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Maternal sensitivity in interactions with their 2-month-old infants in Rio de Janeiro - Brazil

Ana Carla Lima Ribeiro-Accioly^a, Maria Lucia Seidl-de-Moura^a,
Deise Maria Leal Fernandes Mendes^a and Judi Mesman^b

^aGraduate School of Social Psychology, University of State of Rio de Janeiro, Rio de Janeiro, Brazil; ^bInstitute of Education and Child Studies, Leiden University, Leiden, the Netherlands

ABSTRACT

This paper reports on a study of maternal sensitivity in 22 primiparous women and their infants from Rio de Janeiro, Brazil. A semi-structured interview was conducted about sociodemographic risk, as and videotaped home observations to assess maternal sensitivity, and its relation with warmth, verbal and physical engagement, and camera awareness. A K-means cluster analysis was performed to examine patterns of risk in relation to maternal sensitivity. Compared to the 15 mothers with higher sensitivity scores, the seven mothers with lower sensitivity scores were characterized by lower educational levels, lower income, lower age, living in a slum, unplanned and unwanted pregnancies, and later onset of prenatal care. Whether father was resident did not appear to distinguish between the lower and higher sensitivity groups. The pattern of social-contextual risk for Brazilian mothers showing less sensitive caregiving to their infants provide a clear direction for future research in this cultural context.

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Rio de Janeiro city is the second largest municipality in Brazil with 6.3 million inhabitants. It is a tourist town, known for its natural beauty, including several beaches, mountains, and an urban forest. However, the city is also characterized by marked inequality, with wealthy neighborhoods co-existing with various slums (Instituto Brasileiro de Geografia e Estatística (Brazilian Institute of Geography and Statistics) [IBGE], 2012). In the urban slum areas, many infants are born to young single mothers who did not plan to have the baby (Aquino et al., 2003). These circumstances are known to pose a risk for compromised sensitive responsiveness (e.g. Mesman, van IJzendoorn, & Bakermans-Kranenburg, 2012), but these associations between risk and sensitivity have rarely been researched outside of the Western world, and hardly ever in the Latin American context. The aim of the current study is to examine social-contextual risk factors in relation to maternal sensitivity in Rio de Janeiro, Brazil.

Attachment theory emphasizes the importance of secure mother-child relationships fostered by sensitive caregiving for children's healthy social-emotional development (Thompson, 2016). As described by Ainsworth and colleagues (1974), insensitive caregivers can often be described as being preoccupied with their own point of view rather than being

CONTACT Ana Carla Lima Ribeiro-Accioly  anacarlaraccioly@yahoo.com.br

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responsive to the child's needs. In turn, the ability to take the child's point of view and respond sensitively to their needs is often compromised through worries and stress, for example caused by socioeconomic or other personal difficulties (Kim, Capristano, & Congleton, 2016; Mesman et al., 2012; Neuhauser, 2018). Such difficulties are more common in economically deprived communities where various risk factors that can cause stress and a lack of responsiveness to children are important to consider when trying to understand individual variations in sensitivity.

In Brazil, several socio-economic and family risk factors are quite common in urban areas, including low education and income levels (Silva, Le Pendu, Pontes, & Dubois, 2002), young motherhood (19–21 years depending on educational level; IBGE, 2015), and single motherhood (54.4% without a resident father in urban Brazil; IBGE, 2017). Further, because of limited access to birth control and the prohibition of abortion in the country, many women experience unplanned and unwanted pregnancies (Leal & Gama, 2014; Theme-Filha et al., 2016). Further, unintended pregnancy is related to delayed prenatal care (Gipson, Koenig, & Hindin, 2008), which is indeed common in low-income mothers in Brazil as well (Viellas et al., 2014).

Studies show that Brazilian parents tend to favor the autonomous-related socialization model that combines parenting goals and values of interpersonal closeness and individual development (Seidl-de-Moura, Carvalho, & Vieira, 2013). Video observations have previously been used in Latin-American countries to assess maternal sensitivity, mostly conducted in Chile (e.g. Lecannelier, Kimelman, González, Nuñez, & Hoffmann, 2008; Quezada & Santelices, 2010), and Colombia (e.g. Ávila, Maldonado, Saldarriaga, Vega, & Díaz, 2004; Ortiz, Borré, Carrillo, & Gutiérrez, 2006). Importantly, Brazil has a different cultural background than other Latin-American countries due to its Portuguese rather than Spanish colonial history, which might hamper generalization from studies in other countries to the Brazilian context. The few observational studies of maternal sensitivity that have been done in Brazil were not conclusive as to the relation of risk factors such as social class, maternal age and educational level with maternal sensitivity. Some authors did not find significant differences effects (Alvarenga, Dazzani, Lordelo, Alfaya, & Piccinini, 2013; Becker & Piccinini, 2019; Ribas & Seidl-de-Moura, 2006), whereas another found that sensitive behaviors were less frequent among younger mothers of low socioeconomic (Silva et al., 2002).

Because there are so few video observation studies in Brazil, it is important to address the issue of whether this method is appropriate to measure sensitivity in this context, looking at mothers' responses to the camera and the feasibility of coding sensitivity from these videos. In addition, there is evidence that the behavioral manifestations of sensitivity are different depending on cultural context, shown through warmth, and verbal or physical interaction to varying extents (Mesman et al., 2018), and need to be examined to fully understand the nature of sensitivity and its links to risk factors and potential translation to intervention efforts.

The current study aims to investigate sensitivity of mothers from low-to-middle socioeconomic backgrounds in Rio de Janeiro, in the first few months of their first infants' lives, examining salient social-contextual factors. We focus on primiparous mothers because they represent an important target group for preventive interventions aimed at strengthening parenting from the earliest moment onwards to benefit all potential children in a family. The research questions are as follows: (1) Are home video observations an appropriate assessment

tool for maternal sensitivity in an urban Brazilian at-risk sample?, (2) What are the behavioral correlates of sensitivity in an urban Brazilian at-risk sample?, (3) How are sociodemographic risk factors related to maternal sensitivity an urban Brazilian at-risk sample?

Method

Sample

Twenty-two women and their firstborn infants participated in this study. Pregnant women were invited to participate in this research during contacts at the public maternity hospital where they had their prenatal care. Criteria for participation included having a healthy pregnancy from the fourth month of gestation, pregnancy with their first child, and receiving low-risk prenatal care. Eligible mothers were explained the study goals (i.e. to follow and understand the interaction between mother and the baby from pregnancy until two months old), and those who agreed to participate were asked to read and sign the Informed Consent Form. Mothers were not compensated for their participation in the study, because in Brazil the supply of some type of gift or money to research participants is prohibited by the Ethics and Research Committees. A total of 113 mothers completed the screening interview at the hospital, but only 22 ended up participating in the home visit due to not wanting to be filmed, changed phone numbers so that an appointment could not be made, medical problems, and logistic problems for the team to visit the families at home. In an at-risk sample like this one these are common recruitment issues. Comparison of the screening information for the participating group versus the non-participating group revealed no significant differences regarding maternal education level ($p = .15$), whether mother had a job ($p = .81$), whether she lived with the father ($p = .66$), whether the pregnancy was planned ($p = .53$) or wanted ($p = .76$), the onset of prenatal care ($p = .88$), or general wellbeing ($p = .33$). Participating mothers were only marginally older than non-participants ($p = .07$).

At the time of the home observations, all infants were 2 months old. This age was chosen to represent an early phase in mother-infant bonding, but not so early that the infant signals are minimal or unclear. At 2 months a variety of signals, including the social smile are generally clearly present. Mothers were 14 to 42 years old ($M = 26.73$; $SD = 7.91$), and six mothers (27%) were 21 years or younger at the time of the prenatal interview. In six cases (27%), father was not living with the mother and the infant. Six mothers (27%) had not finished high school, 11 finished no more than high school (50%), and five completed higher education (23%). Eight out of 22 mothers were in the low income bracket, the others were in the middle income class. With regard to pregnancy, 17 were unplanned (77%) and nine were unwanted (41%). Further, eight of the participants (36%) resided in poor areas or slums. Half the mothers (11) did not use prenatal care before 10 weeks of pregnancy.

Measures

The data collection consisted of (1) an interview conducted in the hospital on the same day of the first contact with participants to assess sociodemographic and pregnancy characteristics; (2) a home observation session to assess maternal sensitivity, warmth, verbal engagement, and physical contact in relation to the infant, as well as mothers' comfort with the camera.

Interview questions

During the interview, mothers were asked about their age, education, income, housing (slum vs non-slum), living arrangements when the baby was born (with father, with parents, alone, other), the use of prenatal care, whether the pregnancy was planned and wanted.

Home observations

The women who participated in the initial interview were followed by telephone contact and a home visit was scheduled. Naturalistic mother-infant interaction was video recorded for 15 minutes. All observations were conducted by the first author, and mothers were instructed that during the recording the researcher would not interact or ask questions. Mothers were completely free to interact with the child in whatever way they desired, in whatever part of the house she desired. They were asked to try to forget she was being recorded, and to interact with their child as they would do in their daily lives. The scales used to code the video materials are described in detail in the Introduction to this special issue, and summarized below.

Sensitivity was coded using the Ainsworth sensitivity scale (1–9), and scores were given for warmth (0–4), physical contact (0–2), verbal expression (0–2), and camera awareness (looking at camera, talking about being filmed, expressing insecurity about being filmed, each 0–2). The first author was trained in the use of the Ainsworth Sensitivity and Camera-Related Behavior scales by the last author, who is an experienced coder and trainer. To establish intercoder reliability, both coded a set of 15 videos of mother-infant interaction, yielding intraclass correlations of .85 for sensitivity. Intraclass correlations were $> .80$ for each of the Camera-Related behavior scales. The last author coded Warmth, Verbal and Physical interaction, for which intercoder reliability was established on 15 videos from varying countries with a team of three coders, yielding intraclass correlations of $> .70$ for all coder pairs on all scales.

Data analysis

The following analyses were conducted to answer the research questions. For the first research question (Are home video observations an appropriate assessment tool for maternal sensitivity in an urban Brazilian at-risk sample?), we provide descriptive statistics for the ‘camera-related behavior’ scales and the Ainsworth sensitivity scale scores, as well as their intercorrelations. For the second research question (What are the behavioral correlates of sensitivity in an urban Brazilian at-risk sample?), we provide correlations between the Ainsworth sensitivity scores and the scores on warmth, verbal, and physical interaction, as well as a description of the observed activities. To answer the third research question (How are sociodemographic risk factors related to maternal sensitivity in an urban Brazilian at-risk sample?), we provide correlations between all risk factors and the Ainsworth sensitivity scale, followed by a k-means cluster analyses to uncover constellations of risk factors that cluster with different levels of maternal sensitivity. We chose k-means cluster analysis because of the small sample size and the cross-sectional design, acknowledging that we can only provide information about patterns rather than a full predictive model.

Results

Regarding the first research question (appropriateness of video observations to assess sensitivity), the scores on the camera-related behavior scales showed that most mothers

did not look at the camera very often. Eight mothers talked once or twice about being filmed, often in response to the infant showing an interest in the camera, sometimes to inquire about the duration of the filming. Four mothers talked about the filming more than twice, in all cases they repeatedly asked the infant to smile at or talk to the camera. Only three women expressed insecurity about being filmed. These expressions all referred to questions about what they could or could not do while being filmed (generally about breastfeeding). The mean observed Ainsworth sensitivity score was 6.59 ($SD = 1.59$). Only two mothers scored in the insensitive range (both score 3), six in the adequate range (scores 5–6), and 14 in the high range (scores 7–9). Using a sum of the camera-related behavior scales reflecting total ‘camera-awareness’, we found no significant association with sensitivity ratings, $r(21) = -.06, p = .79$.

The second research question addresses the behavioral correlates of sensitivity in terms of warmth, and verbal and physical interaction. Mothers were generally high on warmth: 19 out of the 22 mothers scored a 3 or 4 reflecting (very) high warmth. Verbal interaction was mixed, with seven mothers talking very little to the child, seven talking off and on, and eight talking to the child frequently throughout the video. All mothers had frequent physical contact with their child, which is not surprising given the age of the infants. Seventeen mothers were in physical contact with the infant (almost) the entire time, and the five other mothers had their infants lying down in front of them or in a (push)chair for part of the video, while actively interacting with the infant. Verbal interaction was marginally related to sensitivity, $r(21) = .39, p = .07$, whereas warmth and physical interaction were not ($ps > .10$).

For the third research question about the association between maternal sensitivity and risk factors, [Table 1](#) shows prevalence of each risk factor, as well as the correlations between these risk factors and sensitivity. Because of the small sample size, few correlations were significant. Sensitivity was only significantly related to maternal income in that more sensitive mothers were less likely to have a low income. To assess patterns of risk factors that cluster with sensitivity in a way that is less hampered by the small sample size, a k-means cluster analysis was conducted of which the results are shown in [Table 2](#). The analysis reveal that compared to the 15 mothers with higher sensitivity scores (one with score 6, the others with scores 7–9), the seven mothers with lower sensitivity scores (two with score 3, three with score 5, and two with score 6) were characterized by lower educational levels, lower income, lower age, living in a slum, and unplanned and unwanted pregnancies, later onset of prenatal care, and not living with their parents. Whether father was resident did not appear to distinguish between the lower and higher sensitivity groups.

Discussion

This study yielded preliminary evidence that home video observations are an appropriate way of assessing maternal sensitivity in an urban Brazilian at-risk sample of primiparous mothers. First, mothers generally appeared quite comfortable with being videotaped, and mothers’ camera awareness was unrelated to her sensitivity scores. The general comfortableness with being filmed is consistent with the omnipresence of smartphones with cameras in this sample, and experiences with being filmed at important family festivities such as weddings in the Brazilian culture. Although most mothers appeared to be quite comfortable with the camera, there were also some mothers who were clearly very aware of the camera, and either tried to have their infant ‘perform’ in front of the camera, or expressing some insecurities about what

Table 1. Correlations between variables.

	1	2	3	4	5	6	7	8	9	% risk factor present (n)
1. Sensitivity	-									
2. Low education	-.36	-								27.3 (6)
3. Low income	-.47*	.17	-							36.4 (8)
4. Mother ≤ 21 years	-.36	.77*	.17	-						27.3 (6)
5. Non-resident father	-.10	-.15	.17	.08	-					27.3 (6)
6. Slum residence	-.28	.17	.02	-.04	.17	-				36.4 (8)
7. Unplanned pregnancy	-.07	.09	.18	.09	.09	.18	-			77.3 (17)
8. Unwanted pregnancy	-.08	.32	.14	.32	.11	.14	.45*	-		40.9 (9)
9. Late start prenatal care	-.38	.00	.38	.20	.41	-.19	.11	.09	-	50.0 (11)
10. Living with parents	-.17	.08	-.04	.31	.77*	.17	.09	.32	.41	27.3 (6)

Table 2. Results of K-Cluster analysis examining correlates of observed sensitivity.

	Cluster 1 (n = 7)	Cluster 2 (n = 15)
Sensitivity score	5	7
Low education	57%	13%
Low income	57%	27%
Mother ≤ 21 years	57%	13%
Non-resident father	29%	7%
Slum residence	43%	33%
Unplanned pregnancy	86%	73%
Unwanted pregnancy	57%	33%
Late start prenatal care	71%	40%
Living with parentes	43%	20%

Because all the sociodemographic variables were coded as 0 = no; 1 = yes, the averages of those variables in each cluster reflect percentages. For easier interpretation, these averages are reported as percentages.

they were allowed to do while being filmed. This is however also observed in some Western mothers, and there was no particular sociodemographic profile that seemed to explain these individual differences between mothers' camera awareness in the current sample. More explicit instructions about ignoring the camera, being allowed to breastfeed, and the importance of observing the infants even when they were not smiling or vocalizing might reduce this awareness in future studies. Filming for a longer period of time to make mothers more used to the camera might also be effective.

Despite the at-risk nature of the sample, most mothers showed at least adequate sensitivity, but with enough variation to (from score 3 to 9) to suggest that the videos managed to capture individual differences. Although the videos were relatively brief, the mothers generally engaged in activities that were rich in infant signals such as bathing, changing, and playing, during which varying aspects of (un)responsiveness could be observed, providing useful information for scoring sensitivity.

Regarding the behavioral correlates of sensitivity, we found that warmth and physical contact were unrelated to sensitivity levels, which could be due to the fact that almost all mothers showed quite high levels of warmth (i.e. there was little variation within the sample), and often held them throughout the videos, which fosters easy access and responsiveness to infant signals. The very young age of the infants (2 months) is also likely to have contributed to the high levels of physical contact. Further, there is likely to

have been some self-selection in the process of recruitment for the study, with mothers who are more aware of the importance of high-quality infant care and those enjoying their maternal role being more likely to participate. Higher levels of sensitivity were marginally related to higher levels of verbal expression. Sensitivity co-occurring with verbal expression suggests a more Western manifestation of responsiveness to infant signals, using words to respond to the infants which is less common in many non-Western (rural) settings. Sensitive mothers in this sample were indeed observed to verbally soothe the infants when they were fussy, provide 'subtitling' for the infant's behavior when it was engaged with an object, and to mimic the baby's vocalization, sometimes adding things like "what are you saying?" or 'yes, that's right'.

Less sensitive parenting clustered with the three factors relating to disadvantaged socioeconomic backgrounds (low education, low income, and slum residence), which is consistent with the theoretical and empirical literature (Conger & Donnellan, 2007). The fact that lower sensitivity clustered with not living with their parents probably also reflect socioeconomic circumstances: mothers with enough financial means can afford to move out and live on their own. Another important set of factors that clustered with less sensitive parenting related to issues of planned parenthood. Over three quarters of the participants were surprised by an unplanned pregnancy, and half reported explicitly that the baby was unwanted. Mothers with these characteristics were more likely to be in the cluster with lower sensitivity scores who also sought prenatal care later than those in the cluster with higher sensitivity scores and earlier prenatal care.

The combination of economic and family-planning challenges in large portions of urban areas such as Rio de Janeiro points to the importance of studying the processes explaining their occurrence as well as their impact from a family perspective. Our study showed that unplanned and unwanted pregnancies clustered with lower maternal sensitivity towards the infant, and there is evidence that such negative effects on the mother-child relationship can persist into adolescence (Barber, Axinn, & Thornton, 1999; Nelson & O'Brien, 2012). In addition, unintended pregnancies have been shown to predict parental relationship instability (Guzzo & Hayford, 2012), maternal depression (Suh, Ma, Dunaway, & Theall, 2016), and parenting stress (Claridge, 2017) which in turn are known risk factors for lower levels of sensitivity (Campbell, Matestic, von Stauffenberg, Mohan, & Kirchner, 2007; Goldstein, Diener, & Mangelsdorf, 1996; Leerkes & Crockenberg, 2002).

Thus, research specifically aimed at developing interventions with at-risk families regarding support for appropriate family planning is necessary for fostering sensitive parenting. It has been noted that simply improving access to family planning services is not always enough, as there are multiple complex reasons underlying unplanned pregnancies that also vary by country and region (Casterline & Sinding, 2000). Careful examination of context-specific obstacles to family planning (also known as 'unmet needs for family planning') is necessary to develop effective policies and interventions.

Interestingly, the associations between the various risk factors were generally low and non-significant. Despite sufficient variation within the sample, the three SES-related variables (education, income, slum residence) were not related to each other, which is consistent with observations of high sociodemographic diversity in slums and poor areas, often defying stereotypes (United Nations Human Settlements Programme – UN-Habitat, 2003). Thus, an educated mother could through family circumstances and demands not end up with a job and living in a slum, whereas another mother with little education but

a helpful family connection in a local business could still be able to provide some income and afford non-slum housing. Other risk factors were also mostly unrelated to each other, suggesting that it is worthwhile looking at each of them as a separate source of risk in specific families. The highest interrelations were found between (a) low maternal age and low education, likely because young mothers had not (yet) had the opportunity to finish an education, especially now that they have a baby; (b) non-resident father and living with parents, logically indicating that a mother lives with one or the other, which might also explain why father residence was not an important correlate of sensitivity; (c) unwanted and unplanned pregnancies; (d) living with parents and late prenatal care. The latter one is somewhat surprising, but it is possible that mothers only started living with their parents after the baby was born (or just before), and were still on their own when they first became pregnant, thus not having as close a link with parents who could have advised her to seek care.

The contribution of this study lies in the addition of a relatively new context to the body of literature on risk factors and observed sensitivity, given that such studies are very scarce and have to date yielded varying results. Although there is a larger Latin-American literature on observed sensitivity, those from other countries cannot simply be assumed to apply to Brazil that has a rather different cultural history than other countries in the region. The main limitations of the study are its small sample size, the exclusive focus on primiparous mothers, and the cross-sectional descriptive nature of the analyses regarding correlates of sensitivity (rather than predictive analyses). As such, the results need to be treated with caution. The vast majority of mothers who were interviewed for the screening declined to participate in the study once it became clear that home visits with filming were part of the procedure. This is a very common experience when recruiting families for observation research in all countries and regions, although non-response of this kind is rarely reported so that it is difficult to know whether a response rate of 20% as found in this study is high or low. Importantly however, the non-participants did not differ from the participants on any of the relevant characteristics that we could test with information from the screening interview. It appears that there are other factors than sociodemographic risk factors that determine participation in home visits. Personal differences in being comfortable with strangers in the house in general and filming in particular may be at play. Whether such characteristics also relate to different levels of sensitivity is an open question.

Regardless of some of these limitations, the use of naturalistic home observations is a great asset of the study, given that these are rarely used in research on parenting in Brazil. The value of the findings of the present study lies in its potential as groundwork for future studies in larger samples, addressing the precise nature of the social-contextual risk factors that have been identified as relevant for the understanding of individual variations in mothers' sensitivity towards their infants in a Latin American urban context. Such future studies can contribute to more robust knowledge on the mechanisms underlying the relation between parenting quality on the one hand and socioeconomic risk, planned parenthood issues on the other hand. This in turn can inform the development of (preventive) intervention programs aimed at fostering sensitive parenting, positive family functioning, and ultimately positive child development in urban Brazil and similar Latin-American locations. Broadening the literature to include such regions is crucial to a more culturally inclusive science of parenting and child development.

Disclosure statement

No potential conflict of interest was reported by the authors.

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