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How to cite:

Oates, John; Gervai, Judit; Danis, Ildiko; Lakatos, Krisztina and Davies, John (2018). Validation of the Mothers' Object Relations Scales Short-form (MORS-SF). *Journal of Prenatal and Perinatal Psychology and Health*, 33(1) pp. 38–50.

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Version: Accepted Manuscript

Link(s) to article on publisher's website:

<https://birthpsychology.com/journal/article/validation-mothers%E2%80%99-object-relations-scales-short-form-mors-sf>

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## **Validation of the Mothers' Object Relations Scales Short-form (MORS-SF)**

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### **Abstract**

A 14-item questionnaire, MORS-SF, was developed in a previous study to assess mothers' representations of their infants. It was found to have good psychometric properties, being sufficiently reliable and internally valid to enable the further validation of the instrument with additional independently collected datasets. This paper reports the successful validation of MORS-SF against other measures in both the original Hungarian and British samples and also in new samples in both countries, showing predicted relationships with other measures in the original and the independent validation datasets. It is concluded that this is a valid tool, with uses in research and health practice.

**KEYWORDS:** MORS-SF, mothers' object relations, validation, perinatal screening

## **Introduction**

In a previous set of studies (Danis et al., 2014) a 14-item short-form was derived from an initial 44-item questionnaire to assess mothers' models of their infants on two axes; the emotional warmth-coldness and the invasion-withdrawal of the infant towards the mother. This short-form, MORS-SF, was found to have good psychometric properties and to have good face validity for measuring mothers' representations of their infants' relation to them. Because of the potential of this instrument for use in research and health care, a series of further validation studies was carried out.

To examine the generalisability of the scales and to improve the comprehensiveness of the validity study, two new datasets were collected independently, one in Great Britain and one in Hungary, containing responses to the short form items and data on other related measures.

One aspect of the validation was concerned with concurrent validation, in which other measures of mothers' perceptions of their infants were used to assess the construct validity of the scales. In addition, associations were examined with measures of maternal states of mind that would theoretically be predicted to bear a relation to mothers' working models of their infants, and the relation between mothers' and fathers' scores were examined. The other aspect, the stability of the scales' measurements over time, was assessed by the use of age-to-age correlations.

## **Validity hypotheses**

### ***Concurrent validity***

If the two MORS-SF axes provide valid measures of mothers' models of their infants these axes would be expected to show associations with other measures of mothers' perceptions of their infants' temperaments, and with measures of mothers' mental states that might, on the basis of other evidence, confidently be predicted to affect the ways in which they interpret and describe their infants' behaviour.

### ***Temperament***

Measures of infant temperament that rely on maternal report clearly bear some relation to objectively verifiable observations of infants, for example where frequencies of crying or other

behaviours are concerned, but they also involve an element of interpretation and selection by the mother (Anonymous). Thus, it was predicted that concurrent maternal reports of infant temperament would show predictable moderate associations with the MORS-SF scales. It was predicted that temperament variables concerned with infants' irritability and difficulty would be associated with the Invasion axis, so that mothers reporting that their infants are irritable or hard to soothe would also be likely to return elevated Invasion scores. It was further expected that mothers who report their infants' temperaments to be easy and predictable would be less likely to see their infants as invasive. Variables to do with aspects of temperament involving infant expression of affect were expected to be associated with the Warmth axis, such that mothers reporting more positive emotions being shown by their infants would also return elevated Warmth scores.

### ***Maternal mental states***

Depression in the postnatal period has been shown to have a significant impact on mothers' behaviour towards their infants and to affect how they view their infants (e.g. Field et al. 1993; Murray et al. 1993). Given the heightened anxiety and concern for self that is commonly associated with depression, it was expected that mothers with symptoms of depression and anxiety would be more likely to experience their infants as disruptive and invasive, reflected in higher scores on the Invasion axis of MORS-SF. Given the lowered mood of depressed mothers and their tendency to rate their infants as having lowered mood compared with ratings by independent observers (Field et al., 1993), it was further expected that mothers with depressive symptoms would be more likely to return lowered Warmth scores. It was in addition predicted that mothers who feel confident in their care of their infants would be less likely to perceive their infants as invasive and more likely to see their infants as having warm feelings towards them. It was predicted that mothers who have heightened levels of worries, anxiety and perceived difficulties in their lives, and who experience high levels of stress and fatigue, would also be more likely to feel that their infants are invasive.

### ***Maternal and paternal representations***

If the theoretical basis of the MORS is valid, that mothers' representations of their infants are not purely based on objective characteristics of their infants but also involve projected content,

substantial variation would be expected between mothers' scores and scores given by other caregivers of the same infants. This would arise because these other persons' representations would be likely to contain different projections even where the same infant is the focus. On this basis, it was predicted that fathers' MORS-SF axis scores, taken contemporaneously, would only show moderate to low correlations with the mothers' scores.

### ***Concurrent predictive validity***

A mother's working model of her infant can be expected to affect how she describes their relationship and how she behaves toward her infant. In particular, if she feels her baby to be especially invasive, she could be expected to evaluate the relationship in terms that are more negative and to show more distancing and rejecting behaviours towards her infant's social approaches, as a defensive response.

It might be predicted that if a mother feels that her baby lacks emotional warmth towards her, she may be less likely to experience the relationship as emotionally positive and less likely to behave in emotionally warm ways herself. However, it would also be feasible to predict that some mothers who perceive their infants as lacking in emotional warmth towards them might consequently increase their own positive emotional behaviour in the hope of evoking greater warmth from their infants. Hence there are competing, contradictory predictions regarding the behavioural correlates of low MORS-SF Warmth scores, so a statistical analysis of these relationships must remain exploratory.

### ***Age-to-age stability***

While it might be expected that mothers' working models of their infants will undergo significant changes during the first year of the infant's life, it could also be expected that some underlying consistencies will remain, in terms of enduring biases towards more negative or more positive representations of their infants' feelings and behaviour towards them. On this basis, it can be predicted that moderate age-to-age correlations would be found for both of the MORS-SF axes. Before presenting the results of testing these hypotheses, the details of the validation samples and the measures employed are given.

## **Participant Samples**

### ***Hungarian original sample (HO)***

This validation was based on a sample of 97 first-time mothers from the 134 mothers who provided the Hungarian dataset for the development of the MORS-SF. Data were collected for this sample from both mothers and fathers when the infants were aged six months (these data were used for developing the original instrument) and again when they were aged 12 months (Anonymous), and MORS-SF axis scores were calculated from the short form subset of items in the MORS questionnaire.

### ***British original sample (BO)***

This was the sample of 100 mothers that provided the British dataset for the development of the MORS. Data for this sample were collected between infant ages of two and six months. A subset of 34 mothers in this sample also provided validation data, collected concurrently at infant ages of four months. MORS-SF axis scores were calculated from the subset of 14 items in the MORS 44-item questionnaire.

### ***British validation sample (BV)***

This was an independent study of a new sample of 211 mothers, 117 of whom were primiparous and 94 were multiparous, 207 were white Caucasian and four were Black Afro-Caribbean. This was a community sample with no significant physical health impairments. MORS-SF and validation data were collected from this sample when the infants were aged six weeks.

### ***Hungarian validation sample (HV)***

This was an independent study of a new sample of 78 primiparous mothers, who were all white Caucasian. This was also a low-risk community sample with no significant health impairments. MORS data were collected from this sample when the infants were aged three months and MORS-SF axis scores were calculated from the SF subset of items in the MORS 44-item questionnaire. Validation data were collected concurrently, and also at two weeks infant age.

## **Validation Measures**

The validation studies set out to examine a series of predicted relationships between the two axes in the MORS-SF and mothers' mental states and reports of their infants' temperaments. These were designed to address the range of validity parameters discussed above. The codes in parentheses refer to the samples for which data from these measures were available.

### ***Infant temperament***

All of the following are based on maternal report, hence they contain both subjective and objective components.

(HO) Crying/fussing diary (St. James-Roberts, Conroy & Hurry, 1997): the incidence of infant crying and fussing was logged by mothers on a 24-hour time sheet at 15 minutes intervals on three consecutive days, at six weeks infant age and again at six months infant age. A repeated-measures ANOVA did not show significant differences across days, so total daily crying and fussing were averaged.

(HO, HV) Mother and Baby Scales (MABS; Wolke and St. James-Roberts, 1987): questionnaires were completed by mothers on three consecutive days and on the third day, global items were also completed. MABS was administered at six weeks infant age and again at six months for HO, and at two weeks for HV. For the present purposes only global scale scores (Easy and Regular scales) were used.

(HO) Infant Behavior Questionnaire (IBQ; Rothbart, 1981): this was completed by mothers at six and nine months infant age, based on one week of observation. For the present purposes, five scales were used: Activity, Distress to Limitation (Anger), Distress and Latency to Approach Sudden and Novel Stimuli (Fear), Duration of Orientation and Smiling/Laughter. (Note: the six-month data were not gathered from the complete sample, but covered more than 70% of cases.)

(BV) Infant Characteristics Questionnaire (ICQ; Bates, Freeland & Lounsbury, 1979) a 24-item questionnaire for maternal completion, administered at six weeks infant age, comprising four subscales: Fussy/Difficult, Unadaptable, Dull, and Unpredictable.

(HV) Temperament Adjective Triad Assessment (TATA; Seifer, Sameroff, Barret & Krafchuk, 1995): five subscales (Mood, Approach, Activity, Intensity, Distractibility) completed

by mothers for three situations, free interaction with mother, baby alone and caretaking, and data were collected concurrently at three months. All subscales were highly intercorrelated ( $r = 0.51-0.76$ ) across situations, except Distractibility.

### ***Mothers' mental states***

Several different measures of mothers' mental states were taken as follows:

(BO) General Health Questionnaire (short-form) (GHQ-12; Goldberg & Williams, 1988): a measure of maternal mental health, the sum score assessing a composite of general hedonic tone, the presence of symptoms of depression and anxiety, and sleep disturbance over the previous four weeks.

(BV, HO) Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden & Sagovsky, 1987): a ten-item instrument for maternal completion, which provides a sum score indicating the level of depressive symptoms reported. This instrument captures an element of maternal anxiety as well as depressed mood.

(HO) Irritability, Depression, Anxiety Scale (IDAS; Snaith, Constantopoulos, Jardine & McGuffin, 1978): ten items tapping into anxiety and depression. Combined anxiety/depression scale scores were derived by summing the item scores.

(HO, HV) The Mother and Baby Scales (MABS) contain a 'Global Confidence' scale that assesses a mother's confidence in caring for her infant.

(HO) Cambridge Worry Scale (CWS; Green, Kafetsios, Statham & Snowdon, 2003): a 16-item questionnaire in which mothers rate how much they worry about various aspects of life, ranging from housing and finances to getting pregnant again and caring adequately for their infant. The items were scored on five-point Likert scales and a single mean score was used in the analyses.

(HO) Fatigue: a single rating scale on mother's level of fatigue perceived as caused by childcare.



## Results

### *MORS-SF axis score distributions and Cronbach alphas*

For the BO dataset, the MORS-SF Warmth axis mean score was 29.0 (SD = 3.7) and for Invasion, 11.3 (SD = 4.3). For the HO dataset, the Warmth score mean was 28.8 (SD = 3.3) and for Invasion, 7.8 (SD = 4.0). In the BV sample (BV), the MORS-SF Warmth axis mean score was 19.0 (SD = 6.0) and for Invasion, 7.8 (SD = 5.2). In the HV sample, the Warmth score mean was 28.4 (SD = 3.8) and for Invasion, 7.8 (SD = 3.9). Cronbach alphas were .75 for Warmth and .81 for Invasion in the British sample and .79 and .71 respectively in the Hungarian sample. The mean Warmth score in the BV sample was significantly lower than in the BO sample. The reasons for this are not entirely clear, but the sample did include mothers with depression, and, as the results reported below show, Warmth scores do appear to be lowered by maternal depression.

### *Relations with measures of infant temperament*

As predicted, in the HO sample, MORS-SF Invasion scores were positively correlated with concurrent daily Crying/fussing time (Pearson's  $r = .42$ ,  $p < .001$ ) at six months infant age and with Crying/fussing time at six weeks (Pearson's  $r = .35$ ,  $p < .001$ ). [Note: all subsequent reported correlations are also Pearson's coefficients.] Crying/fussing time for six-week-old infants correlated negatively with MORS-SF Warmth scores at six months ( $r = -.28$ ,  $p < .01$ ) but the correlation of Warmth with concurrent Crying/fussing time, although in the expected direction, was below a significant level ( $r = -.21$ ,  $p < .062$ ).

In the HO sample, the Warmth and Invasion axes of MORS-SF were, as expected, both significantly correlated with the MABS score, Global Easy, that collects a maternal assessment of how easy her infant is to care for, both for the concurrent measures at six months (Warmth,  $r = .22$ ,  $p < .05$ ; Invasion,  $r = -.51$ ,  $p < .001$ ) and for the score on Global Easy collected at six weeks (Warmth,  $r = .35$ ,  $p < .001$ ; Invasion,  $r = -.25$ ,  $p < .025$ ). In the HV sample, Invasion scores at three months were negatively correlated with Global Easy ( $r = -.33$ ,  $p < .003$ ) ratings at two weeks infant age.

Infants in the HO sample who were rated by their mothers on the Global Regular scale of MABS as more consistent in their behaviour at six weeks were also rated as less invasive at six

months ( $r = -.34, p < .001$ ). In the HV sample, infants who were rated by their mothers as more invasive at three months also tended to have been rated as more irregular and unsettled in the MABS at two weeks of age ( $r = .37, p < .001$ ). In the HV sample, infants globally rated at two weeks after birth as more alert were also more likely to be perceived as warmer on the MORS-SF Warmth axis at three months ( $r = .51, p < .001$ ).

MORS-SF Warmth scores at six months were positively correlated, in the HO sample, with IBQ Orientation measures taken concurrently ( $r = .38, p < .002$ ) and at nine months ( $r = .26, p < .019$ ). These Warmth scores were also positively correlated with the IBQ Smiling/laughter ratings taken at nine months ( $r = .36, p < .001$ ). The IBQ Smiling/laughter rating at nine months correlated negatively with the Invasion score ( $r = -.26, p < .019$ ). Mothers who rated their infants at six months as more invasive also tended to rate them at nine months on the IBQ scales as showing more anger (Distress to Limitations) ( $r = .31, p < .006$ ) and as being more active ( $r = .27, p < .014$ ).

In the HV sample, mothers who gave more positive ratings on TATA of their infants' mood when alone were less likely to rate them as invasive ( $r = -.40, p < .001$ ). Mothers who rated their infants as having more positive mood in the caretaking situation on TATA also rated their infants as less invasive ( $r = -.29, p < .012$ ).

In the BV sample, all four dimensions of the ICQ temperament scales, Unadaptable, Dull, Fussy/Difficult and Unpredictable, were significantly correlated with both the Warmth and Invasion axes of the MORS-SF in the predicted directions. Mothers rating their infants as relatively unadaptable were more likely to give high Invasion and low Warmth scores on MORS-SF (Invasion,  $r = .23, p < .001$ ; Warmth,  $r = -.23, p < .001$ ). Where mothers rated their infants as relatively dull, they were also likely to rate them as invasive and lacking in warmth (Invasion,  $r = .29, p < .001$ ; Warmth,  $r = -.34, p < .001$ ). Where infants were seen as relatively fussy or difficult, they were also more likely to be seen as more invasive and low in warmth (Invasion,  $r = .50, p < .001$ ; Warmth,  $r = -.26, p < .001$ ). Mothers who reported their babies to be unpredictable also saw them as more highly invasive and lower in warmth (Invasion,  $r = .38, p < .001$ ; Warmth,  $r = -.20, p < .004$ ).

### ***Mothers' mental states***

EPDS scores for the HO sample were collected at infant age of six weeks and MORS scores were collected at infant age of six months. For the original British sample, GHQ-12 and MORS data were collected concurrently when the infants were aged four months, and for the BV sample, GHQ-12 and MORS-SF data were collected when they were aged six weeks. As predicted, in all three samples there were consistently positive correlations between the EPDS or GHQ-12 scores and the MORS-SF Invasion scores. Mothers reporting higher incidences of depression and anxiety symptoms tended to also report their infants as being more invasive. For HO (EPDS),  $r = .35$ ,  $p < .001$ ; for BO (GHQ-12),  $r = .33$ ,  $p < .04$ , for BV (EPDS),  $r = .42$ ,  $p > .001$ .

Concurrent measures in the HO sample of maternal anxiety/depression (IDAS) and MORS-SF Invasion gathered at six months infant age were positively correlated ( $r = .38$ ,  $p < .005$ ), further supporting the predicted association of anxiety and depression with heightened maternal perceptions of infant invasiveness. The predicted negative relationship between depression/anxiety and MORS Warmth was not consistently supported; no significant correlations were found in three of the four samples. A negative correlation was however found in the BV sample ( $r = -.21$ ,  $p < .003$ ).

MABS scores on the maternal Global Confidence scale were collected at infant age six weeks and six months for the HO sample and at two weeks and six weeks infant age for the independent Hungarian validation sample HV. As predicted, in both samples, mothers who rated themselves as more confident in the care of their infants tended to perceive their infants as less invasive. At six months infant age, in the HO sample, concurrent MABS Global Confidence and MORS-SF Invasion scores were significantly negatively correlated ( $r = -.41$ ,  $p < .001$ ). In this sample, Global Confidence as rated at six weeks infant age also showed a significant negative correlation with Invasion rated at six months ( $r = -.33$ ,  $p < .002$ ). For the HV sample, Global Confidence rated at two weeks showed a significant negative correlation with Invasion rated at three months ( $r = -.27$ ,  $p < .017$ ). We also found the predicted relationship between Global Confidence and perceived infant warmth in the HO sample concurrently at six months ( $r = .22$ ,  $p < .056$ ), and with the prior Global Confidence rating at six weeks ( $r = .29$ ,  $p < .008$ ). As expected, mothers in the HO sample who at six months reported higher levels of worries and perceived difficulties, at the same time also saw their infants as more invasive ( $r = .20$ ,  $p < .047$ ).

Also as expected, mothers reporting high levels of fatigue at six months tended to give concurrent elevated Invasion scores on MORS-SF ( $r = .47, p < .001$ ).

### ***Mothers' and fathers' representations***

As predicted, in the HO sample, at infant age six months, mothers' and fathers' MORS-SF Invasion and Warmth scores were not highly correlated (Invasion  $r = .30, p < .05$ ; Warmth  $r = .23, p < .05$ ). Correlations remained low at infant age 12 months (Invasion  $r = .21, p < .05$ ; Warmth  $r = .33, p < .05$ ).

### ***Age-to-age stability***

For the HO sample, MORS-SF axis scores showed consistent age-to-age stability over a six-month period from infant age six months to 12 months. Both the Invasion and Warmth axis scores were positively correlated. For Invasion,  $r = .63, p < .001$  and for Warmth,  $r = .61, p < .001$ .

## **Discussion**

The most striking general finding to emerge from these results is the robust and stable nature of the MORS-SF psychometric performance. Considering the differences between the samples, and the fact that the results are from both Britain and also from Hungary, there is notably high consistency across the two countries' datasets in the properties of the instrument as a measurement tool. Almost all of the predictions regarding relationships between MORS-SF axis scores and the other validation measures were supported, and they were found consistently in the different samples. The predictions regarding the Invasion axis were all supported, and support was found for most of the Warmth axis predictions. With respect to infant temperament, substantial support was found for the validity of MORS-SF as a meaningful measure of how infants are perceived by the mothers. Given the face validity of MORS-SF, this lends further weight to the view, supported by other research, that mothers' ratings of their infants' temperaments are not purely objective judgements, but also reflect mothers' own mental states and processes. The low correlations between mothers' and fathers' axis scores when their infants were six months old, which were also only weakly correlated when the infants were 12 months old, lend strong support to this validation of the theoretical basis of MORS-SF, especially taken

alongside the much higher age-to-age stability of the mothers' scores, and also of the fathers' scores.

The evidence from this set of studies is consistent that mothers who are stressed, anxious or depressed tend to experience their infants as more invasive, as shown by the MORS-SF. The consistency of the evidence across all the samples and the good theoretical basis for the relevant predictions strongly validates the Invasion axis as a real measure of a core representational component that is affected by a variety of external forces. This suggests that MORS-SF may be a simple and useful way of identifying a mother's response to external stressors and to anxiety and depression, particularly in respect to aspects of her working model of her infant, that may influence her behaviour in negative and possibly problematic ways for the infant's psychological well-being and healthy development.

The evidence regarding correlates of the Warmth axis, while supportive of the validity of the axis was not quite as strong and some correlations failed to reach significance. As briefly mentioned earlier in this paper, there are two different hypotheses that can be plausibly advanced regarding the Warmth scale and its potential relationships to other aspects of mothers' thoughts and feelings. On one hand, it might be expected that a mother who perceives her baby as lacking in emotional warmth towards her might, as a consequence, herself then feel less warmth for her infant. On the other hand, perceptions of low infant warmth might also be a stimulus for some mothers to increase their positive emotional behaviours towards their infants in the hope of thus evoking more warmth. Possibly some mothers might be predisposed to respond in the first mode, while others might have a predisposition to respond in the second mode. Nevertheless, the strong face validity of this axis, its internal consistency and the existence of several correlations as predicted, suggest that it does tap into a mother's model of her infant's emotional stance towards her. A low score on this axis might be taken as indicating a potential impediment to a mother being able to relate in emotionally warm ways towards her infant, but an assessment would also need to be made of the mother's capacity to rise to this challenge and to behave in adequately warm ways towards her infant.

As a research instrument, MORS-SF is shown by these findings to possess the necessary psychometric properties to be used as a measure of mothers' internal working models of their infants, enabling more investigations to be conducted into the influences on these models, as well as their consequences for mothers' behaviour, infants' responses and longer term relationship

and child development outcomes. It also offers a unique tool for exploring further the complex relations between infant temperament, as a biologically based set of predispositions, and mothers' perceptions of the qualities of their infants.

These findings also validate the theoretical basis of the scales. They give further support to the view that mothers' perceptions of their infants' feelings and thoughts, that is, their working models of their infants, are not solely derived from objective, independently observable characteristics of infants, but are also products of mothers' own psychological processes, bearing a relation to their levels of stress, anxiety and depression.

Because the results are consistent for data relating to infants aged from 6 weeks to 12 months, using MORS-SF across this age range is indicated as being appropriate. The axes make intuitive sense to the non-specialist and interpreting individual profiles should not require a great deal of prior preparation. Thus, these scales have a potential value for screening purposes as well as affording opportunities for health workers to open discussions with mothers about potential areas of difficulty in their relationships with their infants. It is expected that these scales may be useful in identifying cases where psychotherapy might be able to address sources of distorted interpretations of infant behaviour. For such uses, evidence of the sensitivity and specificity of the scales will need to be collected along with normative data from community populations. A study in a British primary care trust, with health visitors using MORS-SF as a component in a care pathway scheme, has been under way for more than a year at the time of completing this paper.

## **Conclusions**

The findings of these studies offer strong support for the use of the MORS-SF in primary care as a non-threatening screening tool, which is easy to administer and score, to indicate potential difficulties in mother-infant relationships during the first 12 months post-partum. It may be of value in decision-making about the deployment of appropriate supportive or therapeutic interventions, and in tracking response to treatment. MORS-SF is also a unique instrument for researchers wishing to examine the influences on mothers' internal working models of their infants and the ways in which these models influence maternal behaviour and infant development.

## Acknowledgements

Anonymous

## Note

Copies of the MORS-SF formatted as an A5 self-completion booklet entitled 'My Baby' are available in English, Hungarian, Polish and Simplified Chinese versions from the first two authors.

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*Validation of the MORS-SF*

(Eds), *Psychobiology and early development* (pp. 49-70), Amsterdam: North-Holland/Elsevier.