEM) techniques via use of the AMOS software package (version 25). Multiple indicators (i.e., subscale items) for each latent variable (body agency, body estrangement and body visibility) were entered into the measurement model. A bootstrap procedure was employed with 200 samples, using maximum likelihood estimation.

Several complementary fit indices were used to examine the overall quality and fit of the hypothesized model to the data: Comparative Fit Index (CFI), Normed Fit Index (NFI), Tucker Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and test of close fit (PCLOSE). For CFI, NFI, and TLI, values greater than .90 indicate an acceptable fit between the model and the data (e.g., Arbuckle, 2007). For the Root Mean Square Error of Approximation (RMSEA), values of less than .05 and a nonsignificant test of close fit (PCLOSE) represent a good fit (Browne, Cudeck, Bollen, & Long, 1993). Finally, chi-square was computed; however, because it is sensitive to sample size (e.g., Kline, 1998), we used the ratio of chi-square to degrees of freedom. Although values between 1 and 5 indicate a satisfactory fit between the theoretical model and empirical data, a stricter cutoff of 3 is ideal (Kline, 1998).

To examine the scale's construct validity, a series of Pearson correlations was performed, examining the associations between the BEPS subscales, body shame, disrupted body boundaries, self-rated health, depression, and subjective well-being. Finally, the scale's incremental validity was examined. A series of regression analyses was conducted, one for each well-being measure separately (life satisfaction, positive affect, negative affect, and depression) and for the measures of self-rated health, examining the prediction of the BEPS subscales beyond the contribution of disrupted body boundaries and body shame. In these analyses, scores of disrupted body boundaries and body shame were entered at Step 1 and the BEPS

subscales were entered at Step 2. A significant change in R^2 at Step 2 represents evidence of the incremental validity of the BEPS.

3.2. Results

3.2.1. Preliminary analyses

First, a series of *t*-test examinations was conducted to examine whether the factors' scores differed according to participants' parity. This examination revealed significant group differences in body agency and body visibility, $t(340.34) = -2.43$, $p = .02$; $t(324.73) = -4.34$, $p < .001$, respectively. That is, the sense of body agency and body visibility were higher among women without children ($M = 2.78$, $SD = 0.58$; $M = 2.12$, $SD = 0.62$, respectively) than among those with children ($M = 2.63$, $SD = 0.58$; $M = 1.84$, $SD = 0.57$, respectively). Level of body estrangement was not related to parity, $t(344.99) = -0.38$, $p = .71$. Body agency and body estrangement were not related to participants' gestational week ($r = -.05$, $p = .32$; $r = .06$, $p = .23$, respectively). Body visibility, however, was positively associated with participants' gestational week ($r = .17$, $p = .001$).

3.2.2. BEPS's factor structure

The hypothesized three-factor model is presented in Fig. 1, in which the circles represent the hypothesized latent variables, and the rectangles represent the assessed items. All the predicted regression coefficients proved to be significant (all *p*s < .01). The standardized factor loadings relating to the model are presented in Fig. 1. The fit indices of the model indicated a good fit between the model and the data, $\chi^2/df = 1.87$, $p < .001$, CFI = .96, and RMSEA = .04, PCLOSE = .65, confirming the structure found in Study 1. The model explained 34% of the variance of body agency, 42% of body estrangement, and 73% of body visibility.

The correlations between the three factors were significant (body agency and body estrangement, $r = -.59$, $p < .001$; body agency and body visibility, $r = -.28$, $p < .001$; body estrangement and body visibility, $r = .41$, $p < .001$), indicating the following: the higher the sense of body agency, the lower the sense of body estrangement and sense of visibility of the pregnancy; and the higher the sense of body estrangement, the higher the sense of body visibility.

3.2.3. Internal consistency

The internal consistency estimates (Cronbach's alphas) of the subscales for the current sample was fair to high (.88 for body agency, .89 for body estrangement, and .66 for body visibility), indicating satisfactory reliability. Furthermore, average inter-item correlations were .39, .42, and .28, respectively, which fall in the range of .15–.50, as recommended by Clark and Watson (1995).

3.2.4. Construct validity

Table 2 presents the correlations between the BEPS subscales and disrupted body boundaries, body shame, subjective well-being (satisfaction with life, positive and negative affect), depression, and self-rated health. As hypothesized, body agency was positively associated with measures of well-being (life satisfaction, positive affect) and self-rated health, and negatively associated with sense of disrupted body boundaries, body shame, negative affect, and depression, with effect sizes ranging from small to medium (Cohen, 1969). Body estrangement was negatively associated with life satisfaction, positive affect, and self-rated health, and positively associated with sense of disrupted body boundaries, body shame, negative affect, and depression, with small effect sizes. Finally, small negative correlations were found between body visibility and life satisfaction and self-rated health, and small positive correlations were found between body visibility and disrupted body boundaries, body shame, negative affect, and depression.

Table 2
Correlations between the study's variables.

	Factor 1	Factor 2	Factor 3
Disrupted body boundaries			
Barrier	−.23***	.22***	.27***
Permeability	−.16**	.16**	.19***
Body Shame	−.54***	.44***	.37***
Subjective well-being			
Life satisfaction	.36***	−.26***	−.21***
Positive affect	.47***	−.16***	.09
Negative affect	−.47***	.35***	.27****
Depression	−.51***	.40***	.24***
Self-rated health	.34***	−.31***	−.11*

Note. Factor 1: Body agency; Factor 2: Body estrangement; Factor 3: Body visibility.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

3.2.5. Incremental validity

Table 3 presents a series of regressions predicting well-being (life satisfaction, positive affect, negative affect, and depression) and self-rated health, indicating the unique contribution of the BEPS factors beyond disrupted body boundaries and body shame. As can be seen in Table 3, Factor 1, body agency, was positively associated with life satisfaction, self-rated health, and positive affect, and negatively associated with negative affect and depression. Factor 2, body estrangement, was negatively associated with positive affect and self-rated health, and positively associated with depression. Finally, Factor 3, body visibility, was positively associated with positive affect. R^2 changes were significant at all six of the regressions, accounting for between 5%–26% unique variance in the well-being indices, indicating that the BEPS measures a construct beyond disrupted body boundaries and body shame.

4. General discussion

The results of the present study support the psychometric properties of the BEPS, a scale that assesses the psychological representations of the body experience during pregnancy. It reflects three dimensions of the body experience: the sense of body agency, the feeling of estrangement, and the body's visibility. In Study 1 we evaluated the scale's structure and examined its internal consistency. The scale's structure was replicated in Study 2, and its correlations with measures of well-being, body shame, and disrupted body boundaries support its validity. Estimates of internal consistency supported the body agency and body estrangement factors, while the body visibility factor fell below recommended guidelines. Of note, only subscale scores should be calculated; a total BEPS score should not be calculated.

Sense of body agency during pregnancy, the first BEPS factor, represents pregnancy as a personal and positive body experience. It includes three layers of appreciation of the body and its functionality. The first layer is positive body image and body satisfaction, which is manifested in appreciation of the body's appearance and attractiveness (Tylka & Wood-Barcalow, 2015). Pregnant women may experience body dissatisfaction (Hodgkinson et al., 2014) due to social constructions which frame the pregnant body as unattractive, and thus may feel ashamed of their pregnant bodies (Dworkin & Wachs, 2004). At the same time, high levels of body shame may preclude high levels of body satisfaction in general, and during pregnancy in particular. Indeed, the findings of the current study indicated that body agency was negatively associated with body shame.

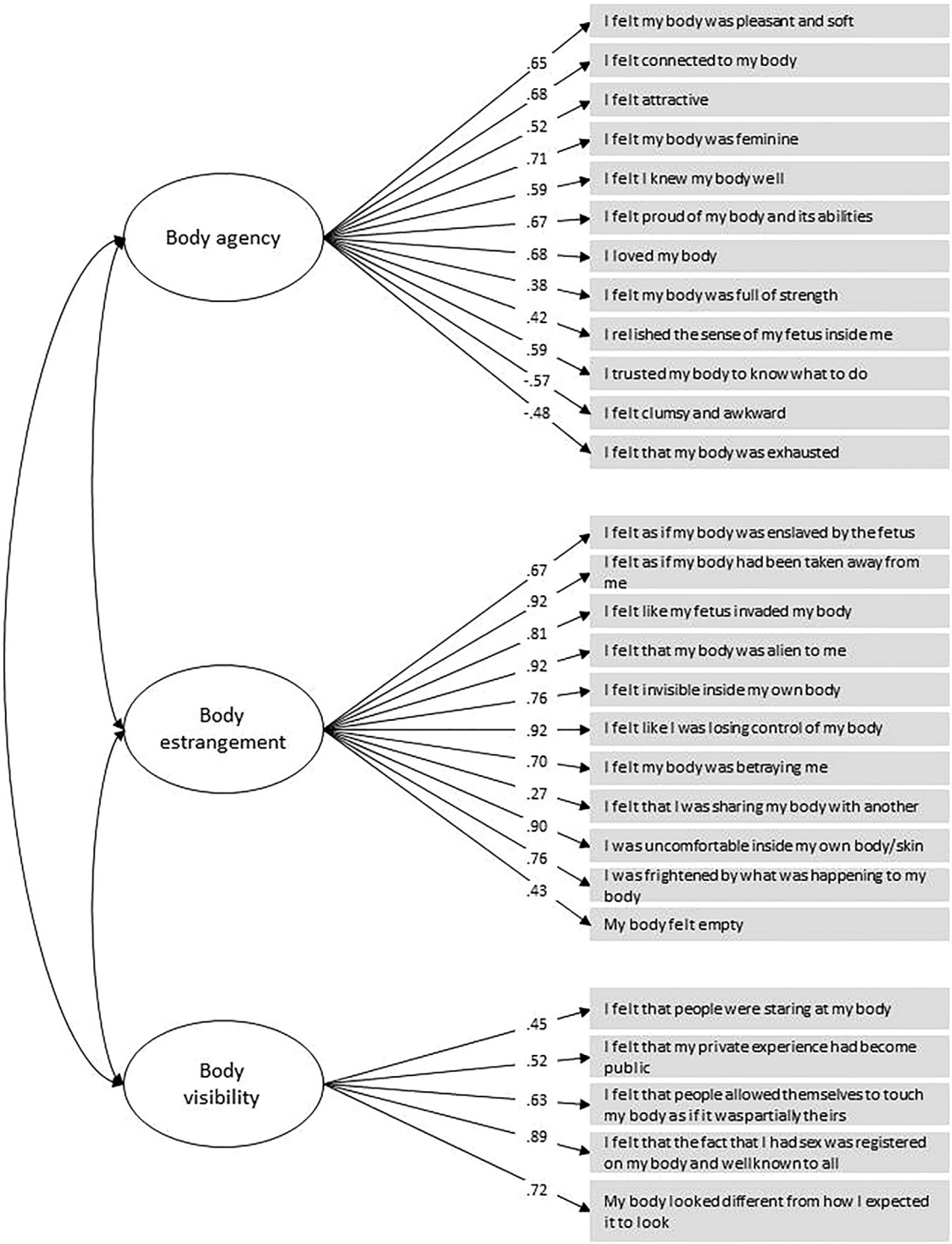

Fig. 1. The results of the confirmatory factor analysis (Study 2).

The second layer refers to the perception of the body as competent and potent (Alleva et al., 2017). In this study, items referring to the potency, strength, and functionality of the body loaded onto the same factor as items denoting the attractiveness of the body. Other studies have indicated that perceptions of the functionality of the body can sometimes compensate for its perceived reduced aesthetic attractiveness (Clark et al., 2009a).

The third and most fundamental layer is the sense of body ownership (Piran, 2016). This sense of being at homeïn one's body may be challenged by the perpetually changing pregnant body (Bergbom, Modh, Lundgren, & Lindwall, 2016). At the same time, women with a low sense of embodiment may find it difficult to adjust to these changes. The sense of being at home in one's body has been shown to be related to adjustment and well-being (see Mehling et al., 2009).

The second factor of the BEPS, which assesses a woman's sense of estrangement from her pregnant body, refers both to her fantasies about her fetus and to her interaction with the fetus. The physical changes taking place in her body mark the existence and growth of the fetus, and its being contained by the uterus – which

Table 3
Incremental contributions of the BEPS factors to relevant criterion variables.

	Total R^2	ΔR^2	ΔF	β	*t*
Predicting **life satisfaction**, $F(6,366) = 16.22^{***}$					
Step 1	.16	.16	23.96***		
Body boundaries					
Barrier				−.28	−2.43*
Permeability				−.14	−1.18
Body shame				−.27	−4.31***
Step 2	.20	.05	7.26***		
BEPS factors					
Body agency				.36	3.86***
Body estrangement				−.02	−0.28
Body visibility				−.06	−0.78
Predicting **positive affect**, $F(6,366) = 25.52^{***}$					
Step 1	.03	.04	5.08**		
Body boundaries					
Barrier				−.20	−2.12*
Permeability				.22	2.25*
Body shame				−.14	−2.69**
Step 2	.28	.26	44.17***		
BEPS factors					
Body agency				.68	10.19***
Body estrangement				.09	1.47
Body visibility				.24	4.37***
Predicting **negative affect**, $F(6,366) = 33.31^{***}$					
Step 1	.28	.28	48.16***		
Body boundaries					
Barrier				.11	1.16
Permeability				.28	3.02**
Body shame				.38	7.54***
Step 2	.34	.07	15.55***		
BEPS factors					
Body agency				−.37	−5.14***
Body estrangement				.04	0.60
Body visibility				.06	1.03
Predicting **depression**, $F(6,366) = 38.20^{***}$					
Step 1	.26	.27	45.54***		
Body boundaries					
Barrier				1.72	2.86**
Permeability				1.19	1.96*
Body shame				2.03	6.25***
Step 2	.38	.12	22.79***		
BEPS factors					
Body agency				−2.75	−6.11***
Body estrangement				.87	2.07*
Body visibility				−.04	−0.10
Predicting **self-rated health**, $F(6,366) = 12.26^{***}$					
Step 1	.10	.11	14.91***		
Body boundaries					
Barrier				−.106	−1.10
Permeability				−.04	−0.48
Body shame				−.23	−4.94***
Step 2	.15	.06	8.68***		
BEPS factors					
Body agency				.18	2.67**
Body estrangement				−.17	−2.64**
Body visibility				.09	1.65

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

implies a connectedness and symbiosis between mother and child – may be seen by the woman as a sign of her adequacy as a mother (Chang, Chao, & Kenney, 2006). At the same time, the presence of the developing fetus may trigger feelings of invasion and violent penetration into the woman's personal space, loss of control, and alienation from her body. These feelings may result in both a fear that her body will not be able to serve as a holding or nurturing environment for the fetus (Raphael-Leff, 2001; Young, 2005), and fears for her own health/safety/well-being. Women may feel as if they are losing their bodies, and perhaps even losing themselves *in* their bodies (Upton & Han, 2003). In addition, women with a reduced sense of health and safety may feel especially threatened during pregnancy. Moreover, the disruption of the women's body boundaries during pregnancy may reach its climax during the delivery, which marks the transition of the fetus from internal to external entity (Lupton & Schmied, 2013; Young, 1984).

The third factor, the pregnant body's visibility, may reflect different processes. On the one hand, the attention given to the pregnant body may reduce a woman's existence to her role as a "mother-to-be." Interpreted in this way, the woman's body may be viewed as an instrument essentially employed to carry out the "reproductive mission." While women in general are often objectified (Fredrickson & Roberts, 1997), pregnant women may be even more vulnerable to this phenomenon. Indeed, self-objectification was shown to be related to depression among pregnant women (Rubin & Steinberg, 2011). In line with this idea, women who meet the social norms of the acceptable pregnant body report on a positive body experience as compared to women who do not meet these norms (Warren & Brewis, 2004).

On the other hand, the visibility of the pregnant body and the attention it attracts may be positively perceived by the pregnant woman. Since pregnancy implies a transition to motherhood, it also represents the recognition of the woman's transformation to the bearer of a new social role. Accordingly, the pregnant body symbolizes a social connectedness and a positive social commentary (Clark et al., 2009b). This situation may be especially significant in a pronatalist society, for instance in Israel, whose birth rate is one of the highest in the OECD countries. While the perception of the body visibility may affect women's well-being, an opposite direction of causality may also be applicable, as well-being may affect women's attitudes and reactions towards this visibility.

The BEPS may be useful in investigating a range of research questions that would contribute not only to the development of the theoretical understanding of the body experience during pregnancy, but also makes clinical and educational contributions. The findings of the current study suggest that the subscale scores of the BEPS are related to measures of well-being in general. Future research should examine the relations of the BEPS scores to measures that are especially relevant to the pregnancy period, such as anticipated maternal efficacy, attachment to the fetus, and fear and/or anxiety of the delivery. Understanding the wide range of implications related to the body experience during pregnancy will enable the identification of women who are at high risk of maladjustment during pregnancy.

Furthermore, many pregnant women gather pregnancy-related information, mostly through the Internet, about physical issues such as their body changes, health related behaviors, and fetal development (Huberty, Dinkel, Beets, & Coleman, 2013; Larsson, 2009). However, this information is mostly limited to the concrete aspects of their bodies; a better understanding of the psychological representations of the body during this period would enable their attainment of broader and deeper information.

The BEPS may also be used to study the body experience of specific populations who are potentially at high risk for disruptions in the body experience during pregnancy. More specifically, subgroups of women with negative body image, such as women with eating disorders (Cash & Deagle, 1997), higher weight women (Sui, Turnbull, & Dodd, 2013), and women who have a history of childhood sexual abuse (Talmon & Ginzburg, 2018), may be especially vulnerable to the body transformations that take place during pregnancy. Furthermore, using the BEPS subscales will enable us to understand not only the experience itself but also the factors that predict negative body experiences during pregnancy. As such, using the subscales may constitute a basis for prevention interventions for targeted populations.

Finally, the concept of the body experience during pregnancy should be viewed in the context of the transition to motherhood. More specifically, the pregnancy period does not exist in isolation from the postpartum period, and many studies show that emotional adjustment during pregnancy is a marker for postpartum adjustment (Brummelte & Galea, 2016). Thus, it would be interesting to examine whether the body experience during pregnancy predicts the postpartum body experience in particular and the adjustment to motherhood and the maternal role in general. That is, the BEPS would allow for example, an examination of whether women's fantasies about their fetuses and their interactions with them – as implicated in body estrangement – would be related to their actual interactions with their babies. Understanding these relations would enable the use of the BEPS to identify pregnant women who are at risk for postpartum adjustment difficulties.

The findings of this study should be considered in light of its limitations. First of all, this study did not utilize focus groups or interviews, which are commonly used in designing scales (on the advantages and disadvantages of focus groups, expert judgements, and theory-driven item generation methods, see Streiner, Norman, & Cairney, 2015). Another limitation was the sampling procedure employed in these studies; despite the large size of the samples, they were samples of convenience. Future studies should recruit participants in the clinical settings in which most women conduct their pregnancy follow-ups, to increase the probability of a representative sample.

Another limitation refers to the fact that data were collected based on self-report questionnaires. This limitation is especially relevant to the data regarding the obstetric variables (fertility treatment, high risk pregnancy, etc.) that were collected via self-reports rather than medical records. Recruiting women in a medical setting would enable the use of their medical records in order to obtain more reliable data. This limitation is less relevant to the other variables which, although also self-reported, are subjective by nature. However, all measures used in this study may have been subject to a social desirability bias. The absence of validity question (e.g., "please do not respond to this question to let us know you are paying attention"), which would enable to screen out random or careless responding, should also be noted.

Although considered an acceptable procedure, and supported by both EFA and CFA analyses, the omission of several items through the validation process may have been conducted at the expense of defining new themes. The relatively low reliability estimate of the third factor should also be noted, which may be due in part to the fewer number of items on this subscale. However, this low reliability estimate may reflect the relative diversity of the participants' experiences in this area. The construct that this factor reflects merits further research.

Finally, given that data were collected only once during the women's pregnancies, the stability of the BEPS scores could not be examined. Although there was no relation between the scores and participant's gestational week, there was a relation between the scores and parity. Thus, it is unclear whether the body experience during pregnancy is a dynamic phenomenon which changes during a specific pregnancy and/or across different pregnancies, or whether it is a stable phenomenon. Future research should examine the stability of the BEPS over time, and its prediction of postpartum adjustment.

4.1. Conclusion

The BEPS is a multi-dimensional measure. It reflects the complexity of women's experiences of their bodies during pregnancy, as manifested by their sense of agency, feelings of estrangement, and the relations with their surroundings in terms of visibility and the public nature of the pregnancy that results from such visibility. Thus, only subscale scores should be used rather than a total score. The development of the BEPS provides an opportunity for rich and fruitful research. Such research would extend both the theoretical understanding of the psychological representations of the body during pregnancy, its predictors and implications during pregnancy, and the postpartum period. This understanding would enable professionals in the field to use the BEPS for clinical purposes, both as a means of identifying individuals at risk and as a basis for the development of preventive and treatment interventions.

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Permission to use this measure is not required. However, we do request that you notify the corresponding author via email if you use the Body Experience during Pregnancy Scale in your research. Please seek permission if any item is modified.

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