ORIGINAL ARTICLE

Revisiting the Mackey Childbirth Satisfaction Rating Scale: Spanish adaptation, factor analysis, and sources of construct validity

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Abstract

Background: Women's dissatisfaction with perinatal health care services is associated with poor postpartum outcomes for the mother and the baby. The Mackey Childbirth Satisfaction Rating Scale is a frequently used measure of women's childbirth satisfaction. However, its factor structure has been inconsistent across investigations. The goal of this study was to evaluate the psychometric properties of the scale (i.e., factor structure and sources of validity evidence).

Methods: This study is a descriptive prospective investigation. Participants included 106 pregnant women (mean age = 31.86, SD = 4.12) recruited from a public university hospital situated in South Madrid. Sources of construct validity of the Mackey were explored with the Women's View of Birth Labor Satisfaction Questionnaire. Sources of criterion validity were investigated with measures of pain (labor, delivery, and just after birth) and post-traumatic stress symptoms.

Results: Minor adaptations in item distribution resulted in an adequate fit of the original six-factor solution of the Mackey scale (i.e., oneself, the partner, the baby, the nurse, the physician, and overall satisfaction). Sources of validity evidence supported the construct and criterion validity of the scale.

Conclusions: Obtaining a psychometrically and conceptually sound factor solution is fundamental when validating a scale. With the present study, researchers and clinicians (e.g., midwives) will be able to measure women's childbirth satisfaction in a more robust manner. Both antecedents and consequences of satisfaction were found to correlate with several satisfaction subscales, which might help guide prevention programs in mother care in a more efficient way.

KEYWORDS
childbirth, pain, perinatal, post-traumatic stress, psychometric properties, satisfaction

1 | BACKGROUND

Over the past several years, the assessment of patients' perspectives on health care have received growing attention due to their association with critical outcomes. Particularly in the field of perinatal care, women's dissatisfaction with health care services has been associated with mental distress (e.g., post-traumatic stress), poor adherence or refusal of medical treatments and services, reduced interest in future pregnancy, interpersonal problems with partners, and negative interactions with the baby, among others.[1–3]

Several arguably "objective" outcomes, such as infant mortality, morbidity, and pain during labor, have been used as tentative measures of the quality of childbirth care and, ultimately, childbirth satisfaction.[4,5] While these factors may have an impact on women's satisfaction, experiences of childbirth are not the same phenomena as satisfaction with care and the latter cannot be accounted for by clinical outcomes alone.[6] In fact, satisfaction is known to be a much more complex, multidimensional construct that requires nuanced assessment of the patient's subjective experiences.[7]

Numerous measures of women's childbirth satisfaction exist. Of these, reviews to date have indicated that there are a moderate number of instruments capable of measuring maternal satisfaction with the care received during labor and birth within a hospital setting.[6,8,9] Overall, these reviews tend to conclude that existent measures of childbirth satisfaction often present good content validity. However, they also indicate that further reliability testing and evidence of criterion validity are needed to ensure their reproducibility and utility. The Mackey Childbirth Satisfaction Rating Scale (MCSRS) is a frequently used measure of childbirth satisfaction, yet its psychometric soundness has been debated for years.[10–12]

The original factor structure of the MCSRS was argued to have six subscales. Five of them were developed to represent satisfaction with the behavior of the main participants in childbirth (i.e., oneself, the partner, the baby, the nurse, and the physician). The remaining subscale (i.e., overall satisfaction) was meant to address labor and delivery satisfaction in general.[12] The majority of researchers have failed to replicate this factor structure when it has been investigated in an exploratory manner,[10,13] which has resulted in various factor structure combinations that have somehow differed from the original. An example of this is a recent Spanish adaptation of the questionnaire,[11] in which the partner, the baby, the nurse, and the physician subscales were replicated (with the exception of item 34 "The overall care you received during labor and delivery," which was originally assigned to the "physician" subscale only and to both "nurse" and "physician" subscales

in the Spanish adaptation). Major changes were made in the "self" and "overall satisfaction" subscales, which were renamed as satisfaction with "labor" and "delivery" in the Spanish adaptation due to the reorganization of the factorial distribution of items.

There are several reasons that justified the selection of the MCSRS instead of other measures of childbirth satisfaction. One is the large body of work using this measure, which has been adapted and validated across several countries, including the United States, Iran, the Netherlands, Belgium, and Spain.[10–12] In addition, the MCSRS evaluates satisfaction for a wide range of childbirth factors/actors, while other psychometrically sound measures, such as the Wijma Delivery Expectancy/Experience Questionnaire, focus on a subset of elements only (e.g., labor and childbirth fear).[9] Finally, the MCSRS is one of the very few measures to include partners as subjects of inquiry.[8] This aspect is important because satisfaction with partner relationships is associated with perinatal distress.[14]

The purpose of this study was to provide novel insights about the psychometric properties of the MCSRS. Because factor distribution is important for score calculation and conceptualization of a scale, a first goal was to obtain a psychometrically sound internal structure of the scale by comparing the factorial solution obtained by the most recent and rigorous validation of the MCSRS with the original factor solution using confirmatory factor analysis.[11,12] In doing so, we also investigated sources of validity evidence for the MCSRS, which have been largely ignored by researchers in the field of perinatal care yet are important for supporting the utility and construct validity of the scale. Specifically, we aimed to correlate the MCSRS with the Women's View of Birth Labor Satisfaction Questionnaire (WOMBLSQ),[15] another frequently used measure of childbirth satisfaction (sources of construct validity), and to investigate the criterion validity of the MCSRS by exploring its association with well-established antecedents (labor pain) and consequences (postpartum post-traumatic stress) of childbirth satisfaction. The WOMBLSQ was selected as a measure of sources of construct validity because it has been shown to provide a good overall picture of satisfaction with childbirth care.[9] In addition, it has been adapted for use in different countries, including Spain, and has several subscales that should be comparable to the ones in the MCSRS (e.g., overall, professionals, and holding babies).[16] Sources of criterion validity were labor pain and postpartum post-traumatic stress because of their impact on the quality of life of mothers and because both have been associated with childbirth satisfaction in past research.[17,18]

We hypothesized that both factorial solutions (the original six-factor solution and a previous Spanish adaptation)[11,12] would have adequate psychometric properties.

We also anticipated that the MCSRS would significantly correlate with the WOMBLSQ, labor/delivery pain, and postpartum post-traumatic stress.

2 | MATERIALS AND METHODS

2.1 | Procedures

For this study, we used a descriptive prospective approach. First contact with potential participants was made by a midwife who was part of the research team and who worked with and attended pregnant women at the hospital where recruitment occurred. Contact was initiated at the antenatal clinic during the first trimester (the day of the planned ultrasound). Eligibility was first checked by the midwife using the electronic medical record. Those who met the inclusion criteria (see below) were then informed about the study objectives and procedures and invited to participate.

With respect to assessments, the midwife was in charge of evaluating pain severity (during labor, delivery, and immediately after delivery) and childbirth satisfaction (24–48 h after childbirth). This type of assessment is common in Spanish public health settings. Four months after childbirth, the post-traumatic stress questionnaire was sent by mail together with a prepaid envelope, which was used to return the questionnaires back to researchers. The study was carried out from 2013 to 2015.

The ethics committee of Hospital Universitario de Fuenlabrada approved the present study procedures (PI07/0571; approval date January 1, 2012). Written informed consent was obtained from all participants before they were included in the study.

2.2 | Sample

This study is a secondary analysis and is part of a larger investigation exploring women's experiences during the perinatal period in Spain. Data obtained during pregnancy have been published elsewhere.[19]

In total, 285 women receiving obstetric care at a public university hospital situated in South Madrid (Hospital Universitario de Fuenlabrada, Madrid), in healthcare Area 9 agreed to participate in the larger study. The study hospital provides care to about 3000 obstetric patients per year. The target sample size was determined based on recommendations from similar studies ($n = 200$).[20] Of the original 285, 106 also provided information during delivery and in the postpartum period, which represents the final sample used in the present investigation. This final sample of 106 women ranged in age between 23 and 42 years (mean = 31.86, SD = 4.12). Follow-up was not possible for 169 women in the initial sample, mostly because of the difficulties in completing the questionnaires while caring for the baby. The implications of sample size loss are discussed in more detail below.

Our inclusion criteria in the first trimester of pregnancy were as follows: being aged 18 years or over, not having a diagnosis of a mental health disorder, and having a low-risk pregnancy. Women were excluded if they had a diagnosis of maternal or fetal disease. This step was done to increase the homogeneity of the sample in terms of pregnancy risk. Women were not included if they declined to sign the informed consent form or if they did not have the physical or mental ability to complete the questionnaires.

With respect to the sample characteristics, the majority of participants (64.8%) were employed before childbirth. Half of the women (49.1%) had completed secondary education. The remaining participants had either completed primary education (21.7%) or more (29.2%).

With respect to the obstetric characteristics of the sample, more than half of deliveries were spontaneous vaginal births (60.0%). Twenty-one percent of them required a planned cesarean, and 19% involved forceps or vacuum extraction. The most frequent type of anesthesia was epidural (77.3%). Only a small percentage of women did not receive anesthesia (11.3%) or required other types of anesthesia (i.e., local 6.2%; general 3.1%; spinal 2.1%). The infants' umbilical arterial pH ranged from 7.12 to 7.45 (mean = 7.27, SD = 0.07) and birth weights ranged from 1.98 to 4.08 kilos (mean = 3.15, SD = 0.45). A large majority of women (85.8%) had planned their pregnancy. Less than one-third of participants (29.2%) had experienced previous miscarriages. Half of the sample (52.8%) was primiparous.

2.3 | Measures

The main study outcome (satisfaction with childbirth) was assessed with the MCSRS,[12] a measure of childbirth satisfaction in which items are grouped into six dimensions, including oneself ("Your level of participation in decision-making during labor"), the partner ("The help and support of your partner during labor"), the baby ("Your baby's physical condition at birth"), the nurse ("The physical care you received from the nursing staff during labor and delivery"), the physician ("The physical care you received from the medical staff during labor and delivery"), and with the overall process of labor and delivery ("Your

overall delivery experience"). The scale has 34 items that use a 5-point Likert response scale ranging from "very dissatisfied" to "very satisfied." To obtain a Spanish version of the original MCSRS,[12] a back-translation process was followed (professional translation into Spanish, then back-translation into English by a separate bilingual researcher, and comparison of the original and back-translated versions). The original six-factor solution of the MCSRS was also replicated in our Spanish version of the scale after changing the factor assigned to four items (see the Results section). The internal consistency of the subscales and the variances explained by items in our sample were: oneself ($\alpha=0.84$; 61.5% variance explained), partner ($\alpha=0.75$; 80.0% variance explained), baby ($\alpha=0.66$; 60.2% variance explained), nurse ($\alpha=0.94$; 67.8% variance explained), physician ($\alpha=0.92$; 65.4% variance explained), and the overall process of labor and delivery ($\alpha=0.87$; 53.3% variance explained). The internal consistency for the whole scale was $\alpha=0.95$.

To explore sources of validity evidence, we administered the Spanish adaptation of the WOMBLSQ,[16] which is composed of 32 items and evaluates 10 dimensions of satisfaction (30 items) and overall satisfaction (two items; $\alpha=0.56$ in the present sample; 69.8% of factor variance explained by items). The 10 dimensions and their internal consistency and explained factor variance in the present sample are: professional support ($\alpha=0.82$; 59.0% variance explained), previous expectations ($\alpha=0.81$; 64.4% variance explained), assessment at home (e.g., "I should have had a home assessment in early labor" or "When I thought that my labor had started, I would have liked a carer to come and see me at home to confirm that I had"; $\alpha=0.78$; 69.4% variance explained), holding the baby (e.g., "I got to see my son right at the moment he was born" or "After my baby was born they didn't give it to me as soon as I wanted"; $\alpha=0.66$; 60.2% variance explained), partner's support ($\alpha=0.53$; 51.7% variance explained), pain during labor ($\alpha=0.77$; 68.8% variance explained), pain after childbirth ($\alpha=0.28$; 41.7% variance explained), continuity (e.g., "From the beginning of labor I knew who my caregivers were" or "I knew the professionals present at the birth of my son"; $\alpha=0.35$; 61.6% variance explained), environment (e.g., "The delivery room was a bit impersonal and medicalized" or "The room where I gave birth was very nice and relaxing"; $\alpha=0.64$; 73.6% variance explained), and perceived control ($\alpha=0.49$; 66.4% variance explained). The total WOMBLSQ score had an internal consistency of $\alpha=0.83$. The internal consistency estimates obtained in the present sample were comparable to those from past research with the Spanish version of the scale.[16]

Sources of criterion validity were investigated by means of an 11-point numerical rating scale of pain severity administered during labor, during delivery, and immediately after birth. Four months after childbirth, postpartum post-traumatic stress symptoms were evaluated, as childbirth is a potentially traumatic experience.[21] To do so, we used the modified version of the Perinatal Post-Traumatic Stress Disorder Questionnaire.[22] This instrument is composed of 14 items that evaluate post-traumatic symptoms related to the childbirth experience, including intrusiveness or re-experiencing (e.g., "Did you have upsetting memories of giving birth or of your baby's hospital stay?"), avoidance behaviors (e.g., "Did you lose interest in doing things you usually do?"), and hyperarousal or numbing of responsiveness (e.g., "Did you feel more jumpy (e.g., did you feel more sensitive to noise, or more easily startled)?"). The measure was back-translated (see the procedure described for the MCSRS) and found to be internally consistency in the present sample (Cronbach's $\alpha=0.85$) and similar to past research.[22] Mothers were instructed to provide responses that reflected their experience during the targeted time frame (4 months after delivery). Item responses in the questionnaire are rated using a 5-point Likert-type scale, and total scores range from 0 to 56.

2.4 | Data analysis

Items in the MCSRS are ordinal and categorical. Thus, the estimator used in the confirmatory factor analysis (CFA) was the weighted least square mean and variance adjusted (WLSMV). This estimator is preferred for categorical and ordered data because it does not assume a normal distribution of the data.[23] Two models were tested: the original version of the questionnaire and the one obtained from a previous Spanish adaptation of the questionnaire.[11,12] The modification indices were investigated to explore whether changes in the proposed model would result in improved model fit to the data.

Several fit indices were used, including the Chi-square test (χ^2), the root mean square error of approximation (RMSEA), the Tucker–Lewis index (TLI), and the comparative fit index (CFI). RMSEA scores below 0.05 and 0.08 are interpreted as representing an excellent or a good fit, respectively. TLI and CFI scores over 0.95 and 0.90 are argued to indicate excellent and good fit of the model to the data.[24,25]

To explore sources of validity evidence, we computed a series of Pearson correlations between the MCSRS and the Women's View of Birth Labor Satisfaction Questionnaire (construct validity) and between the MCSRS and three measures of pain intensity (during labor, during delivery, and after birth; retrospective criterion validity) and postpartum post-traumatic stress (predictive validity).

The CFA was computed with Mplus version 6.12.[26] All other analyses were calculated with SPSS version 22.[27]

3 | RESULTS

3.1 | Confirmatory factor analysis

The results of the model fit of the confirmatory factor analyses are indicated in Table 1. Overall, both when replicating the original six-factor solution and a previous Spanish adaptation,[11,12] we obtained marginally acceptable fit indices (TLI and CFI scores close to 0.95 and RMSEA slightly over 0.08). However, an analysis of the modification indices in the case of the original factor solution suggested that that model fit would significantly improve if four items, namely Items 3 ("Your level of participation in decision-making during labor"), 4 ("Your level of participation in decision-making during delivery"), 6 ("Your level of comfort during labor"), and 7 ("Your level of comfort during delivery"), were changed from the "self" subscale to the "overall labor and delivery satisfaction." A closer look at item content suggested that these items could, indeed, be interpreted as referring to satisfaction (with the degree of participation and with the experienced comfort). Thus, the fit of this third model was investigated. As shown in Table 1, the modification of the original factor solution obtained the best fit, which was good for the RMSEA (0.076, 90% CI = 0.066, 0.085) and excellent for the TLI (0.953) and the CFI (0.957). Because the model adapted from the original factor solution evidenced the best fit to the data and had high face validity, as revealed in item content analysis, further analyses were performed with the modified model. Table 2 shows a comparison of the item distribution obtained in different samples (the original study,[12] the most recent Spanish validation,[11] and the current investigation).

3.2 | Intercorrelations among MCSRS subscales

Table 3 shows the means, standard deviations, and intercorrelations among MCSRS subscales. All subscales were significantly correlated, yet not all were associated with the same strength. The strongest relationship emerged between nurse and physician satisfaction ($r = 0.65$, $p < 0.001$), self and overall satisfaction ($r = 0.64$, $p < 0.001$), and overall and physician satisfaction ($r = 0.62$, $p < 0.001$) and nurse satisfaction ($r = 0.42$, $p < 0.001$). The

weakest associations were found between partner and physician ($r = 0.19$, $p = 0.049$) and overall satisfaction ($r = 0.22$, $p = 0.026$) and between baby and physician satisfaction ($r = 0.24$, $p = 0.012$).

3.3 | Sources of construct validity evidence

Overall, the analyses of sources of construct validity evidence revealed significant associations in the expected directions and strengths (Table 4). For example, the partner and baby scales from both questionnaires were moderately associated ($r = 0.43$, $p < 0.001$ and $r = 0.62$, $p < 0.001$, respectively), and these correlations were stronger than those with other scales. Similarly, the nurse ($r = 0.62$, $p < 0.001$) and physician ($r = 0.62$, $p < 0.001$) satisfaction scales from the MCSRS moderately correlated to the professionals' satisfaction scale from the WOMBLSQ. Only home, which is not covered in the MCSRS, did not correlate or was only very weakly correlated to the MCSRS scales. The remaining WOMBLSQ scales (expectations, pain, continuity, environment, and overall) were consistently associated with MCSRS scales, with the exception of the partner scale.

3.4 | Sources of criterion validity evidence

Both antecedents and consequences of satisfaction were included in the evaluation of sources of criterion validity evidence (Table 5). Our analyses indicated that pain after birth was the strongest and most robust pain antecedent associated with childbirth satisfaction, but the strength of the correlations was weak. In relation to the consequences of childbirth satisfaction, overall ($r = -0.25$ $p = 0.028$), self ($r = -0.25$ $p = 0.028$), and baby dissatisfaction ($r = -0.28$, $p = 0.012$) were associated with greater severity of perceived post-traumatic stress symptoms.

In addition, with regard to the antecedents of satisfaction, a Pearson correlation between the MCSRS and the infants' umbilical arterial pH and weight revealed a significant association between the self scale and the child's weight at birth ($r = -0.26$, $p = 0.010$). A Mann–Whitney's test did not indicate differences in satisfaction among

TABLE 1 Fit indices of the confirmatory factor analyses with the six-factor solutions ($n = 106$).

Model	χ^2	p	RMSEA	90% RMSEA	TLI	CFI
Original[12]	900.29	<0.001	0.084	0.075, 0.093	0.942	0.947
Previous Spanish adaptation[11]	894.16	<0.001	0.084	0.075, 0.093	0.942	0.948
Current study (modified from original)	827.86	<0.001	0.076	0.066, 0.085	0.953	0.957

TABLE 2 Item distribution of the six-factor solutions obtained in different samples.

	Original[12]	Spanish adaptation[11]	Current study
1. Your overall labor experience	F1	F1	F1
2. Your overall delivery experience	F1	F2	F1
3. Your level of participation in decision-making during labor	F2	F1	F1
4. Your level of participation in decision-making during delivery	F2	F2	F1
5. Your ability to manage your labor contractions	F2	F1	F2
6. Your level of comfort during labor	F2	F1	F1
7. Your level of comfort during delivery	F2	F2	F1
8. The control you had over your emotions during labor	F2	F1	F2
9. The control you had over your emotions during delivery	F2	F2	F2
10. The control you had over your actions during labor	F2	F1	F2
11. The control you had over your actions during delivery	F2	F2	F2
12. Your partner's help and support during labor	F3	F3	F3
13. Your partner's help and support during delivery	F3	F3	F3
14. Your baby's physical condition at birth	F4	F4	F4
15. The amount of time that passed before you first held your baby	F4	F4	F4
16. The amount of time that passed before you first fed your baby	F4	F4	F4
17. The physical care you received from the nursing staff during labor and delivery	F5	F5	F5
18. The physical care you received from the medical staff during labor and delivery	F6	F6	F6
19. The technical knowledge, ability, and competence of the nursing staff in labor and delivery	F5	F5	F5
20. The technical knowledge, ability, and competence of the medical staff in labor and delivery	F6	F6	F6
21. The amount of explanation or information received from the nursing staff in labor and delivery	F5	F5	F5
22. The amount of explanation or information received from the medical staff in labor and delivery	F6	F6	F6
23. The personal interest and attention given to you by the nursing staff in labor and delivery	F5	F5	F5
24. The personal interest and attention given to you by the medical staff in labor and delivery	F6	F6	F6
25. The help and support with breathing and relaxation you received from the nursing staff in labor and delivery	F5	F5	F5
26. The help and support with breathing and relaxation you received from the medical staff in labor and delivery	F6	F6	F6
27. The amount of time the nurses spent with you during labor	F5	F5	F5
28. The amount of time the doctors spent with you during labor	F6	F6	F6
29. The attitude of nurses in labor and delivery	F5	F5	F5
30. The attitude of physicians in labor and delivery	F6	F6	F6
31. The nursing staff's sensitivity to your needs during labor and delivery	F5	F5	F5
32. The medical staff's sensitivity to your needs during labor and delivery	F6	F6	F6
33. Overall, the care you received during labor and delivery	F5	F5/F6	F5
34. Overall, how satisfied or dissatisfied are you with your childbirth experience?	F1	F2	F1

Note: F1, Overall; F2, Self; F3, Partner; F4, Baby; F5, Nurse; F6, Physician.

TABLE 3 Means, standard deviations, and intercorrelations among MCSRS subscales ($n = 106$).

	Mean (SD)	Self	Partner	Baby	Nurse	Physician
Overall	30.22 (6.41)	0.64***	0.22*	0.42***	0.56***	0.62***
Self	18.95 (3.85)		0.29**	0.36***	0.42***	0.42***
Partner	9.07 (1.34)			0.38***	0.29**	0.19*
Baby	13.44 (2.14)				0.33***	0.24*
Nurse	38.99 (6.56)					0.65***
Physician	33.42 (6.14)					

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$.

TABLE 4 Sources of concurrent construct validity evidence of the MCSRS (rows) in relation to the Women's View of Birth Labor Satisfaction Questionnaire (columns) ($n = 106$).

	Professionals	Expectations	Home	Holding baby	Partner	Pain	Continuity	Environment	Overall
Overall	0.47***	0.66***	0.24*	0.35***	0.15	0.34***	0.32***	0.42***	0.47***
Self	0.37***	0.52***	0.16	0.30**	0.18	0.43***	0.26**	0.24*	0.35***
Partner	0.28**	0.21*	0.15	0.22*	0.43***	0.17	0.22*	0.29**	0.14
Baby	0.24*	0.35***	0.14	0.62***	0.13	0.10	0.22*	0.30**	0.28**
Nurse	0.61***	0.33***	0.12	0.04	0.08	0.24*	0.38***	0.32***	0.56***
Physician	0.57***	0.35***	0.17	0.10	0.06	0.30**	0.29**	0.34***	0.53***

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$.

TABLE 5 Sources of criterion validity evidence of the MCSRS in relation to antecedents (pain) and consequences (post-traumatic stress symptoms) of satisfaction.

	Antecedents			Consequences
	Pain during labor ($n = 102$)	Pain during delivery ($n = 101$)	Pain after birth ($n = 104$)	Post-traumatic stress symptoms ($n = 74$)
Overall	−0.08	−0.18	−0.33***	−0.25*
Self	−0.21*	−0.22*	−0.25**	−0.25*
Partner	−0.03	0.05	−0.13	−0.05
Baby	0.02	−0.05	−0.32***	−0.28*
Nurse	−0.25*	−0.12	−0.22*	−0.16
Physician	−0.22*	−0.17	−0.24*	−0.21

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$.

those who received epidural or other types of anesthesia. Women who had a spontaneous vaginal birth were more satisfied (Baby, Overall, Physician, and Partner scales, all $p < 0.05$).

4 | DISCUSSION

In this study, we aimed to examine evidence for the psychometric properties of the MCSRS, a frequently used measure of women's childbirth satisfaction for which inconsistent factor solutions have been obtained across investigations. Specifically, we investigated the scale's internal structure and sources of validity evidence. In contrast to the majority of previous research with the MCSRS,[8] in the present study, we tested the fit of the original factor solution proposed by Goodman et al.[12] by means of a confirmatory analysis as opposed to conducting an exploratory analysis, because the latter has been shown to lead to very diverse and unreliable factor solutions and item distributions.[10–13] Overall, our results are consistent with past research in suggesting that the original factor solution is not be the most reliable, which might explain why so many different factor structures have been reported across the different scale validations when conducting exploratory analyses. Importantly, however, a key contribution of this investigation was that, by changing the factor assigned to four items from the original

structure, the model fit was excellent without challenging the content validity of the questionnaire (see Table 2). In addition, the analyses of sources of validity evidence supported the construct and criterion validity of the proposed factor structure of the MCSRS.

While examining the factor structure using an exploratory approach is common (usually when there is no clear hypothesis on how items will be distributed or when there is no previous research exploring the factor structure of an instrument), in exploratory analyses, the number of factors extracted and the distribution of items are largely determined by the data and the interpretation of the factors. This process is problematic, especially when there are expectations about what the structure of the instrument should be and when different studies yield very different solutions, such as the case with the MCSRS.[8] The most ambitious attempt to overcome this problem in the MCSRS was the recent Spanish adaptation of the instrument.[11] In the aforementioned study, the authors obtained several acceptable factor structures with exploratory analyses (from 2 to 6 factors). Then, their confirmatory analyses suggested that the five- and six-factor solutions were the most adequate and revealed a poorer fit of the original factor solution proposed by Goodman et al.[12] As seen in Table 2, however, this proposed solution significantly differs from the original model (on seven items) and includes a cross-loading in item 33 ("Overall, the care you received during labor and delivery"), which is concerning. In addition, because of the large number of changes in item distribution, the "self" and "overall satisfaction" scales had to be renamed to "labor" and "delivery," thus affecting the interpretation of the instrument.

A contribution of the present investigation is the exploration of modification indices, which revealed that, by changing the distribution of only four items from the original factor structure of the MCSRS, the instrument obtained a very good fit. Also, importantly, the face validity of the instrument (content adequacy of items into factors) was not negatively influenced by these changes, and the factor names could be retained. Note that the affected items "Your level of participation in decision-making during labor," "Your level of participation in decision-making during delivery," "Your level of comfort during labor," and "Your level of comfort during delivery," which were originally expected to refer to the "self" subscale, can indeed be interpreted as belonging to the "overall labor and delivery satisfaction".

An additional strength of the present investigation was the inclusion of an analysis of the sources of construct and criterion validity evidence of the MCSRS. In relation to the former, the associations obtained with the Women's View of Birth Labor Satisfaction Questionnaire support the construct validity of the proposed factor solution in the current study. Specifically, the highest correlations among subscales were obtained when comparing subscales that evaluated an arguably comparable construct (e.g., "baby" and "holding baby"; "nurse," "physicians," and "professionals"; and "partner" and "partner").

In addition to sources of construct validity, sources of criterion validity were also investigated, which again is infrequent in studies exploring the psychometric validity of the MCSRS but is a recommended practice in research and clinical settings.[28] The inclusion of measures of childbirth satisfaction is important because the experience of care is known to influence outcomes in both the birthing person and the baby.[12] In this sense, our findings are consistent with past research showing that maternal childbirth dissatisfaction is associated with poorer outcomes, particularly childbirth-related post-traumatic stress symptoms.[17,29,30] Specifically, our findings suggest that organizations and professionals should pay special attention to the "overall," the "self," and the "baby" satisfaction of the mother in the prevention of post-traumatic stress symptoms. In addition, and also consistent with past research, our analyses support the idea that labor antecedents of maternal satisfaction exist.[4] According to our findings and those of past research,[31–34] pain during labor and, most importantly, pain after birth should be a major focus of interest in order to minimize dissatisfaction in the birthing person. Pain during delivery, however, was less strongly associated with satisfaction, which is consistent with previous findings in the literature.[35] It is possible that pain during delivery is better tolerated either because the mother is under the effect of analgesia (those who receive analgesia), because the body protects the mother during an intense pain experience, or because the reward of delivery is imminent.[36,37] While the exact reasons for the findings are merely speculative at this stage, the results obtained are important as they can guide best practices in real-life clinical settings and indicate the most critical outcomes to consider when attempting to maximize maternal satisfaction.

Our study has several limitations. First, the sample size was relatively small due to sample loss, which is frequent in prospective research.[38] In particular, replication of validity studies is recommended when the sample size is below 300.[39] Therefore, we encourage researchers to test the reliability of the proposed factor solution in larger samples in Spain and cross-culturally. We recommend replication of the procedures implemented in this study (e.g., a confirmatory factor analysis to test an a priori factor structure), as well as adherence to guidelines for questionnaire validation.[40] In addition, all data were obtained episodically and from self-reports only. Despite this

approach being a frequent practice in health research, repeated assessment using multiple sources of information (e.g., wearable devices) has been argued to provide more accurate and complete information about the status of individuals, especially in prospective studies.[41]

Despite these limitations, this study represents an important step forward in the direction of assessing childbirth satisfaction and the experience of care. Importantly, sources of construct validity and criterion validity were investigated, and both support the psychometric soundness of the proposed adaptation of the original factor structure proposed by Goodman et al.[12] We encourage researchers to replicate this factor structure as well as to explore sources of validity evidence that provide furthermore support when exploring the factor structure of this and other scales. Obtaining robust, psychometrically sound, and replicable factor structures is key because this ultimately affects how instruments are corrected and interpreted, thus guiding clinical decisions that impact experiences of care. The rigorous evaluation of childbirth satisfaction should also inform decisions at the organizational level, help to reduce litigation problems associated with malpractice, and enable the high quality maternal and newborn care,[1] that should be the right of all people everywhere.

CONFLICT OF INTEREST STATEMENT
None declared.

DATA AVAILABILITY STATEMENT
Data available on request from the authors.

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