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A Longitudinal Study on Emotional Dysregulation and Obesity Risk: From Pregnancy to 3 Years of Age of the Baby

Emotion regulation (ER) is a multi-componential process, and it is a central skill involved in our daily life. Broadly defined, it refers to the attempts a person makes to influence both the emotions he or she feels, and how he or she expresses them (Mauss, Bunge, & Gross, 2007). Although there is some uncertainty as to how to precisely conceptualize the construct of ER (Gross, 2008), it is widely accepted that a failure in the ER processes is involved in various psychopathological manifestations (e.g., McLaughlin, Mennin, & Farach, 2007; Mennin, Heimberg, Turk, & Fresco, 2005; Fox, Axelrod, Paliwal, Sleeper, & Sinha, 2007; Fox, Hong, & Sinha, 2008; Gratz, Bornovalova, Delany-Brumsey, Nick, & Lejuez, 2007; Klonsky, 2009; Sim & Zeman, 2005, 2006; Whiteside, Chen, Neighbors, Hunter, Lo & Larimer, 2007; Glenn & Klonsky, 2009; Tull, Barrett, McMillan, & Roemer, 2007).

The ability to regulate emotions and to cope with stress begins early in life, and develops in the context of the early interactions with caregivers. A central role in this process is played by maternal sensitivity, known as the mother's ability to understand and adequately answer to the baby's requests and cues (Spanglar, Schieche, Ilg, Maier & Ackermann, 1994). Right after the birth of a baby, mother and infant become a reciprocally regulating unit, the two elements of the dyad working as a shared and common system of physical and emotional regulation (Schore, 2000). During this stage, the baby needs the mother to regulate his/her own internal states, and through the provision of emotional and physical support (i.e., food, clothing), the caregiver supports the infant in his/her state regulation. Later, more complex dyadic exchanges and communications facilitate the child's acquisition of abilities important to cope with distress, control impulses, and delay gratification. These ongoing mother-child exchanges promote a transition from a hetero-regulation (in which the baby uses the parents to regulate him/herself) to self-regulation. Thus, the process of developing emotional regulation skills and strategies largely depends on maternal sensitivity, so that

a low maternal sensitivity is associated with a greater risk for the child development, and poor emotion regulation skills in the baby (Anderson, Gooze, Lemeshow & Whitaker, 2012)

A growing body of literature indicates that the capacity to regulate emotion plays a key role in eating behavior. For example, Milligan and Waller (2000) found that in a nonclinical sample of women, bulimic attitudes and behaviors reduced immediate anger states, particularly when the individual had a strong tendency to avoid expressing anger. In an earlier study on binge eating, McManus and Waller (1995) suggested that dysregulated eating behaviors are more likely to serve the function of regulating immediate emotional states rather than regulating a more global predisposition to an emotion. Macht and Simons (2000) found that self reported motivation to eat in 23 female subjects increased during periods of negative emotion, and that these subjects reported a higher tendency to cope with these negative emotions through eating. Various other studies also support the link between emotional dysregulation and eating disorders (Corcos et al., 2000; de Groot, Rodin, & Olmsted, 1995; Gilboa-Schechtman, Avnon, Zubery, & Jeczmien, 2006; Kucharska-Pietura, Nikolaou, Masiak, & Treasure, 2004; Rizzuto, 1988; Speranza et al., 2005; Taylor, Parker, Bagby, & Bourke, 1996; Zonnevijlle-Bender, van Goozen, Cohen-Kettenis, van Elburg, & van Engeland, 2002).

The specific mechanism through which emotion regulation affects eating attitudes and habits has been largely investigated, in recent years. Anderson et al. (2012) suggested that individuals who experienced poor quality of early relationships with their mothers, likely due to low levels of maternal sensitivity and lack of adequate hetero-regulation, had a greater risk of obesity in adolescence. By establishing how much and what their children eat during mealtime, the mothers shape the emerging self-regulation ability of their babies, and prevent or promote the onset of early eating problems (Blissett & Farrow, 2007; Farrow & Blisset, 2006; Hughes et al., 2011). For instance, if parent–child interactions are inadequate during the feeding time, children may learn to use food as a consolation tool (Faith, Scanlon, Birch, Francis, & Sherry, 2004). Similarly, directive strategies during the mealtime are associated with lower abilities to self-regulate in eating, as well

as with higher weight status in developmental age (Veugelers & Fitzgerald, 2005). Along the same lines, caregivers who are controlling toward their children's food intake, lead them to a marked increase of attention toward external rather than internal cues in order to regulate their food intake. This, in turn, results in lack of self-regulation and greater eating in the absence of hunger signals (Anderson et al., 2012; Hughes et al., 2011).

In line with the aforementioned literature, a recent, longitudinal study (de Campora et al., 2014) showed that maternal emotion regulation measured during pregnancy predicts the early mother-child feeding patterns, at 7 months of age of the baby. Specifically, 65 pregnant women (about half were “overweight” and half “non-overweight” participants) were administered the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) and then, 7 months after the delivery, the mealtime interactions between these women and their babies were videotaped. As expected, when compared to the normal-weight controls, the overweight women were more emotionally dysregulated during pregnancy, and showed more dysfunctional dyadic feeding interactions when the baby was 7 months of age. Given the young age of the babies, however, no actual outcome measures for the emotion regulation and weight of the child were reported and discussed. Aiming at extending those findings, our article provides a follow up on the emotion regulation strategies of these same babies at 1 year of age, as well as on their weight status at 3 years of age. Our hypothesis was that poorer maternal emotional regulation abilities and higher pre-pregnancy body mass index (BMI, i.e., the “weight in kilograms divided by the square of the height in meters (kg/m^2)”, World Health Organization, 2000) would associate also with insecure attachment and higher BMI of the baby at, respectively, 1 and 3 years of age.

Method

This project started about four years ago. Initially, 65 pregnant women agreed to participate to this longitudinal study. About half (n = 33) were classified as being “overweight” women, and about half (n =32) as “non-overweight.” During pregnancy (Time 1, T1), these 65 women filled out a number of self-report instruments measuring constructs related to emotion regulation, depression,

social support, and distress. Seven months after the delivery (Time 2, T2), 53 of these 65 participants were videotaped during their feeding interactions with their newborns. At one year of age of the baby (Time 3, T3), 43 mother/infant dyads who did not discontinue their participation in the study were videotaped during a separation-reunion task. Lastly, at three years of age of the baby (Time 4, T4), weight and height of the babies were reported by the 53 mothers who took part at T2. Weight and height information of the babies were collected over the phone so as to ensure that all participants would provide the requested information, given the minimal personal effort required. Though some of the participants included at T1 did not continue their participation throughout all the phases of our research, neither the age, education, or employment position of the mother, nor the gender of the baby accounted for attrition.

Participants

At T1, participants were 65 Italian women who were assigned to different groups based on their pre-pregnancy Body Mass Index (BMI), i.e., 33 were “overweight” and 32 were “non-overweight” women. Their mean age was approximately 35 years, and nearly half had a bachelor's degree or a higher level of education. The “overweight” and “non-overweight” groups did not significantly differ from each other for any of the demographic features taken into consideration (for details, see de Campora et al., 2014).

At T2, 12 women discontinued their participation so that 53 women (25 “overweight” and 28 “non-overweight”) remained in the study. About 60% of their newborns were male and about 40% female. These 53 mother-child dyads remained in the study until T4, though 10 of them did not undergo the T3 separation-reunion task.

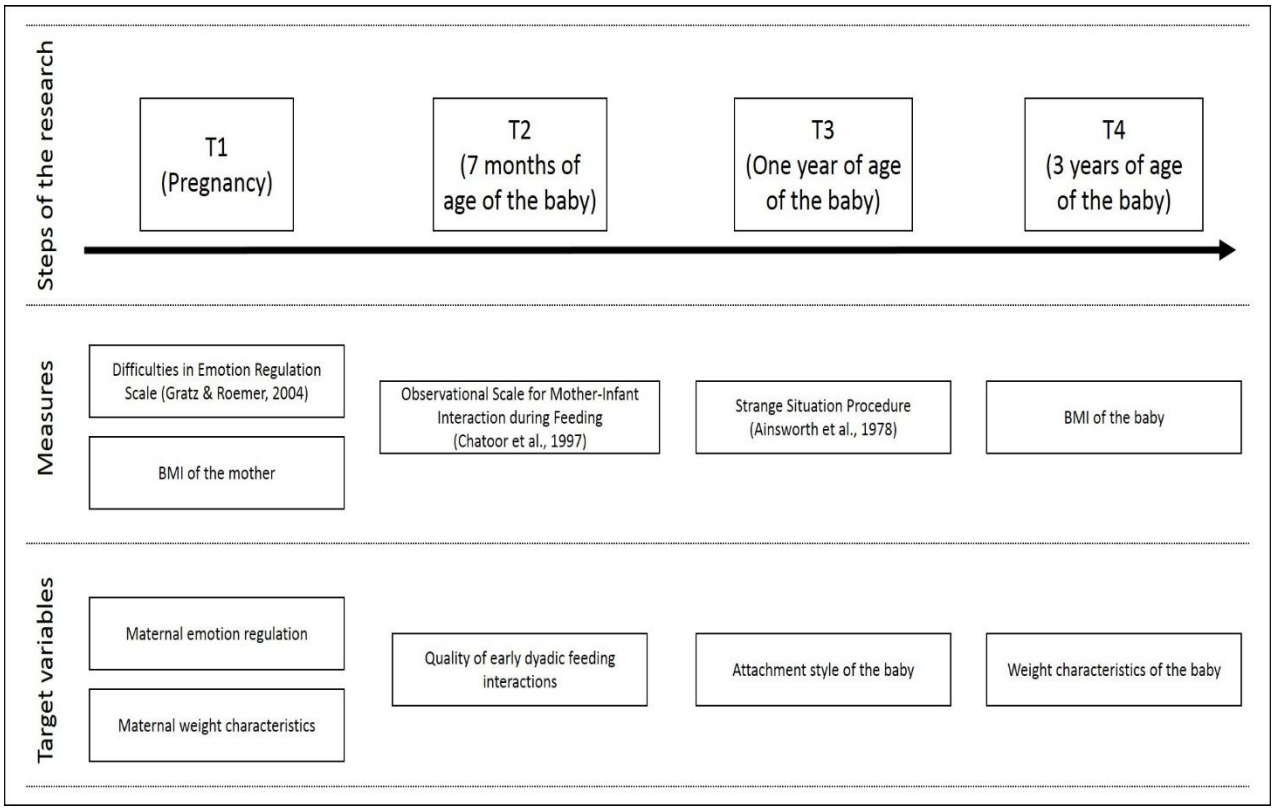
Procedures and Aims

The entire sample was recruited at the OBGYN Department of Fatebenefratelli Hospitals in Rome, after receiving approval of the project from the hospital’s ethical review board. Informed consent was obtained by all participants. At T1 (the third trimester of pregnancy) our main interest was to evaluate the emotion regulation strategies of the participants, and to conduct a broad

spectrum assessment of psychopathology. Seven months after delivery (T2), we observed the mother-baby feeding interactions at home, in order to investigate a theoretically expected link between the presence of maternal difficulties in ER during pregnancy (T1) and the subsequent quality of the dyadic mealtime exchange (T2). A more detailed description of the procedures followed for T1 and T2 is presented and discussed in de Campora et al. (2014).

The current study reports on two additional and subsequent steps of this research. Specifically, T3 occurred about one year after delivery, and aimed to investigate the emotion regulation abilities of the baby at one year of age. The goal of T3, more in detail, was to provide additional data on the intergenerational transmission of the regulation skills by using a multidimensional self-report instrument (i.e., the DERS) during pregnancy, and an observational measure at one year of age of the baby. Lastly, T4 aimed to investigate the weight and height (or, more specifically, the BMI) of the baby at three years of age, so as to further explore the role of maternal weight, maternal emotion dysregulation, and early dyadic feeding interactions on the risk for obesity of the baby. A graphical representation of all steps and measures investigated by the current study is outlined in Figure 1.

Figure 1. Layout of the study design.



Measures

The questionnaires collected at T1 aimed to evaluate the existence of a broad-spectrum of issues related to the participants' mental health during pregnancy. We primarily focused on the DERS, a self -report instrument assessing the presence of difficulties in emotion regulation strategies, from a multidimensional perspective. This measure revealed good psychometric properties both in the original (Gratz & Roemer, 2004) and in the Italian versions (Giromini et al., 2012; Giovannini et al., 2014; Giromini, Brusadelli, et al., 2015; Giromini, de Campora, et al., 2015), and it is often used, for various research purposes, across different cultural contexts (e.g., Tweed, White, & Lehman, 2004; Ruganci & Gençöz, 2010).

T2 occurred at seven months of age of the baby. In this step, we videotaped and coded the early dyadic feeding interactions by using the Observational Scale for Mother-Infant Interaction during Feeding (Chatoor et al. 1997; Lucarelli et al., 2002). This observational procedure allows to assess the quality of the mealtime exchanges according to four main subscales (Affective State of the Dyad, Affective State of the Mother, Interactional Conflict, and Food Refusal). This measure

possesses good psychometric properties, as extensively documented elsewhere (Chatoor et al., 1997; for the psychometric properties of the Italian version of the instrument, see Lucarelli et al., 2002). As reported in a recent work from de Campora et al. (2014), inter-rater reliability was satisfactory also in this study, as demonstrated by intraclass correlation coefficient (ICCs) values ranging from .68 to .80 for the various subscales of the instrument.

At T3, mother-baby couples were videotaped through a laboratory procedure aimed to assess the attachment style of the baby with respect to the main caregiver. Specifically, we used the Strange Situation Procedure (Ainsworth et al., 1978), the gold standard measure, and a widely-utilized, standardized procedure based on eight separation-reunion episodes, and characterized by the child exposure to conditions of increasing stress. This task was originally introduced to classify the attachment security of each mother-infant dyad based on how infants react to their mothers' brief separations. The final classification allows to place infants into one of the three main attachment groups: Insecure-Avoidant (A), Secure (B), and Insecure-Resistant (C). Additionally, coders may also score the infant behavior based on his/her disorganized/disoriented reaction (D) (Main and Solomon, 1990). Several studies extensively described and lend support to its strong psychometric properties (Dykas & Cassidy, 2013; for an in-depth description, see Solomon & George, 2008). In the current study, all videotapes were coded by two blind judges who were trained to be reliable in classifying infants using the SSP. For these judges, the inter-rater reliability for the two-way, three-way and four-way classifications was excellent (all k's > .74; for benchmarks on the interpretation of Cohen's k, see Cicchetti, 1994; Shrout & Fliess, 1979).

Lastly, at T4 we recorded weight and height of the baby at three years of age. This information was self-reported, over the phone, by the mothers included in the study. As stated by McCormack et al. (2014), phone is often the method with the highest completation rate, and data are less likely to be missed, demanding the least participant burden in terms of time and resources.

Data Analysis

Data analysis aimed at investigating whether the T1 and T2 variables of the study (i.e., maternal emotional regulation and pre-pregnancy BMI) would predict the attachment style of the baby at T3, and whether all T1, T2, and T3 variables would predict the BMI of the baby at T4. A series of point bi-serial and Pearson correlations was conducted to accomplish these purposes. Subsequently, additional regression-based analyses (see below) were also conducted, so as to further investigate the relationship of maternal emotional regulation and pre-pregnancy BMI to infant weight status.

Results

The point-biserial correlations of all T1 and T2 measures included in this study to the attachment style of the baby at T3 (dummy code: 0 = Secure; 1 = Insecure)[1] are reported in Table 1.

[1] A two-way classification of attachment style was used, rather than a three- or four-way, because of the limited sample size.

Table 1. Relationship of T1 (Maternal Weight Status, BMI, and Emotion Regulation) and T2 (Quality of Feeding Interactions) Measures to Child Attachment at T3.

	Insecure Attachment of the Baby at T3[b]	
	r	*p*
Maternal Weight Status at T1		
Pre-Pregnancy Maternal BMI	.231	.136
Overweight Status of the Mother[a]	.214	.169
Maternal Difficulties in Emotion Regulation at T1		
DERS Nonacceptance	.095	.543
DERS Goals	.216	.164
DERS Impulse	.112	.473
DERS Awareness	-.009	.952
DERS Strategies	.218	.159
DERS Clarity	.157	.315
DERS Total Score	.196	.208
Poor Quality of Feeding Interactions at T2		
Affective State of the Mother	.247	.110
Interactional Conflict	.203	.191
Food Refusal Behavior	.212	.173
Affective State of the Dyad	.094	.548

[a]Dummy Code (0 = Non-Overweight Group; 1 = Overweight Group);

[b]Dummy Code (0 = Secure; 1 = Insecure).

Somewhat unexpectedly, neither the pre-pregnancy maternal BMI, nor the maternal emotional regulation abilities, nor the quality of the feeding interactions at 7 months of age of the baby produced statistically significant correlations with the attachment style of the baby at T3. Table 2 presents the correlations of our T1, T2, and T3 measures to the BMI of the babies at 3 years of age (T4).

Table 2. Relationship of T1 (Maternal Weight Status, BMI, and Emotion Regulation), T2 (Quality of Feeding Interactions), and T3 (Child Attachment) Measures to Child BMI at T4.

	BMI of the Baby at T4	
	r	*p*
Maternal Weight Status at T1		
Pre-Pregnancy Maternal BMI	.389**	.004
Overweight Status of the Mother[a]	.397**	.003
Maternal Difficulties in Emotion Regulation at T1		
DERS Nonacceptance	.150	.284
DERS Goals	.259	.061
DERS Impulse	.491**	<.001
DERS Awareness	.037	.790
DERS Strategies	.314*	.022
DERS Clarity	.134	.340
DERS Total Score	.355**	.009
Poor Quality of Feeding Interactions at T2		
Affective State of the Mother	.373**	.006
Interactional Conflict	.271*	.050
Food Refusal Behavior	.215	.123
Affective State of the Dyad	.227	.103
Strange Situation Procedure at T3		
Insecure Attachment of the Baby[b]	-.028	.857

*p < .05; **p < .01; [a]Dummy Code (0 = Non-Overweight Group; 1 = Overweight Group); [b]Dummy Code (0 = Secure; 1 = Insecure).

In line with our hypotheses, both maternal weight and maternal emotion regulation at T1 produced significant correlations, with a *medium* to *large* effect size (Cohen, 1988). As hypothesized by de Campora et al. (2014), thus, the greater the pre-pregnancy BMI of the mother and the poorer her emotion regulation skills, the greater the BMI of the baby at 3 years of age. Noteworthy, among the DERS subscales, Impulse – which measures the mother's attitude toward impulsive behaviors to face negative emotions – produced the strongest correlation across all measures under investigation, $r = .49$, $p < .001$.

Also in line with our expectations, the poorer the quality of the feeding interactions at T2, the greater was the BMI of the child at T4. This conclusion was particularly true for the subscale labeled Affective State of the Mother, $r = .373$, $p = .006$, which indicates that the greater the maternal difficulties in showing positive affect and the higher the frequency of negative affects during feeding (T2), the higher the BMI of the baby (T4). Conversely, the attachment style of the baby at T3 had no impact on his/her BMI at T4.

Additional Analyses

Attachment of the Baby at T3. None of the T1 and T2 variables included in our study significantly correlated with the attachment style of the baby at T3. Nonetheless, almost all of the T1 and T2 predictors produced *r* values of about .2, and almost all were in the expected direction. Furthermore, intergenerational systems typically feature complex, multivariate relationships that cannot be fully accounted for via simple, bivariate correlations. Accordingly, we decided to also test whether combining the three main predictors from T1 and T2, i.e., the pre-pregnancy maternal BMI, the maternal emotional regulation abilities, and the quality of the feeding interactions at 7 months of age of the baby, would tell us something more informative about the relationship between these maternal factors and infant attachment. Because our sample lacked sufficient power to perform more advanced statistical analyses (e.g., logistic regression, structural equation modeling), we decided to simply combine our three chief predictors by averaging their z-transformed scores. The resulting, averaged z-score (basically, a composite, proxy measure of the

pre-pregnancy maternal weight, the maternal emotional regulation abilities, and the quality of the feeding interactions at 7 months of age of the baby) correlated .277 with the attachment style of the baby at T3, with a marginally significant *p* of .072. Thus, combining the three predictors did produce a higher *r* value than inspecting each of them separately – even though, technically, the correlation continued to be non-significant at an alpha level of .05.

BMI of the Baby at T4. The results reported in Table 2 show that both the pre-pregnancy maternal BMI and the maternal emotional regulation abilities during pregnancy predicted the BMI of the baby at three years of age. In particular, the DERS subscale Impulse produced a correlation of about .5, and the weight of the mother produced a correlation of about .4. Wanting to test whether both the DERS Impulse score (T1) and the pre-pregnancy maternal BMI (T1) would make a unique contribution to the prediction of the baby's BMI at T4, we next conducted multiple regression analyses. Specifically, the DERS Impulse score and the pre-pregnancy maternal BMI were entered in a regression model as predictors, and the BMI of the baby was entered as the criterion variable. The resulting model was significant, $F(2,50) = 9.96$, $p \leq .001$, and accounted for about 25%-30% of the criterion variance, $R = .53$, $R^2 = .29$, Adjusted $R^2 = .26$. Impulse produced a statistically significant ($p = .004$) β of .399, and the pre-pregnancy maternal BMI produced a marginally significant ($p = .087$) β of .228. Accordingly, while Impulse did make a unique contribution, it is somewhat uncertain as to whether the pre-pregnancy BMI of the mother also made a unique contribution to the model.

Discussion

Some recent findings indicate that poor maternal sensitivity and emotional dysregulation may play a key role in predicting the risk for obesity of the child in early ages. To broaden our knowledge on this topic, a few years ago we began a longitudinal study encompassing more than 50 women, across a time-span that currently goes from pregnancy to three years of age of the baby. In a previous report on our ongoing research project, we showed that maternal emotion regulation measured during pregnancy and pre-pregnancy BMI were able to predict the quality of the early,

dyadic feeding interactions, at 7 months of age of the baby. The current study confirmed and extended those findings, by showing that maternal emotional dysregulation during pregnancy and pre-pregnancy BMI, along with the quality of the early, dyadic feeding interactions at 7 months of age of the baby, predict the BMI of the child at three years of age too. Somewhat unexpectedly, however, none of the T1 and T2 variables included in our study significantly associated with insecure attachment of the baby at 1 year of age (T3).

Among all variables taken into consideration, the maternal T1 scores on the DERS Impulse subscale produced the strongest correlation with the BMI of the baby at 3 years of age, with a *large* effect size of about $r = .5$ (Cohen, 1988). To the best of our knowledge, this study is the first to report a *longitudinal* association between maternal impulsivity during pregnancy and increased BMI of the child at three years of age. During the past few decades, however, several authors have acknowledged the existence of a link between impulsivity and weight status. Just as an example, a few years ago Braet, Claus, Verbeken, and Van Vlierberghe work (2007) showed that overweight children are significantly more prone to act impulsively than are normal weight children. In our view, all these findings indicate that maternal impulsivity might play a key role in the development of both eating and impulsivity problems in the child. Accordingly, we believe that treatment and prevention programs for reducing the risk of weight and behavioral problems during infancy should carefully assess (and possibly focus their clinical work on) the maternal ability to deal with and manage her impulses.

The maternal pre-pregnancy BMI significantly correlated with the BMI of the child at 3 years of age, too. The effect size of this correlation ($r \approx .4$) was *medium* to *large* (Cohen, 1988). On one hand, the fact that the weight of the mother associates with the weight of the baby is not new in the literature. For example, the Norwegian Mother and Child Cohort study (Stamnes Kopp, Dahl-Jorgensen, Stigum, Frost Andersen, Naess & Nystad, 2012) reported that both the pre-pregnancy BMI and the gestational weight gain (GWG) significantly predict the increase of BMI in children, that these factors significantly interact with each other, and that the strength of this interaction is

highly correlated with the severity of the offspring BMI. Furthermore, there is extensive literature indicating that genetic factors largely contribute to the inter-generational transmission of weight problems (e.g., Kral & Faith, 2009). On the other hand, however, it is interesting to note that, at least in our study, maternal impulsivity produced a stronger correlation with the BMI of the baby than did maternal BMI (r = .49 vs. r = .39). Moreover, the β of maternal BMI (= .228) was only marginally significant (p = .087) in the multiple regression model presented in our Additional Analyses (see above). Thus, once again, what emerges from our research is that the study of the early risk factors for the development of obesity requires a multidisciplinary approach, which takes into account the psychological characteristics of the mother and her dyadic relationship with her baby, in addition to genetic or biological factors.

A somewhat unexpected and controversial finding of the current study is that none of the variables we took into consideration at T1 and T2 significantly predicted the attachment style of the baby at T3. Indeed, because the mother's ability to understand and adequately answer to the baby's requests and cues (Spanglar et al., 1994) is crucial to promote the child's transition from hetero-regulation to self-regulation (Schore, 2000), we expected that maternal emotional regulation at T1 would significantly predict the attachment style of the baby at T3. A number of explanations are possible for this nonsignificant, and thus unpredicted finding. First, it is worth noticing that while maternal sensitivity is deemed to contribute largely to the quality of the infant's attachment to her (Ainsworth, 1982; Ainsworth, Blehar, Waters, & Wall, 1978), De Wolff and van Ijzendoorn's (1997) meta-analytic findings showed that the effect size of the relationship between maternal sensitivity and child's attachment is in fact not large, ranging from .17 and .24. In our study, the correlation between the maternal DERS Total Score at T1 and the insecure attachment of the baby at T3 was .196 (Table 1), and thus its effect size was actually within the range described by De Wolff and van Ijzendoorn (1997). Hence, it is possible that our limited sample size just lacked sufficient power to detect a statistically significant effect, for this relationship. Additionally, some theoretical considerations are also worth mentioning. In particular, in a remarkable commentary,

Woodhouse (2010) recently attempted to answer the question "why is the link between parental responsiveness and infant attachment outcomes not as high as theoretically expected"? (p. 152). Among others, a very thorough reflection offered by the author is that because attachment relationships depend on both individual as well as interactive factors, it should not be surprising that a self-report instrument that only focuses on one person (such as the DERS we used at T1) does not perfectly predict a complex, interactive relationship between two individuals (such as the SSP we used at T3) (see also Beebe et al., 2010). Future studies, thus, might further investigate the relationship between maternal emotional dysregulation during pregnancy and attachment of the baby at three years of age by using multiple methods of observation and diverse sources of information. Related to this consideration, intergenerational systems typically feature complex, multivariate relationships that cannot be fully accounted for via simple, bivariate correlations. For this reason, in our Additional Analyses we tested whether combining all our T1 and T2 predictors by averaging their z-transformed scores would significantly correlate with the attachment style of the baby at T3. Even though the results of these additional analyses were only marginally significant, they achieved a *medium* effect size of $r \approx .3$. Thus, because our sample lacked sufficient power to adopt sophisticated statistical analyses such as logistic regressions or structural equation modeling, it is necessary to wait for future studies to further investigate this topic, with bigger sample sizes and more advanced statistical techniques.

This study has a number of limitations that warrant mentioning. First, the sample size was relatively small, which limits both power and generalizability. Said differently, though our significant findings are likely to generalize to future studies on similar populations, it is currently unknown whether our nonsignificant results are more likely to be due to a lack of associations vs. a lack of power. Future research should therefore try to replicate our work by collecting bigger samples, and possibly by investigating diverse populations, from different cultural contexts. Another important limitation of our study is that T1 only included a self-report instrument in order to measure emotion regulation during pregnancy. Though the DERS is deemed to be a very sound

measure and is in fact used in various contexts all over the world (e.g., Coutinho et al., 2009; Mitsopoulou et al., 2013; Ruganci & Gençöz, 2010), it certainly suffers from those limitations that are common to all self-report instruments, such as social desirability and self-judgment bias. Accordingly, future research should attempt to overcome this problem by also administering additional measures. Similarly, the fact that the BMI of both mothers and babies was calculated based on self-reported information also is a shortcoming of our study. Future studies should therefore seek to replicate our findings by inspecting clinical records or other similar, objective documents. Importantly, our study failed to take into account the role that trauma exposure might have on the outcomes of our research. Indeed, a recently published study by Michopoulos and colleagues (Michopoulos et al., 2015) showed that childhood and adulthood trauma exposure mediate the association between emotion dysregulation and emotional eating in at-risk populations. Along the same lines, our work did not address the potential impact of maternal diet on their neuroendocrine system and behavior, which in turn might affect the baby's metabolism and behavior (for a review, see Sullivan, 2015). Additionally, we did not address the potential role of many other variables that might mediate our findings, such as breast vs. bottle feeding, or the presence of paternal obesity vs. normal weight.

Despite all these limitations, to date most of the studies available on this topic used cross-sectional research designs, which do not allow for conclusive inferences in regards to causal relationships. Conversely, our study adopted a longitudinal approach and therefore provided a more convincing evidence for the causal role of maternal emotional dysregulation and weight status in increasing the risk for obesity in the child.

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