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Atenção conjunta em díades de mãe-bebê com e sem depressão pós-parto

Joint attention in postpartum depressed and non-depressed mother-child dyads

Atención conjunta en díadas madre-bebé con y sin depresión pós-parto

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RESUMO
Este estudo investigou a associação entre a DPP e a atenção conjunta nas interações mãe-bebê. Quarenta e quatro díades foram filmadas durante interações de brincadeiras livres. As díades de mães sem DPP se engajaram mais na atenção conjunta, com episódios mais longos. As mães que tiveram episódios de atenção conjunta tinham mais anos de escolaridade. Houve uma associação entre as díades de mães e meninos e a frequência da atenção conjunta. No entanto, as meninas olharam mais para suas mães e por mais tempo. Os achados sugerem que a atenção conjunta é influenciada pela DPP, associada à baixa escolaridade materna.

PALAVRAS-CHAVE:
Atenção conjunta; Interação visual, Interação mãe-bebê; Depressão pós-parto; Escala de depressão pós-parto de Edinburg.

ABSTRACT
The purpose of the current study was to examine associations between PPD and joint attention during mother-infant interactions. Forty-four dyads were videotaped during free play interactions. Non-PPD dyads engaged more in joint attention and their episodes lasted longer. The mothers who engaged in joint attention had more years of schooling. There was an association between mother-boys dyads and the frequency of joint attention. However, the girls looked more at their mothers and for a longer time. Findings suggested that joint attention is influenced by PPD associated with the mother's lower level of education.

KEYWORDS:
Joint attention; Visual interaction; Mother-baby interaction; Postpartum depression; Edinburg postnatal depression scale.

RESUMEN
Este estudio examinó las asociaciones entre la DPP y la atención conjunta entre la madre y el bebé. Cuarenta y cuatro díadas fueron filmadas durante las interacciones de juego libre. Las díadas sin DPP se involucraron más y más tempo en la atención conjunta. Las madres que presentaron atención conjunta tenían más años de escolaridad. Hubo una asociación entre las díadas de madres y niños y la frecuencia de atención conjunta. Sin embargo, las niñas miraron más hacia las madres y por más tiempo. La atención conjunta fue influenciada por la DPP y por la menor escolaridad de las madres.

PALABRAS CLAVE:
Atención conjunta; Interacción visual; Interacciones entre la madre y el bebé; Depresión posparto; Escala de depresión posparto de Edinburg.

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Postpartum depression (PPD) is a disorder that occurs in the puerperium within six weeks after delivery (American Psychiatric Association [APA], 2013). After childbirth, there may be a transitory kind of melancholy, called baby blues, which affects an average of 40% of women (Rezaie-Keikhaie et al., 2020). The prolongation of the baby blues indicates that it may be a case of postpartum depression. Among the main symptoms of PPD are not only those associated with depression that occurs at any other time in life, but also ambivalent feelings about the baby and feelings of inadequacy as a mother (Shorey et al., 2018). The prevalence rate of PPD ranges from 10% to 15%, depending on the criteria used for diagnosis, however the meta-analysis carried by Hahn-Holbrook et al. (2018) reported a prevalence of 17% in 291 studies.

In Brazil, studies using the Edinburgh Postnatal Depression Scale (EPDS) described the following prevalence rates: 19% in Amazon and in the northeast region (Corrêa et al., 2016); 31% in São Paulo (Abuchaim

et al., 2016); and 26% in Brasília (Santos et al., 1999). The research conducted by Santos et al. (2021) in 30 municipalities of six states of Brazil revealed that the overall prevalence of PPD was 26.5%.

As a common factor in all these studies, low socioeconomic status was identified as a significant risk factor for PPD symptoms. As an example of this association, the study by Morais et al. (2015) carried out in the city of São Paulo found that in the public hospitals, which generally serve women from lower and lower middle classes, the prevalence of PPD was 26%, against 9% in the private hospitals, which are affordable only for women from upper and upper middle classes. According to the authors, schooling was the main sociodemographic indicator related to PPD symptoms.

Besides the education level, it has been considered a whole series of risk factors, such as poverty, prior episodes of depression, high levels of marital problems and lack of social support (Rasmussen et al., 2017; Vaezi et al., 2019). Some of the risk factors associated with PPD in Brazilian women samples include mother having many children, pregnancy and delivery problems, mother not living with the partner, unwanted pregnancy and stressful family context during the mother's childhood (Alvarenga et al., 2018; Morais et al., 2015; Santos et al., 2021).

Studies have shown that mother-infant early interactions can be influenced by PPD. These interaction disturbances comprise less warmth and less sensitivity of the mothers (Slomian et al., 2019) with negative consequences on the development of their children (Liu et al., 2017). PPD mothers show higher levels of hostility during the interaction with their infants (Hentges et al., 2021), have more impaired parenting abilities (Wang, 2018) and are less responsive to their babies (Norcross et al., 2017). They are also less likely to practice the exclusive breastfeeding (Silva et al., 2017) and have more self-focused infant-directed speech (Humphreys et al., 2018).

In this study, we focus on the visual interaction between mother and infant, which we divide in two types: mutual attention – a dyadic face-to-face visual engagement in which mother and baby are mutually responsive through the expression of emotions and behavioral turn taking (Tomasello et al., 2005) –, and joint

attention – an interaction in which there is coordination of attention between two individuals, directed towards a third object of mutual interest (Tomasello, 1995).

The traditional conception of joint attention includes that both partners must be aware (knowing together) that they are sharing attention on that object (Tomasello, 1995). The most commonly used evidence of this "knowing together" is this alternation of gaze between the object of interest and the eyes of the partner (Carpenter & Call, 2013). This gaze alternation is a rapid shift in the infant's visual focus, given that the mother and the object are in the direction of his eyes.

Findings suggest that joint attention is related to language development (Salo et al., 2018), the development of theory of mind (Rubio-Fernandez, 2020), and the successful establishment of interpersonal relationships (Siposova & Carpenter, 2019).

The age at which joint attention emerges is a subject of debate among scholars. At first, 8–9 month was generally considered the common age (O'Madagain & Tomasello, 2019). Nevertheless, there are studies that show that babies as young as three months old are able to establish triangular attention coordination. Tremblay and Rovira (2007) showed that 3-month-old babies were able to establish joint attention in a condition involving "person-person-person", but not when there was a "person-person-object" situation, this pattern was achieved only by the 6-month-old babies. Rossmanith et al. (2014) described that 3-month-old infants coordinated their attention during a picture book activity, between the book and their caregiver. Amano et al. (2004) identified the infant gaze to a third element in the dyadic interaction as a precursor of the joint attention.

Postpartum depression and its contingencies, such as lower mother responsiveness (Mitchell et al., 2019) and lower proactivity, may interfere with the ontogeny of joint attention. Depressed mothers present less coordinated and shorter episodes of joint attention (Goldsmith & Rogoff, 1997) and less engagement in mutual and shared attention during infant-direct speech (Santos et al., 2020).

Although maternal depression is a risk factor for disrupting mother-infant interactions, some findings regarding visual engagement behavior in infants of PPD versus non-PPD mothers have been inconsistent. Beebe et al. (2008) found that infants of depressed mothers looked more at their mother's face. Opposite results were

described by White et al. (2011) – infants of depressed mothers engaged more in gaze aversion – and by Striano et al. (2002) – PPD did not influence gazing during a mother-infant interaction. Henderson & Jennings (2003) reported that depressed and non-depressed mothers did not differ in their ability to engage in joint attention. Jameson et al. (1997) revealed that depressed mothers were less inclined to engage in joint attention.

Most studies on maternal depression and its effects on mother-child interaction are carried out with European or Anglo-Saxon populations (Shorey et al., 2018). There is a substantial need to better understand the effects of maternal depression on mother-infant interaction in more adverse contexts with of low-income populations, in which the prevalence of PPD is usually high (Hahn-Holbrook et al., 2018). The purpose of the current study was to examine associations between PPD and joint attention during mother-infant face-to-face interactions. We expected that infants of depressed mothers would engage less in joint attention, with episodes of shorter duration.

Method

Participants

Forty-two dyads of mothers and their babies were analyzed. They were participants of a four-year longitudinal project on PPD conducted at the University of São Paulo (USP) and funded by São Paulo Research Foundation (FAPESP). Mothers were evaluated in seven phases: third trimester of pregnancy, delivery and child's 3rd, 8th, 12th, 24th and 36th months of life. The mothers were considered low-income persons based on data such as level of education, place of residence and housing conditions, and the fact that they were users of the public health system.

The participants were recruited by research assistants in the university hospital and in basic health units from São Paulo city (Butantã District). The original sample was composed of 400 mothers. Over the months, many participants could not be reached anymore. Subsequently, mothers with complications during pregnancy or delivery, and cases of prematurity or pathology of the newborn were excluded. At 3-6 months postpartum, 82 dyads were observed and mothers were screened for PPD using the Brazilian version of Edinburgh Postnatal Depression Scale (EPDS). A subsample of 42 dyads participated in the present study. Two groups were created:

depressed (PPD; n = 22) and non-depressed (non-PPD; n = 20). Treatment was provided for the depressed mothers.

Maternal age (in years) at delivery was on average 23 (SD = 5.6; range = 17 - 40) for non-PPD and 25 (SD = 6.16; range = 16 - 38) for PPD group. The majority of them (73.8%) lived with the father of the child in nuclear or extended nuclear families (66.7%). Most of the mothers (62%) had 2-4 children, while 38% were primiparous. Seventy-one percent reported having someone to help them with baby care and daily tasks. In general, mothers reported that the pregnancy was unplanned (62%), but desired (76%).

There were 22 babies (11 boys and 11 girls) in PPD group and 20 (10 boys and 10 girls) in non-PPD. Infants' mean age (in weeks) at assessment for PPD group was 18 (SD = 2.44; range = 12 - 23) and 18 (SD = 2.93; range = 12 - 24) for non-PPD. This is the period when the infant is in the beginning of the primary intersubjectivity period (up to nine months), being optimally suited for assessing infant engagement in face-to-face interactions (Trevarthen & Aitken, 2001).

A t-test showed that the groups differed in mother's years of education ($t(40) = 2.94$; $p = 0.005$) and pregnancy length ($t(36) = 3.36$; $p = 0.002$). On average, PPD mothers had lower levels of education [PPD=8.36 years (SD = 2.75); non-PPD = 10.3 years (SD = 1.08)] and shorter pregnancy [PPD=38.53 weeks (SD = 1.26); non-PPD= 38.89 weeks (SD = 1.24)].

Instruments

EPDS (Cox et al., 1987)

Validated in Brazil by Santos et al. (1999), this scale is an instrument of self-assessment which consists of ten self-report items that evaluate the presence or intensity of depressive symptoms (e.g. I have felt so bad that I have difficulty in sleeping). Each item is graded from zero to three (e.g., 0 = never; 3 = always), so scores can range from 0 to 30. The depressed group was composed of participants who had a score of 10 points or more on the scale. The cut-off point of 10 was considered the most appropriate for users of the Brazilian public health system (Figueira et al., 2009).

Mother-Child Visual Interaction Behaviors Protocol

We created this observation protocol to evaluate mother-infant visual interaction. The categories were created based on the main category "joint attention" and are described in an increasing order of complexity.

1. The mother looks at the baby: The mother looks at the baby, but the baby does not look back. The mother must be looking into the baby's eyes so this category can be considered valid.

2. The baby looks at the mother: The baby looks at the mother, but the mother does not look back. The baby must be looking toward mother's eyes so this category can be considered valid.

3. Dyadic attention: The mother and the baby establish a mutual gaze (Niedźwiecka et al., 2018). This interaction is a coordinated dyadic behavior, characterized by face-to-face exchanges in which the members of the dyad are mutually responsive to each other (Tomasello et al., 2005).

4. Joint attention: The mother and the baby direct their attention to the toy. During these episodes, the child's gaze should be coordinated with the adult's gaze on the object, alternating between the object and the mother (Carpenter & Call, 2013; Tomasello, 1995).

The alternation of gaze was defined as the beginning of joint attention. As Tomasello and Todd (1983) described, the episode of joint attention begins when a member of the dyad establishes an interaction with the partner. The sequence of alternating gaze should be: 1) the baby looks at the mother; 2) the baby looks at the toy; 3) the baby looks at the mother; or 1) the baby looks at the toy; 2) the baby looks at the mother; 3) the baby looks at the toy. The minimum time for an episode to be defined as joint attention was three seconds (Tomasello & Todd, 1983).

6. Non-codable: when it was not possible to see the face of at least one of the two members and, therefore, it was not possible to identify where the mother or baby was looking at. This can happen due to the mother covering the face of the infant or by positioning herself so that her face cannot be seen.

Interobserver reliability was calculated on a random sample of 10 mothers. Videos were coded by a second observer blind to the maternal condition and to the aims of the study. Cohen's Kappa was 0.72.

Procedures

Data Collection

The filming was carried out by researchers of the project. A digital 25x optical zoom camcorder with attached mirror was used, which was installed approximately one meter from the dyad. The baby was seated in an infant chair placed on the table and the mother was placed in front of him at approximately 60 cm. She was instructed to play with her baby as she would at home, in a free interaction. A basket with different types of toys was provided. Each dyad was video-taped during a 10-minute session.

The inclusion criteria for the videos were: (1) it should have an optimal sound and image quality; (2) the mother shouldn't engage in activities that did not involve interaction with the baby; and (3) the baby should not show any signs of discomfort due to a health condition, hunger, sleepiness etc. The videos were coded in terms of frequency and duration of the categories, based on the classification of the visual interaction. The software Interact Mangold 9.0 was used.

Data Analysis

The analyses were performed using the program Statistical Package for Social Sciences (SPSS) version 22.0. Descriptive analyses were conducted such as means and standard deviations, and tested for the significance of group differences and associations between variables with t-tests and Chi-squares. A confidence interval of 95% and a significance level of 5% were adopted.

Ethical Considerations

The longitudinal project received approval from [three ethics committees: Research Ethics Committee of the Teaching Hospital of the University of São Paulo; Research Ethics Committee of the Institute of Psychology of the University of São Paulo; and Research Ethics Committee of the Municipal Health Secretariat of the Municipality of São Paulo. All mothers signed an informed consent form which explained the objectives of the study and assured the confidentiality of the data.

Results

The *t*-test showed that there was a significant difference for the joint attention category, both in terms of occurrence and duration. Groups did not differ with respect to the categories "the mother looks at the baby", "the baby looks at the mother" and dyadic attention (Table 1).

Table 1.

Mean and Standard Deviation of Occurrences and Duration in Seconds for Categories by Group.

Category	Non-PPD	PPD	*p*-value
Mother look at baby *n*=42			
Occurrence	47.65 (11.17)	51.2 (13.34)	0.35
Duration	357.6 (72.63)	348.14 (100.11)	0.73
Baby look at mother *n*=40			
Occurrence	4.85 (3.88)	5.85 (4.74)	0.47
Duration	8.25 (6.59)	9.2 (7.48)	0.67
Dyadic attention *n*=42			
Occurrence	22.05 (9.8)	20.77 (11.4)	0.70
Duration	105.8 (60.51)	75.77 (46.74)	0.08
Joint attention *n*=19			
Occurrence	1.25 (1.41)	0.55 (0.8)	0.05
Duration	20.27 (14.82)	7.38 (2.77)	0.02

The category "the mother looks at the baby" had the highest average of occurrences and longer duration for both groups, followed by dyadic attention, "the baby looks at the mother" and joint attention. Although no differences were found, it is worth noting that PPD mothers and their babies looked more at each other and for a longer time than the non-depressed dyads.

Given that joint attention was the category that had a significant difference between the two groups, in addition to its importance in child development, a specific analysis of this behavior was performed. Out of the

42 dyads, 19 (8 PPD; 11 non-PPD) engaged in joint attention. The non-PPD group had more events of joint attention (JAT), with longer duration. There was no significant difference between the ages of the babies that engaged in joint attention (JAT) and babies that had no episodes [$B_{Non\text{-}JAT}$ = 18.15 weeks (SD = 2.78); B_{JAT}= 18.08 weeks (SD= 2.58)]. The dyads that performed joint attention had more episodes of dyadic attention (*t* (40) = - 3.05; *p* = 0.00) [$M_{non\text{-}JAT}$ = 17.26 (SD=8.72); M_{JAT} = 26.37 (SD= 10.63)], with longer duration [*t* (40) = - 2.68; *p* = 0.04) (SD=8.72) ($M_{non\text{-}JAT}$ =70.7 seconds (SD= 51.36); M_{JAT} = 113.53 seconds (SD= 51.52)]. They also had on average more years of education (*t* (40) = - 2.17; *p* = 0.03) [M_{JAT} =10.1 (SD = 1.24); $M_{non\text{-}JAT}$ = 8.61 (SD = 2.77)].

Three non-PPD mothers had each one non-codable episode (NCE) with a maximum duration of three seconds. Ten PPD mothers had non-codable episodes, with an average of three episodes per dyad, and duration ranging from one to 36 seconds. The EPDS average score of mothers who had non-codable episodes was higher (t(40) = -5.33; p = 0.00) and statistically significant than of mothers that positioned herself and the baby in a way that their faces were visible throughout the entire video [(M_{NCE} = 15.23 (SD= 6.11); $M_{non\text{-}NCE}$ = 9.9 (SD=7.28)]. There was no significant difference between the groups in terms of years of education.

There was an association between the occurrence of joint attention and the child's gender (X^2 = 4.709; *p* = 0.03), in this case, the establishment of joint attention was associated with boys. Among the babies who had joint attention, 13 were boys and six were girls. Although no significance test was applied, due to the sample size, some differences that called our attention could be observed. Boys who engaged in joint attention were on average (M = 17.7 weeks; SD = 2.57) younger than girls (M = 18.8 weeks; SD = 2.65), and their mothers had higher EPDS scores [$B_{EPDS\ scores\ =}$ 10.6 (SD = 7.05); $G_{EPDS\ scores\ =}$ 7.67 (SD = 5.46)]. Nevertheless, the girls looked more at their mothers (M = 12.5; SD = 8.01) and for longer periods (M = 18 seconds; SD = 12.61) than the boys [M = 4.46 (SD = 2.63); M = 7.69 seconds; (SD = 4.28)].

Discussion

The main objective of this study was to investigate if PPD would influence mother-child visual interaction, especially the joint attention. Our results are similar to those found by Boyd et al. (2006) and by

Striano et al. (2002) in which depressed and non-depressed groups did not differ significantly in mother-child gazing behavior. Regarding dyadic attention, the groups had similar patterns both in frequency and duration. Mutual gazing was not impaired due to the maternal depression. These results imply that the less complex behaviors had similar frequency and duration for both groups. This means that depressed mothers and their babies looked at each other and sought visual interaction. However, the findings regarding the effect of PPD on mother-infant visual interactions are inconsistent. Studies state that one of the alterations in the parental function caused by PPD is the face-to-face interaction, resulting in impaired engagement in attention-sharing activities (Goldsmith & Rogoff, 1997). Righetti-Veltema et al. (2002) argue that even milder maternal depression can affect the baby. The infant would perceive the minimal deficiencies of the interaction with his mother, resulting in impaired visual interaction.

Consistent with our hypothesis, non-PPD dyads engaged more in joint attention and their episodes lasted longer. Even at a preliminary stage, this behavior requires more complex operations to happen, therefore it is expected that maternal depression is associated with differences in the ability to establish and maintain joint attention. Goldsmith and Rogoff (1997) also reported that dyads with depressed mothers spent less time engaged in joint attention. Nevertheless, the data in the literature are inconclusive. For example, in the study by Henderson and Jennings (2003), depressed and non-depressed mothers performed equally well on joint attention with their infants.

The mothers who engaged in joint attention had more years of schooling. Studies have already associated low-educated PPD mothers with impairments in some aspect of the interaction with the baby (Norcross et al., 2017; Santos et al., 2020; Slomian et al., 2019). Reilly et al. (2021) found that infants of well-resourced families respond better to cues for joint attention. On the other hand, in a study with mothers from a low socio-economic status, maternal depression didn't have an effect on joint attention (Gueron-Sela et al., 2018). Studies from our longitudinal project, as well as other studies conducted in similar contexts, show that maternal schooling can be a protective factor for the child (Alvarenga et al., 2018; Defelipe et al., 2017; Morais et al., 2015; Santos et al., 2020; Santos et al., 2021). Greater access to schooling can enable women to have greater cognitive and social

support to deal with the difficulties during the postpartum, reducing the probability of being excessively vulnerable to the adverse conditions that they may face.

Depressive symptoms during pregnancy were associated with shorter gestational age at delivery. Previous studies have also found this association (Felder et al., 2017; Jarde et al., 2016; Liu et al., 2016). It is likely that, together with socioeconomic disadvantage, antenatal depression influences the duration of pregnancy. Mothers who had non-codable episodes scored higher on the EPDS. It is possible that depressed mothers feel uncomfortable with the video cameras and try somehow not to be visible.

There was an association between mother-boy dyads and the frequency of joint attention. In contrast to our result, Hirose and Barnard (1997) found that joint attention was more frequent for girls in the context of PPD, but no difference was detected in the non-PPD group. It is likely that gender differences become more evident in the context of maternal depression.

The literature indicates that male infants seem to suffer more from the consequences of postpartum depression and are more neglected by their mothers (Murray et al., 1993; Reck, et al., 2018). Gender differences are widely discussed in research on mother-baby interaction in the context of postpartum depression. The results and the explanations are far from being conclusive. Murray (1992) reported that boys were more vulnerable to the effects of PPD. For example, the speech of depressed mothers directed to male babies was markedly more negative than that of mothers who weren't depressed (Murray et al., 1993). This was not the case when the baby was female. Reck et al. (2018) described that boys of PPD mothers showed less positive engagement during play episodes compared to the non-PPD group. This effect was not found for girls.

A comparison between boys and girls that had episodes of joint attention showed that the girls looked more at their mothers and for a longer time. One explanation for this result may be linked to the fact that the girls, for not receiving enough attention, sought more diligently the mother's gaze. PPD mothers had more and longer episodes of the non-codable category. This category was used when the mothers moved in a way that covered her face or the face of the infant, making it impossible to code the gaze direction. This finding may reflect that the depressed mothers moved in a way to hide themselves from the camera.

Our behavioral coding was based on gaze alternation as evidence of joint attention. However, Tomasello (1995) points out that this could lead to false positives, as gaze alternation can be just a sign of alternating attention or confirmation that the partner is paying attention, rather than joint attention. It was not possible to apply more accurate tests to confirm that the dyads were actually sharing the attention, as suggested by Carpenter and Call (2013). This is a limitation of this study, although the evidence obtained is plausible to consider the episodes as joint attention. Even though there are few cases and no general conclusions can be drawn, the results regarding the relationship between episodes of joint attention and the sex of the baby deserve attention and may indicate avenues for future research. Furthermore, studies are needed to examine how the impact of PPD may manifest differently on mother-infant visual interaction and joint attention, depending on the social and cultural context of the families.

In conclusion, this study highlights the potentially disruptive effects of PPD, specifically in a high-risk and low-class sample. The observation of the early joint attention may provide indications of a possible impairment between the dyad. Our results also highlight the differential performance between boys and girls, a research topic that has been discussed for decades, and more recently in the context of PPD.

Our findings show that the influence of PPD on mother-infant interaction may be mediated by the association with sociodemographic and contextual factors. Unfavorable socioeconomic conditions and lower levels of education have the potential to affect maternal care and investment in her children, and can have a negative impact on their development. Pinheiro et al. (2021, p. 21) state that “less schooling alone should be considered a possible factor that indicates the need for special attention in the pregnancy-puerperal cycle, even in those women who do not present cumulative risk factors”. In low income contexts, the health services should regularly evaluate women for PPD, giving them the benefit of health prevention programs and treatment for depression. Because low-income mothers usually have difficulty seeking and finding support, home-based interventions focused on mother-child interactions may be very beneficial in poorer areas.

Final Considerations

Our behavioral coding was based on gaze alternation as evidence of joint attention. However, Tomasello (1995) points out that this could lead to false positives, as gaze alternation can be just a sign of alternating attention or confirmation that the partner is paying attention, rather than joint attention. It was not possible to apply more accurate tests to confirm that the dyads were actually sharing the attention, as suggested by Carpenter and Call (2013). This is a limitation of this study, although the evidence obtained is plausible to be considered as episodes of joint attention. The second limitation is the small sample size from only one city in Brazil. Besides that, mothers can interact with their babies differently in a laboratory setting, therefore it is important not to generalize these results. Even though there are few cases and no general conclusions can be drawn, the results regarding the relationship between episodes of joint attention and the sex of the baby deserve attention and may indicate avenues for future research. This study brings contributions to the understanding of postpartum depression and mother-infant interaction in high-risk contexts. Furthermore, analyses associating joint attention and postpartum depression add information to the literature that seeks to understand how socio-affective stressors can influence the early interactional process and the child development. Future studies are needed to examine how the impact of PPD may manifest differently on mother-infant visual interaction and joint attention, depending on the social and cultural context of the families.

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