

**Validation of the Hebrew Birth Satisfaction Scale-Revised (BSS-R) and its
Relationship to Perceived Traumatic Labour**

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Abstract

Objective and background: The Birth Satisfaction Scale-Revised (BSS-R) is a multi-dimensional measure which is recommended by international clinical guidelines for global use as the birth satisfaction outcome measure of choice. The current investigation sought to develop a Hebrew version of the BSS-R for use in the Jewish-Israeli context and examine the relationship between BSS-R domains and the perception of the experience of labour as traumatic.

Methods: Following review, translation, and back translation for linguistic equivalence, a Hebrew version of the BSS-R (H-BSS-R) was prepared and psychometrically evaluated using key indices of validity and reliability. Complete multivariate normal data from 288 first-time Jewish Israeli mothers within two years after childbirth was entered into the analysis.

Results: The H-BSS-R was found to have a good fit to the BSS-R tridimensional measurement model, excellent internal consistency, divergent and known-group discriminant validity. Moreover, women who experienced their labour as traumatic had significantly lower H-BSS-R sub-scale scores than women who reported that their birth experience was non-traumatic.

Conclusion: The H-BSS-R is a robust and valid measure suitable for use with Jewish-Israeli women, as well as for investigating the relationship between traumatic labour and birth satisfaction.

Keywords: Birth Satisfaction Scale-Revised (BSS-R); Birth trauma; Israel; Hebrew; Validation.

Introduction

The 10-item Birth Satisfaction-Revised (BSS-R; Hollins Martin & Martin, 2014) is a contemporary, valid and reliable birth satisfaction questionnaire endorsed by a consensus of international experts for global use as the birth satisfaction outcome measure of choice (The International Consortium for Health Outcome Measurement, 2016). Details of the development of the BSS-R are beyond the scope of this short report, however all information germane to this are available by reference to Hollins Martin and Martin (2014).

In Israel, healthcare is universal and participation in a medical insurance plan is compulsory. The healthcare system is based on the National Health Insurance Law, mandating all citizens resident in the country to join an official health insurance organization, which is run as a not-for-profit organization. Maternity care is thus carried out in such organizations, while childbirth is mostly conducted in public hospitals.

The goal of the current study was to develop and validate the Hebrew version of the BSS-R (H-BSS-R) and examine the relationship of the birth satisfaction construct to the reported experience of labour as traumatic. Specifically, our objectives were to:

1. Demonstrate the replicability of the tri-dimensional measurement model of the BSS-R to the H-BSS-R.
2. Evaluate the internal consistency of the Quality of Care (QC), Women's Attributes (WA), and Stress Experienced during Child-bearing (SE) sub-scales for the H-BSS-R.
3. Evaluate the known-groups discriminant validity of the H-BSS-R.
4. Evaluate the divergent validity of the H-BSS-R.
5. Investigate the potential relationship between the BSS-R sub-scale and total scores and the perception of the birth experience as traumatic.

Method

A cross-sectional survey design utilising purposive sampling was used to evaluate the study objectives. Data capture was by means of an electronic data collection program via social media and convenience sampling. Women were recruited for the study within two years of the birth of their first child. This time period, along with the ability to understand and complete a questionnaire in Hebrew, were the sole inclusion criteria for participation in the study.

Ethical approval

Ethical approval for the study was granted by the Institutional Review Board of Bar Ilan University in Israel.

Measures

The BSS-R (Hollins Martin & Martin, 2014), comprises ten items scored on a five-point Likert type scale with possible responses being: strongly agree, agree, neither agree or disagree, disagree, strongly disagree. Six of the items are scored from 0 (*strongly disagree*) to 4 (*strongly agree*), and the other four are reverse-scored from 0 (*strongly agree*) to 4 (*strongly disagree*). The items relate to three sub-scales: *stress experienced during child-bearing* (SE; 4 items); *quality of care* (QC; 4 items); and *women's attributes* (WA; 2 items). Sum scores are calculated for each of the sub-scales, as well as for the BSS-R as a whole (range=0-40). Higher BSS-R sub-scale and total scores indicate greater birth satisfaction.

The experience of labour was examined by a single dichotomous item asking if the participant experienced labour as traumatic with a Yes or No response.

Development of the Hebrew version of the BSS-R: Translation process

The original British scale was reviewed, translated into Hebrew, and back-translated into English to check for linguistic equivalence (Brislin, 1970). The process was performed by a panel of experts consisting of bilingual professionals (an English editor, a psychologist, and a social worker). The team aimed to keep the translation as literal as possible to enable future cross-cultural comparisons. No major adaptations were required, so that the H-BSS-R completely adheres to the original English version **which are detailed in the original BSS-R development and validation paper (Hollins Martin and Martin, 2014).**

Statistical analysis

Following previous studies (Goncu Serhatlioglu, Karahan, Hollins Martin, & Martin, 2018; Hollins Martin & Martin, 2014; Martin et al., 2017), Objective 1 was addressed using Confirmatory Factor Analysis (CFA). The tri-dimensional measurement model **described in detail in the original development and validation paper** (Hollins Martin and Martin, 2014) of the BSS-R comprising three correlated factors was evaluated. Maximum-likelihood estimation was used to evaluate the CFA model (Brown, 2015). The comparative fit index (CFI), the root mean squared error of approximation (RMSEA) and the square root mean residual (SRMR) were used to evaluate model fit. **Threshold**

levels for acceptable model fit for CFI, RMSEA and SRMR respectively are ≥ 0.90 (Hu & Bentler, 1995), ≤ 0.08 (Browne & Cudeck, 1993) and ≤ 0.08 (Hu & Bentler, 1999).

Divergent validity

Divergent validity was evaluated by correlating H-BSS-R sub-scale scores with participant age. No statistically significant correlation between H-BSS-R sub-scale scores and age is predicted.

Known-groups discriminant validity

Delivery type

Consistent with previous investigations (Jefford, Hollins Martin, & Martin, 2018) known-groups discriminant validity was evaluated by comparison of BSS-R sub-scale and total scores as a function of delivery type, i. unassisted vaginal delivery, ii. assisted delivery (instrument, Caesarean section). Statistically significant higher H-BSS-R SE and WA sub-scale and total scores are predicted in women having an unassisted vaginal delivery. No statistically significant difference is predicted between groups for the QC sub-scale.

Traumatic labour experience

It was also predicted that participants who experienced their labour as traumatic will have significantly lower sub-scale and total H-BSS-R scores.

Internal consistency

Cronbach's coefficient alpha was used to evaluate the internal consistency of H-BSS-R sub-scales and the total scale with a threshold of 0.70 or greater indicating acceptability (Kline, 2000).

Data analysis was undertaken using the R programming language (R Core Team, 2017).

Results

Participants

A convenience sample of two-hundred and ninety-two Israeli-Jewish primigravida women who had given birth within the past two years consented to take part in the study. Four participants were excluded due to having (N=2) significant missing H-BSS-R data (>5%) or being (N=2) multivariate outliers. Complete multivariate normal H-BSS-R data for analysis was N=288. The mean age of participants was 26.66 (SD 4.12), range = 18-44 years. Mean duration of pregnancy was 39.36 (SD 1.65) weeks. The mean and standard deviation of SE, WA and QC sub-scales and the H-BSS-R total score was 7.93 (3.69), 4.19 (2.21), 11.55 (3.27) and 23.67 (7.19) respectively. No excessive skew or kurtosis was observed in individual item, sub-scale or total H-BSS-R scores.

Statistically significant correlations were observed between the H-BSS-R total score and SE, WA, and QE sub-scales, $r = 0.86, p < 0.001$, $r = 0.77, p < 0.001$ and $r = 0.71, p < 0.001$, respectively. The SE sub-scale was positively and significantly correlated with the WA ($r = 0.66, p < 0.001$) and QC ($r = 0.32, p < 0.001$) sub-scales. Finally, the WA sub-scale was positively and significantly correlated with the QC sub-scale ($r = 0.28, p < 0.001$).

Confirmatory factor analysis

The three-factor measurement model of the BSS-R offered a good fit to the data ($\chi^2_{(df=32)} = 92.68, p < 0.01$, CFI = 0.94, RMSEA = 0.08, SRMR = 0.06). All item-factor loadings as anticipated were highly statistically significant ($p < 0.001$) with standardised coefficients ranging from 0.38 to 0.91. Correlations between factors were also all highly statistically significant ($p < 0.001$) ranging from 0.34 to 1.01¹.

¹ The correlation between the stress and women's attributes sub-scales was noted to be >1. Correlation values >1 within a structural equation model may be caused by inherent numeric derivative calculation procedures, an acceptable model where the sample endorses a higher value of factor correlation or model misspecification. Collapsing stress and women's attributes items into a single factor and thus running a two-factor model (combined factor and quality of care) produces a good model fit ($\chi^2_{(df=34)} = 92.88, p < 0.01$, CFI = 0.95, RMSEA = 0.08, SRMR = 0.06) with a factor correlation of 0.34 ($p < 0.001$). The chi-square difference test reveals no significant difference between the three-factor measurement model and this two-factor model (χ^2 difference = 0.19, df difference = 2, $p = 0.91$).

Divergent validity

No statistically significant correlations were found between SE and QC H-BSS-R sub-scales and total score and participant age, $r = -0.03, p = 0.61, r = -0.06, p = 0.35,$ and $r = -0.09, p = 0.12$ respectively. However, a statistically significant negative low correlation was found between the WA H-BSS-R sub-scale and age, $r = -0.17, p = 0.005$.

Known-groups discriminant validity

Statistically significant differences as a function of group type were observed on all H-BSS-R sub-scales and the total score with women having an unassisted vaginal delivery having higher H-BSS-R scores. Women who perceived their labour experience as traumatic had significantly lower H-BSS-R sub-scale and total scores compared to those who did not (Table 1.)

Internal consistency

Cronbach alpha for SE, WA and QC sub-scales and the H-BSS-R total score were 0.71, 0.70, 0.81 and 0.82 respectively.

Discussion

The current investigation on the translation and validation of the BSS-R into Hebrew has demonstrated the H-BSS-R to be largely equivalent to the original UK version in all fundamental conceptual and measurement aspects. Moreover, the current investigation has, for the first time in terms of the BSS-R, identified a significant statistical relationship between perceived traumatic labour experience and birth satisfaction. The CFA revealed the H-BSS-R to be concordant with the original BSS-R tri-dimensional measurement model thus providing convincing evidence for conceptual alignment between versions. The finding of a correlation >1 between SE and WA sub-scales would appear to be more likely due to numeric derivative

calculation procedure inherent to the estimation of structural equation models or sample characteristics that favour a high correlation between these two factors (or a combination of both) rather than model misspecification, the rationale for this being similar model fit with a two-factor version of the model (collapsed SE and WA factors), absence of Heywood cases and previous observations that these factors are highly correlated, for example the original BSS-R validation paper revealed a correlation between these two factors of 0.86 (Hollins Martin & Martin, 2014).

Internal consistency estimations of the H-BSS-R sub-scales and total score were all acceptable (≥ 0.70) and comparable with those reported by Hollins Martin and Martin (2014) with the exception of the QC sub-scale which had a significantly higher Cronbach's alpha compared to the original version.

It is of note that our divergent validity findings differ from those observed in previous studies (Fleming et al., 2016; Hollins Martin & Martin, 2014) with respect to the WA sub-scale. It was observed that in the current sample, WA sub-scale scores were significantly and negatively correlated with mothers age, with no other statistically significant correlations observed between the other two H-BSS-R sub-scales and total score and mothers age. This represents a somewhat curious and counter-intuitive finding, that this domain of birth satisfaction diminishes with increasing age. Given that the WA sub-scale represents perceptions of anxiety and lack of control in relation to birth satisfaction, scrutiny of how the context of birthing within Israel may influence a woman's experience as a function of her age would seem worthy. However, from a practical perspective, this finding represents a valuable insight and also a minor caution in the interpretation of the WA sub-scale in this population that

there may be a systematic influence of age. This observation however, should be considered within the finding that the other sub-scale scores and the H-BSS-R total score exhibit exemplary divergent validity characteristics and the correlation in absolute terms was low and the sample comprised exclusively first-time mothers. This is also of relevance given the recommended use of the total BSS-R score in outcome measurement (The International Consortium for Health Outcome Measurement, 2016) and a recent investigation indicating that BSS-R total and/or sub-scale scores can be used with confidence and that the preferred scoring option should be informed by the clinical or research context (Martin et al., 2018).

The findings from the known-groups discriminant validity evaluation are consistent with previous investigations, essentially, women having an unassisted vaginal delivery have greater levels of birth satisfaction compared to those experiencing an intervention.

Consistent with prediction, and additional evidence to support the validity of the BSS-R, it was observed that women who perceived their experience of labour as traumatic had significantly lower BSS-R sub-scale and total scores. Though not entirely unsurprising, a striking observation however, is the absolute magnitude of the effect sizes across BSS-R scores, these being large for the SE and WA sub-scales and BSS-R total score and medium for the QC sub-scale. Given even the medium effect size observed for QC sub-scale scores, it is clear that the perception of a traumatic labour permeates every strata of birth satisfaction and is clearly of concern in terms of adequacy of service provision for both labour and birth and also for appropriate support postnatally.

The current study had a number of limitations. Firstly, the investigation focused exclusively on validation of the BSS-R into Hebrew for use within Israeli-Jewish women. Further research is desirable to examine the birth satisfaction of Israeli-Arab women in a comparable manner, thus it is highly desirable to develop an Israeli-Arabic version of the BSS-R. Currently, the findings of this study are specific to Israeli-Jewish first-time mothers, therefore the potential to evaluate the H-BSS-R in multiparous women is a logical and appropriate progression from the investigation. Finally, we note that our method of dichotomising the participants by traumatic/non-traumatic labour status was simplistic and clearly an area for future research endeavour.

Conclusion

Consistent with existing translation/validation studies of the BSS-R of the conceptual and measurement transferability of the instrument to non-UK contexts, our study has also extended the evolving evidence base concerning the BSS-R to a Semitic language, a distinct religio-cultural group and the experience of traumatic labour.

Obtaining the BSS-R

To request a copy of any available version of the BSS-R including all translated and short-form versions and permissions to use, please contact Professor Caroline Hollins Martin by email: C.HollinsMartin@napier.ac.uk

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Table 1. Comparison of BSS-R total and sub-scale scores differentiated by birth delivery type and experience of labour as traumatic. SD are in parentheses, degrees of freedom = 281 (df =280 trauma comparisons). Assisted/operative delivery group comprised, planned Ceasarean section N=7, Emergency Ceasarean section N=38, Instrument N = 27.

BSS-R Scale	Group comparison		95% CI	<i>t</i>	<i>p</i>	Hedges <i>g</i>	Hedges <i>g</i> 95% CI	Effect size
	Unassisted vaginal delivery (N=211)	Assisted/ Operative delivery (N=72)						
Stress	8.60 (3.59)	5.99 (3.24)	1.67 - 3.55	5.46	<0.001	0.74	0.47 - 1.02	Medium
Attributes	4.47 (2.21)	3.47 (2.07)	0.41 - 1.58	3.35	<0.001	0.46	0.19 - 0.73	Small
Quality	11.97 (2.97)	10.38 (3.79)	0.74 - 2.46	3.66	<0.001	0.50	0.23 - 0.77	Small
Total score	25.04 (6.70)	19.83 (7.18)	3.37 - 7.04	5.59	<0.001	0.76	0.48 - 1.04	Medium
	Traumatic labour (N=85)	Non-traumatic labour (N=197)						
Stress	4.47 (2.22)	9.47 (3.08)	4.27 - 5.72	13.50	<0.001	1.75	1.45 - 2.04	Large
Attributes	2.49 (1.84)	4.97 (1.93)	1.99 - 2.96	10.01	<0.001	1.30	1.02 - 1.57	Large
Quality	9.95 (3.58)	12.24 (2.86)	1.50 - 3.08	5.71	<0.001	0.74	0.48 - 1.00	Medium
Total score	16.92 (5.02)	26.68 (5.85)	8.33 - 11.20	13.39	<0.001	1.73	1.44 - 2.03	Large