Does maternal reflective functioning mediate associations between representations of caregiving with maternal sensitivity in a high-risk sample?:

Psychoanalytic Psychology

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Abstract

Although it is known that mothers with substance abuse disorders struggle to provide adequate parenting to their children, little is understood about the mechanisms behind this. This cross-sectional study uses an attachment perspective to examine whether reflective functioning mediates the relationship between mental representations of caregiving and maternal sensitivity, in an ethnically diverse sample of 142 substance-abusing mothers (M [SD] = 29.83 [5.79] years of age) and their toddlers (M [SD] = 24.04 [15.15] months of age). Data were baseline measures from two randomized controlled trials. The three variables of primary interest were positively correlated. As expected, there was a significant relationship between mental representations of caregiving and maternal sensitivity that was largely explained by reflective functioning. Confounding and alternate explanations were not supported by a secondary data analyses. The findings underscore the importance of reflective functioning in positive parenting within this high-risk population of mothers, and they provide support for the development of attachment-based interventions.

Keywords

Although it is well known that mothers with substance abuse disorders struggle to provide adequate parenting to their young children, little is understood about the mechanisms that cause this to occur (Suchman, McMahon, Slade, & Luthar, 2005). One way to think about this problem is through the complementary lenses of attachment and mentalization theory. Representations of the child and the mother-child relationship (i.e. mental representations of current caregiving experiences) are thought to evolve from a mother's attachment relationship with her own early caregivers (i.e. mental representations of early caregiving experiences) and research has generally supported this premise (Slade, Aber, Berger, Bresgi,

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& Kaplan, 2003; Theran, Levendosky, Bogat, & Huth-Bocks, 2005). Likewise, a mother's representations of caregiving –which reflect her own attachment security (Huth-Bocks, Muzik, Beeghly, Earls, & Stacks, 2014)– are though to predict a child's attachment security, which has also been supported by research (Crawford & Benoit, 2009). Growing evidence suggests that parental mentalization explains the widely recognized 'transmission gap' between adult attachment and child attachment (Fonagy & Target, 2005; Madigan et al., 2006; Slade, Grienenberger, Bernbach, Levy, & Locker, 2005). However, this mechanism has not yet been tested in a high-risk sample.

Mental representations of current caregiving experiences and maternal sensitivity

Mental representations are thought to be internal working models or dynamic systems of expectations and attributions about the environment, the self, and others (Bowlby, 1988). Mental representations of attachment (i.e. of early and current caregiving experiences) are thought to form during the first mother-infant interactions (Fonagy & Target, 2008; Pines, 1972). These internal working models of interaction make up an individual's representational world, and are thought to guide complex behavior such as those needed for sensitive mothering (Fonagy & Target, 2008).

Recent studies have suggested that mental representations of current caregiving experiences can affect parental behavior and sensitivity (Sayre, Pianta, Marvin, & Saft, 2001; Trapolini, Ungerer, & McMahon, 2008). For instance, mothers with disengaged representations of the child tend to be less sensitive, more passive, and use less encouragement and guidance with their children (Sokolowsky, Hans, Bernstein, & Cox, 2007). On the contrary, those with more joyful or coherent representations of the child engage in less negative (e.g. negative tone, angry facial expressions, or rough handling) and more positive mothering (e.g. smiling, praising, hugging, or kissing) (Slade et al., 1999).

Mental representations of current caregiving experiences and maternal reflective functioning

Maternal reflective functioning –the operationalization of mentalization in an attachment relationship– is a caregiver's capacity for interpreting the behavior of oneself and the child in terms of mental states and intentions (Fonagy, Gergely, & Target, 2007; Slade, 2005). It is inherently linked to the concept of mental representations of early and current caregiving experiences, and is thought to originate as early as the first mother-infant interactions. Recent studies have supported the notion that mental representations of current caregiving experiences are associated with the level of maternal reflective functioning (Huth-Bocks et al., 2014; Bost et al., 2006). This may be because early attachment experiences, such as those reflected in attachment narratives, are considered as the "practice arena" for the development of mentalization (Fonagy & Target, 2008). However, the link between mental representations of current caregiving experiences and maternal reflective functioning has not been thoroughly studied.

Maternal reflective functioning and maternal sensitivity

Maternal reflective functioning not only consists of the ability to metabolize and model affective experiences, but also the maternal ability to appropriately transmit them to the child through a series of behavioral enactments (Fonagy & Target, 2008; Slade, 2005). It is through marked (i.e. exaggerated), ostensive (e.g. *motherese* tone of voice or raising eyebrows during eye contact), and contingent feedback reactions (i.e. "mirroring") towards the infant's automatic behavioral expressions, that the caregiver slowly sensitizes the child to primary and secondary mental states (Fonagy, Gergely, & Target, 2007; Gergely & Unoka, 2008). This "mentalizing" stance (i.e. sensitization to mental states and intentions in oneself and others; Fonagy et al., 2007) helps the child become increasingly self-aware and self-regulated, and eventually becomes central for complex social interactions such as parenting (Gergely & Unoka, 2008).

Consistent with these theories, studies have found that reflective functioning is positively correlated with the level of maternal sensitivity, for instance during free play and structured teaching interactions (Farrow & Blissett, 2014; Stacks et al., 2014). These findings suggest that maternal interest on the child's mental experience (i.e. mentalizing stance) is related to sensitive caregiving, which may reflect maternal availability and an ability to support the child behaviorally and emotionally.

From a "transmission gap" to a "transition gap"

Based on the evidence, it seems that the mechanisms between attachment and mentalization theories are still far from being clearly delineated. On one hand, it is known that while attachment and mentalization systems are separate from each other, they are connected by the mental representations inherent to both. It is also acknowledged that both mechanisms are involved in the intergenerational transmission of attachment patterns potentially via maternal sensitivity (Fonagy & Target, 2005; Madigan et al., 2006; Slade et al., 2005). However, this relationship only explains the interpersonal transmission of attachment styles. It does not consider the intrapersonal processes that develop during the transition to motherhood and that are thought to guide maternal behavior (Pines, 1972).

Overall, the literature supports Bowlby's (1988) notion that the degree of coherence in a caregiver's attachment representations may help them to accurately perceive the offspring's mental states and promote the caregiver's ability to respond to them consistently and effectively. Therefore, it is possible that maternal reflective functioning might be the link between mental representations of attachment and the quality of mother-infant interactions (Fonagy & Target, 2005; Meins, 2013); however, this relationship has not yet been backed by empirical evidence.

Substance-abusing mothers: A high-risk population

Most evidence on attachment and parental sensitivity is obtained from healthy samples in which organized attachment is the norm. There is little evidence related to disturbed mother-infant relationships, such as those affected by parental personality traits (Suchman, McMahon, DeCoste, Castiglioni, & Luthar, 2008), sociodemographic risk (Choi & Ryan,

2007), and behavioral health problems such as substance abuse (Espinosa, Beckwith, Howard, Tyler, & Swanson, 2001).

Mothers addicted to opioids –such as heroin– tend to be harsher (i.e. disapproving, provocative, threatening) and more authoritarian towards their children, compared to controls (Hans, Bernstein, & Henson, 1999). They are also less responsive and have more difficulties communicating with their infants (Bernstein, Jeremy, Hans, & Marcus, 1984; Hans et al., 1999). Furthermore, opioid addiction has been associated with alexithymia (i.e. difficulty in expressing and distinguishing between feelings and bodily sensations) and difficulties in emotion regulation, both of which have been correlated with parenting problems (Torrado, Ouakinin, & Bacelar-Nicolau, 2013).

Secure attachment relationships seem to allow for proper development of a mentalization system. However, missing important attachment experiences or experiencing early trauma might hinder its full development (Fonagy & Target, 2008). This in turn can increase vulnerability to later trauma and lead to reenactments of negative attachment patterns (Crittenden, 2015; Fonagy & Target, 2008). Therefore, it has been argued that reflective functioning may be a potential resilience factor that supports relationships in high-risk samples such as substance abusing mothers (Fonagy & Target, 2008). Therefore, it is relevant to further study reflective functioning in the context of substance abuse, especially considering its high comorbidity with history of trauma and other psychiatric disorders (Milby, Sims, Khuder, Schumacher, & Huggins, 1996).

Evidence suggests that substance-abusing mothers have (1) a reduced sensitivity to infant cues (Landi et al., 2011), (2) compromised mental representations of current caregiving experiences (Suchman et al., 2006; Torrado et al., 2013), and (3) considerable mentalizing problems (Hans et al., 1999). Therefore, it would be relevant to study whether the relationship between variables observed in healthy samples is also present in the context of substance abuse. Suchman and colleagues (2012) suggest that reflective functioning and representational quality may be components of an important mechanism of change for the improvement of maternal sensitivity in substance-abusing mothers. Nonetheless, the exact nature of the relationships involving these three components of parenting is still unclear.

Study Aims and Variables of Interest

The primary aim of this study was to examine –in a sample of substance-abusing mothers– the extent to which maternal reflective functioning may be the mechanism through which mental representations of current caregiving experiences materialize into sensitive, observable behaviors. Four specific hypotheses were tested. First, after allowance for the demographic and psychological covariates of marital status, child age, and primary drug use, the quality of mental representations of current caregiving experiences was expected to correlate significantly and positively with maternal sensitivity. Second, the quality of mental representations of current caregiving experiences was expected to correlate significantly and positively with maternal reflective functioning. Third, maternal reflective functioning was expected to correlate significantly and positively with maternal sensitivity. Finally, maternal

reflective functioning was expected to mediate the relationship between the quality of mental representations of current caregiving experiences and maternal sensitivity.

Method

Participants

The present study used the data from 142 mothers recruited into two randomized controlled trials (RCT) from the "Mothers and Toddlers Program" (Suchman, DeCoste, Castiglioni, Legow, & Mayes, 2008). The "Mothers and Toddlers Program" is a research project comparing a short-term (12-week), mentalization-based intervention called 'Mothering from the Inside Out' (MIO) with an active parenting education (PE) control. Participants were recruited from a community-based substance about treatment program. Most were referred by their drug treatment clinicians, the project staff, or previous participants. Both RCTs consisted of baseline, post-treatment, and follow-up assessment (see Suchman, DeCoste, Castiglioni, Legow, & Mayes (2008) for more information).

To be eligible for enrollment in either clinical trial, mothers had at least one child between 1 and 60 months of age, and were receiving outpatient substance abuse treatment services from a community-based provider. Exclusion criteria were (a) severe mental health problems, which would include suicide or homicide risk, psychosis or thought disorder, (b) severe cognitive impairment, (c) psychiatric or substance-related symptoms requiring hospitalization or ambulatory detoxification, (d) inability to speak English, or (e) target children with a serious illness or severe developmental delay.

Baseline data for RCT1 ($N = 77$) and RCT2 ($N = 100$) were merged into a single dataset to increase the statistical power of this study. However, several participants were missing data from the study measures. Mothers missing all three critical data points ($n = 35$) were excluded from this study. The final sample consisted of 142 mothers. Demographic information is displayed in Table 1.

As noted in Table 1, most mothers were single, white, heroin-dependent, had completed high school, were enrolled in methadone maintenance treatment, did not have child protective services involved in their family affairs, and had both male and female children. As would be expected, the percentage of boys versus girls was approximately equal. On average, mothers showed low reflective functioning, representational quality, and maternal sensitivity scores when compared to normative samples. Analysis of between-group difference in demographic and clinical characteristics indicated that there were significant differences accounted for by (a) a greater representation of mothers who described themselves as White in RTC2, $p = .03$ for Fisher's exact test, (b) a greater proportion of mothers involved with child protective services in RTC1, $\chi^2 (1, N = 142) = 11.89$, $p < .001$, and a greater proportion of mothers whose primary drug of abuse was opioids, $p < .001$ for Fisher's exact test. The children who participated in RCT1 were also somewhat younger than those who participated in RCT2, $t (140) = -4.25$, $p < 0.001$. There were no other statistically significant differences between samples at a $p < .05$ level of confidence.

Measures

Representational quality—The Working Model of the Child Interview (WMCI, Zeanah & Benoit, 1993) was used to assess the caregiver's perception and subjective experience of and with the infant during moments when the attachment systems are commonly activated (e.g. separation, illness, or injury). The WMCI evaluates how the mother makes sense of the child's emotional needs, personality, and interactions with her. Since questions have the potential to activate psychological defenses in relation to painful early memories in the mother, they may distort her representations of her child; therefore, it focuses primarily on the quality of the evoked descriptions rather than factual experiences. The original measure (19 items) was used for RCT1 but it was slightly modified –with permission from the primary author– into a 15-item version for RCT2, to reduce the interview burden. Scores range from 1 to 5, with a score of 3 considered a norm for adequate quality (Zeanah & Benoit, 1993). Scores from RCT1 were coded by an independent Ph.D. psychologist, who was trained to reliability by the PI and was blind to sample information and measurement time point (ICC ≥ .50, $p < .05$ on 21 independently rated protocols) (Suchman, DeCoste, Castiglioni, Legow, & Mayes, 2008). A clinical consultant on the team that was not blind to sample information and measurement time point coded RCT2. For RCT2, a randomly selected sample of 10 interviews was used to assess interrater reliability; interclass correlations ranged from .77 ($p < .01$) to .91 ($p < .001$). The outcome score of greatest interest for this study was the mean score for all six items representing overall coherence which yielded a .88 Cronbach's α for this sample.

Maternal reflective functioning—The 33-item Parent Development Interview (PDI; Slade et al., 2003) was administered to measure mentalizing activity. The PDI is a semi-structured interview used to assess how the mother makes sense of positive and negative situations with the child, the relationship, or herself as a parent. The original measure was slightly modified –with permission from the primary author– into 17-item (used in RCT1) and 14-item (used in RCT2) versions to reduce the interview burden and avoid overlap with the WMCI. Scores range from −1 to 9, with a score of 5 considered a norm for adequate mentalizing skills, which suggests awareness of mental states and their influence on interpersonal relationships (Slade et al., 2003). Interviews were video-recorded and transcribed verbatim. Transcripts were coded by a Ph.D. psychologist who was trained to reliability by the PI (ICC ≥ .50, $p < .05$ on 15 independently rated protocols) (Suchman, DeCoste, Castiglioni, Legow, & Mayes, 2008). An independent rater, blind to sample information and measurement time point, coded scores from RCT1. A clinical consultant on the team that was not blind to sample information and measurement time point coded RCT2. For RCT2, a randomly selected sample of 10 interviews was used to assess interrater reliability. Interclass correlations for two items were < .70 and the items were therefore omitted. Interclass correlations for the remaining 12 items ranged from .77 ($p < .05$) to .98 ($p < .001$). The outcome score of greatest interest was the mean RF score for all 12 items, which yielded a .80 Cronbach's α for this sample.

Maternal sensitivity—The Nursing Child Assessment Satellite Training (NCAST) Teaching Scale (Barnard & Eyres, 1979) was used to measure the quality of mother-infant interactions during a structured session. The mother is asked to introduce or teach the child a

new developmentally appropriate skill that has not yet been demonstrated or mastered by the child. The mother spends five minutes teaching the activity, and interactions are video-recorded and scored by a third party of trained coders. The NCAST can heighten the stress the mother and child feel because the mother is required to try to attain the child's interest and compliance in learning a new task and there are times the child is likely going to disengage from the task. The measure consists of six dimensions measuring the mother, the child, and the dyadic contributions to the interaction. Sessions were coded by certified NCAST raters (RCT1 = 1; RCT2 = 4) who were trained, according to NCAST requirements, to 90% reliability by the Project Director (a NCAST-certified instructor). The outcome score of greatest interest was the score in the "maternal sensitivity to cues" dimension, which yielded a .72 Cronbach's α for this sample.

Biopsychosocial evaluation—A semi-structured interview was used to obtain information about (a) general demographics, (b) family structure and history, (c) current living situation, (d) history of substance use, (e) medical and legal history, (f) history of trauma, and (g) mental health history.

Psychiatric Distress—Data from three measures of psychiatric distress were used to create covariates of conceptual interest: (a) severity of depression, (b) severity of post-traumatic stress symptoms, and (c) somatic preoccupation. Severity of depression was represented by total score on the Beck Depression Inventory (BDI; Beck, Steer & Brown, 1996, Cronbach's α = .92 for this sample). Severity of post-traumatic stress was represented by the number of trauma symptoms endorsed on the biopsychosocial evaluation, and somatic preoccupation was represented by the Somatization subscale of the Brief Symptom Index (BSI; Derogatis, 1993, Cronbach's α = .80 for this sample).

Procedures

The present study had a cross-sectional design. All baseline data for this study was obtained during the intake baseline assessment stage of both RCT cohorts. Baseline assessments consisted of a comprehensive biopsychosocial evaluation, a Parent Development Interview (PDI), a Working Model of the Child Interview (WMCI), a video-recorded mother infant interaction session coded with the Nursing Child Assessment Satellite Training Teaching Scale (NCAST), and additional measures that were not used in this study.

Statistical analyses

The SAS System for Windows, Version 9.4 M3 (SAS Institute, Inc., 2015) was used to conduct the data analysis. Because the final dataset contained 51 (12.0%) missing data points for the variables of primary interest across 32 (22%) participants, PROC IMPUTE, PRIC UNIVARIATE, and PROC MIANALYZE were used to compute a best estimate of the missing data to increase statistical power in the primary data analysis by maximizing sample size while minimizing the risk for bias (Young, Weckman, & Holland, 2010). Screening of the data suggested that the pattern of missing data was arbitrary. Consequently, the MCMC method of multiple imputation available in PROC IMPUTE to impute continuous values missing in an arbitrary pattern was used to generate 10 datasets with best estimates of the missing values for each participant. As suggested by Hayes (2013), those

preliminary estimates were reviewed and combined across the 10 datasets with PROC UNIVARIATE to create a single best estimate of each missing value in a dataset prepared for use in a multiple regression analysis to test for mediation. The three variables of primary interest and several conceptually relevant continuous auxiliary variables that correlated moderately with the three variables of primary interest were used in the multiple imputation procedure.

Next, descriptive statistics and a zero-order correlation matrix were calculated for the variables of primary interest. Because the sample for this study was drawn from samples associated with two randomized clinical trials, a t-test for independent samples was used to test for differences in each of the primary variables.

PROCESS, Version 2.16, the flexible SAS macro developed by Hayes (2013) to test statistical models involving mediation and moderation, was used to conduct a path analysis to test for statistically significant mediation. The path model used in the primary data analysis is outlined in Figure 1. Consistent with the procedures outlined by Hayes and his colleagues (Hayes, 2013; Preacher & Hayes, 2004, 2008), five parameters of interest were estimated: (a) the total effect of representational quality on maternal sensitivity (*c* path), (b) the direct effect of representational quality on maternal reflective functioning (*a* path), (c) the direct effect of reflective functioning on maternal sensitivity on maternal sensitivity after allowance for representational quality (*b* path), (d) the indirect effect of representational quality on maternal sensitivity through reflective functioning (*ab* path), and (e) the direct effect of representational quality on maternal sensitivity (c′ path).

As suggested by Hayes (2013), a product of coefficients approach and bootstrapping techniques were used to calculate the indirect effect of representational quality on maternal sensitivity through reflective functioning. Bootstrap estimates were based on 10,000 samplings of the data, and 95% confidence intervals derived from the bias-corrected bootstrap estimates were used to define product coefficients significantly different from zero. Because statistical tests of mediation done with cross-sectional data are subject to confounds and misspecification (Hayes, 2013), three additional mediation analyses were done. One tested for confounding of the primary relationships by demographic characteristics, a second tested for confounding of the primary relationships by psychiatric distress, and a third tested an alternate conceptual model where mediation of the relationship between reflective functioning and maternal sensitivity by representational quality was considered. This alternate model is specified in Figure 2. Across statistical analyses, all parameter estimates with *p*-values less than .05 were considered statistically significant.

Results

Between-group differences

Although there were no significant differences in either PDI scores representing reflective functioning or NCAST scores representing maternal sensitivity, WMCI scores representing representational quality were, as noted in Table 1, both significantly less variable and significantly lower in RCT2 than RCT1, Folded $F (52, 88) = 1.66$, $p = .03$ and

Satterthwaite's t (89.16) = 2.63, p = .01. As also noted in Table 1, there were no significant differences (p < .05) in severity of somatic, depressive, or trauma symptoms.

Zero-order correlations

The zero-order correlation matrix of the variables of primary interest can be observed in Table 2. As expected, representational quality, maternal reflective functioning, and maternal sensitivity were significantly, moderately, and positively correlated to each other.

Mediation analysis: Maternal reflective functioning as mediator

Results of the path analysis are summarized in the Figure 1. As noted, there was a statistically significant, positive relationship between representational quality and maternal sensitivity (c path, Figure 1). There was also a statistically significant, positive relationship between representational quality and maternal reflective functioning (a path, Figure 1), and there was a statistically significant, positive relationship between maternal reflective functioning and maternal sensitivity after allowance for representational quality (b path, Figure 1). As expected, there was also a statistically significant indirect effect of representational quality on maternal sensitivity through maternal reflective functioning, ab = 0.67, 95% CI [0.14, 1.60]. The partially standardized effect size described by Hayes (2013) was 0.15, 95% CI [0.03, 0.34]; and the completely standardized effect size was 0.06, 95% CI [0.1, 0.13]. The direct relationship between representational quality and maternal sensitivity (c' path, Figure 1) did not prove statistically significant, suggesting that maternal reflective functioning may explain the relationship between representational quality and maternal sensitivity.

Supplementary mediation analysis: Potential confounding effects

Because mediation models tested with cross-sectional data are subject to confounding (Hayes, 2015), two alternate models were tested to see if the indirect effect of representational quality on maternal sensitivity through reflective functioning remained significant after allowance for demographic and clinical covariates. As noted in Table 2 maternal age, child age, severity of depressive symptoms, severity of post-traumatic stress, and somatic preoccupation each correlated moderately and significantly with representational quality, reflective functioning, or maternal sensitivity. However, in a statistical model that included maternal and child age as covariates, the indirect effect of representational quality on maternal sensitivity through reflective functioning remained statistically significant (ab = 0.62, 95% CI [0.12, 1.52]). Similarly, in a statistical model that included the three markers of psychiatric distress in the mother as covariates, the indirect effect of representational quality on maternal sensitivity through reflective functioning remained statistically significant (ab = 0.69, 95% CI [0.10, 1.79]).

Alternate mediation analysis: Representational quality as mediator

Because casual ordering in mediation models tested with cross-sectional data can also be misspecified (Hayes, 2013), an alternate mediation analysis was performed to test for mediation in the relationship between maternal reflective functioning and maternal sensitivity by representational quality as outlined in Figure 2. Results of the path analysis are

summarized in Figure 2. As noted, there was a statistically significant, positive relationship between maternal reflective functioning and maternal sensitivity (*c* path, Figure 2). There was also a statistically significant, positive relationship between maternal reflective functioning and representational quality (*a* path, Figure 2), but the relationship between representational quality and maternal sensitivity did not prove statistically significant after allowance for maternal reflective functioning (*b* path, Figure 2). There was also no significant indirect effect of reflective functioning on maternal sensitivity through representational quality (*ab* = 0.26, 95% CI [−0.03, 0.83]), and the direct effect of reflective functioning on maternal sensitivity (*c′* path, Figure 2) remained statistical significant, suggesting that representational quality does not mediate the relationship between reflective functioning and maternal sensitivity.

Discussion

Mental representations of caregiving and maternal sensitivity

Consistent with the first hypothesis, results from this sample suggest that the quality of mental representations of current caregiving experiences is significantly and positively correlated with maternal sensitivity. This matches with studies suggesting that mothers with more coherent mental representations of current caregiving experiences demonstrate more sensitive caregiving behaviors (Sayre et al., 2001; Slade et al., 1999; Sokolowsky et al., 2007). It is possible that mothers with a high level of richness, flexibility, balance, and coherence in their mental representations are more aware and accepting of the potential aspects of the relationship to attend to while interacting with the child (e.g. impulse control, limit setting, distress levels). This may make them more sensitive or perceptive to relevant cues that could reflect distress, frustration (e.g. crying, throwing the toys, yelling), or positive feedback (e.g. smiling, celebrating, calling for attention) from the child while teaching a new skill. As a result, they may be prepared to adapt their teaching strategies accordingly, to regulate their children's affective responses and behavior. Another possibility would be that the level of sensitivity to the child's cues might inform representations regarding current caregiving experiences. In other words, more sensitive mothers may be better at picking up relevant cues to inform their representations of the relationship with her child, thus helping revise those working models into richer and more coherent ones. A third possibility would be that it is a reciprocal process where contact with the child influences the relationship.

Mental representations of caregiving and maternal reflective functioning

Consistent with the second hypothesis, results from this sample suggest that the quality of mental representations of current caregiving experiences is significantly and positively correlated with the level of maternal reflective functioning. This is similar to findings from studies suggesting that mothers with more coherent mental representations of caregiving are more aware or attuned to their child's mental states and affective needs (Bost et al., 2006; Fonagy et al., 1991; Huth-Bocks et al., 2014). It could be the case, as suggested by Fonagy and colleagues (1991, 2004, 2008), that the mothers with more coherent representations of caregiving were more aware of the boundaries between themselves and their children and thus were better able to see them as having a mind of their own. In other words, it is possible

that the quality of mental representations of caregiving reflects the degree to which the mother has a notion of the child as a separate being from herself, which then engages a mentalizing stance and helps inform the mother about which perspective she is taking during an interaction (e.g. the child, herself as a child, herself as a mother). Nevertheless, it is also conceivable that the observed quality of mental representations of current caregiving experiences was due to higher reflective functioning. In other words, it is possible that reflective functioning is –as Schechter and colleagues (2005) proposed– a prerequisite for developing more coherent and flexible mental representations of their caregiving experience. That being said, mothers who were capable of understanding the intentions and mental states behind their child's behavior had better chances of accommodating them into more consistent mental representations of caregiving. Another possibility would be however, that contact with the child evokes either variable in the mother, thus affecting the interaction in a reciprocal manner.

Maternal reflective functioning and maternal sensitivity

Consistent with the third hypothesis, results from this sample suggest that the level of maternal reflective functioning is significantly and positively correlated with the level of maternal sensitivity. This is comparable to studies suggesting that mothers that are more attuned to their child's mental states and affective needs demonstrate more sensitive caregiving behaviors during a teaching task (Farrow & Blissett, 2014; Stacks et al., 2014). One possible explanation could be that mothers who have higher reflective functioning scores were more capable of metaphorically "taking a step back" from the interactions, to make sense of what their child –and themselves– may be experiencing during the task (see *alpha-function* in Bion, 1962). This may allow them to become more perceptive and attuned to additional cues corresponding to those mentalized affective states. However, it is also possible that this interaction is a reciprocal process where contact with the child evokes a mentalizing stance in the mother, thus promoting more sensitive caregiving.

The mediating role of maternal reflective functioning in the relationship between mental representations of caregiving and maternal sensitivity

Consistent with the fourth hypothesis, results suggest that maternal reflective functioning mediates the relationship between the quality of mental representations of current caregiving experiences and maternal sensitivity. On the contrary, results from the alternative mediation model suggest that the quality of mental representations of current caregiving experiences do not mediate the relationship between maternal reflective functioning and maternal sensitivity. These findings are concordant with theories suggesting that mental representations of current caregiving experiences affect maternal sensitivity by means of the maternal ability to reflect upon their child's mental states and affective needs (Fonagy & Target, 2008; Meins, 2013; Suchman, DeCoste, Rosenberger, & McMahon, 2012).

This is a particularly interesting finding for two main reasons. First of all, both mediation models suggest that maternal reflective functioning has a greater effect on maternal sensitivity than the quality of mental representations of caregiving. Second, results suggest that maternal reflective functioning and the quality of mental representations of caregiving are not interchangeable variables in the way they affect maternal sensitivity. This is an

important finding as it supports theories and findings suggesting that attachment and mentalization are separate processes that might dovetail under certain circumstances (Bartels & Zeki, 2004; Gergely & Unoka, 2008). Likewise, it supports Fonagy and Target (2008) idea that attachment is the developmental "training ground" for mentalization. Taken together, our findings could support Winnicott's (1960, 1971) ideas on *holding* and "*good-enough" parenting.* Results suggest that the level of coherence in a mother's mental representations of current caregiving experiences may influence her attunement towards the child's physical and emotional needs, which in turn may foster more appropriate responses in their interactions with their children.

These findings also support theories suggesting that having more secure attachment relationships –in this case reflected by more coherent mental representations of caregiving experiences– allows the mother to go past her own attachment needs and engage in a more reflective attitude towards the child (Fonagy & Target, 2008). This is consistent with neuroscientific findings proposing that having a sense of security in the attachment relationship deactivates the attachment system, enabling the mentalizing system, which allows the individual to see the love-object as a person with separate mind and emotions (Bartels & Zeki, 2004; Noriuchi, Kikuchi, & Senoo, 2008). Considering that the representational quality is related to the security of attachment (Huth-Bocks et al., 2014), it is possible that substance-abusing mothers that have more coherent mental representations of caregiving may be able to better mentalize their children. However, mothers with less coherent representations of caregiving may have a hyperactive attachment system –as is commonly the case in insecure or disorganized attachment styles (Crittenden, 2015; Madigan et al., 2006)– and may thus have trouble setting aside their own attachment needs to engage their mentalization systems to reflect upon the child's mental states.

It is possible that mental representations of early caregiving experiences as a child are revised and expanded into those of the current caregiving experience (Pines, 1972). In other words, it is possible that mothers keep on "learning from (their own) experience" (Bion, 1962) as the mother makes the transition to motherhood. This may happen based on persistent mother-infant interactions that are first guided by the child's own temperament and then adapted to the dyadic interaction. The findings from this study could suggest that, as representations of current caregiving experiences become increasingly coherent, they may foster the development of a mother's capacity for *reverie* (Bion, 1962) or reflecting upon the child's mental states, and thus display more appropriate and sensitive responses to the child's behavioral cues. These responses may manifest for instance, in more contingent and mind-minded comments and responses (Meins, 2013).

Contrarily, if these mental representations of caregiving are negative or distorted –perhaps due to perceptual or attentional problems in the mother, poor behavioral cues from the child, or hypersensitivity in the child– then the mother might not have a clear notion of how the child reacts to different circumstances. In that sense, it may be difficult for the mother to engage her mentalizing skills to translate such behaviors into mental states and therefore may have more trouble in adapting her responses to foster positive states and regulate negative ones. In other words, these mothers may not understand the reason why the child is distressed (or may not even pick the cues) and consequently may not know how to act

accordingly to regulate the affect. Furthermore, drug use, depression, anxiety, and situational stress –all common among substance-abusing mothers– could also further impact this process.

Clinical implications

Attachment-based and mentalization-based interventions are gaining popularity as effective treatments for parents with substance-use and serious mental health difficulties (Neger & Prinz, 2015). These interventions are focused on improving the emotional bonds and maternal mentalizing skills in order to improve mother-infant interactions (Pajulo & Kalland, 2013). Despite the small effect sizes, findings from this study further support these interventions by underscoring the importance of mental representations and reflective functioning in fostering more sensitive maternal behaviors. Consistent with Suchman and colleagues (2012), these findings suggest that altering both representational quality and reflective functioning may be a mechanism of change for improving maternal caregiving behaviors in high-risk samples. Although mental representations of current caregiving experiences are central to the relationship, it is the mother's capacity for reflecting upon them (and about her child's underlying mental and emotional experience) that has a greater effect on the level of sensitivity towards the child. Therefore, it would be relevant to develop interventions that have a dual focus on both factors and clarify how change in one construct promotes change in the other in reciprocal patterns of change. Nevertheless, it is important to be mindful of the limited explanatory power of the statistical model and the limited strength of the relationship.

Since substance-abusing mothers show different levels of reflective functioning; therefore, clinicians should first of all be able to assess the level of mentalization in their patients and adapt the interventions accordingly, instead of assuming that the patient is mentalizing properly. That said, therapists could begin the intervention by targeting a mother's reflective skills by gradually making them more aware of their child's psychological experience. This would not only help in setting the foundations for a positive therapeutic relationship –as the mother would not feel threatened by early interpretations or while exploring traumatic experiences, as suggested by Fonagy and Target (2008)– but would also help for laying the ground for a richer exploration of the internal world of the mother (by enhancing their self-reflective skills and by strengthening the boundaries between self and other). Once a strong-enough mentalizing foundation has been sufficiently developed to help the mother understand her own and her child's psychic experience without getting too distressed, then the clinician might start exploring and enhancing the quality of mental representations of attachment.

Strengths and limitations

Although this study furthers our understanding of mental representations and mentalizing in the parenting behavior of substance-abusing mothers, it has some limitations. The first limitation is that it was a cross-sectional study; therefore, no causal or temporal inferences could be made. Second, as the main focus was on these three constructs (i.e. representational quality, maternal reflective functioning, and maternal sensitivity) there were other potential influences that were not included in the statistical model. Including additional measurements

could have solved this limitation; however, because the data were already collected it was not possible to do so.

The third limitation is that, although enough theory supports the associations between variables, their ordering in the hypothesized mediation model was derived primarily from theoretical assumptions rather than established empirical knowledge. Nevertheless, this limitation was buffered to a certain extent by testing both models alongside a supplemental analysis for potential confounding effects, resulting in more reliable findings.

A fourth limitation is that all subjects in this sample were substance-abusing mothers and hence the effects of substance abuse itself were not controlled for. It would have been useful to include data from non-substance-abusing mothers to control for the effect of substance abuse and test if the model still yielded significant results. However, the "Mothers and Toddlers Program" is targeted specifically to substance abusing mothers; therefore, it was not possible to recruit any healthy mothers.

Fifth, due to the diverse child age range in the sample, it is possible that these mother-infant interactions were already influenced or primed by child-specific factors. Furthermore, since mothers chose which children to work with during the interventions, it was not possible to control for parity. Since child age was significantly correlated with maternal sensitivity, it would be relevant for future studies to take this factor into account by including additional child-factors such as parity, temperament, birth problems, or disability, as they may also affect the mother-infant bond.

Finally, there was a considerable amount of missing data from the original samples, yielding to medium sample sizes from each RCT. Therefore, it was decided to merge the datasets from both samples bearing in mind the potential limitations, particularly due to differences in sample characteristics. These limitations were targeted by first using identical measures that allowed for the merging of both samples into a large, heterogeneous, multi-method, and multisource dataset; and second, by using one of the most rigorous methods to estimate the overall missing data. Furthermore, by using highly reliable and rich measures, results were highly sensitive to the mentalizing, representational, and interactive characteristics of the sample.

Future directions of research

Considering the methodological limitations of the present study and small effect sizes, it would be relevant to do a prospective study with a larger sample where the potential influence of other social and psychological factors could be considered in a research design that allows for documentation of temporal ordering of measures. Also, it would be valuable to test this model controlling for parental attachment style. This would help better understand how the security of attachment influences the representational world and mentalizing capacities of mothers. However, it may be advantageous to consider the attachment categories from the Dynamic Maturational Model (DMM) of attachment (Crittenden, 2015) to determine attachment security. It has been suggested that the DMM may have greater theoretical and clinical value as it takes into consideration multiple environmental factors (e.g. education, social support, poverty, homelessness, trauma, and

parental psychopathology) that have been found to influence representational quality, reflective functioning, and maternal sensitivity (Crittenden, 2015). Similarly, it would be relevant to test the model in fathers, to see if it is generalizable to both parents or if it is specific to maternal care. Finally, the present study used a teaching paradigm to measure maternal sensitivity. Even though this task could be argued to activate the attachment system (e.g. when the child disengages from the task or when the mother becomes frustrated), it is possible that results relate more specifically to attachment interactions during learning processes rather than the attachment system in general. Therefore, it might be useful to test this model using measures involving different settings and demands.

Conclusion

Altogether, findings from the present study suggest that mental representations of current caregiving experiences may affect maternal sensitivity by means of the maternal ability to reflect upon their child's mental states and affective needs. It seems that maternal reflective functioning has a greater effect over maternal sensitivity than the quality of mental representations of caregiving. Therefore, it would be relevant to develop interventions that have a dual focus on both factors. This study sheds light on how the internal world and reflective skills of the mother shape her interactions with the child, which might eventually lead to the intergenerational transmission of attachment.

Acknowledgments

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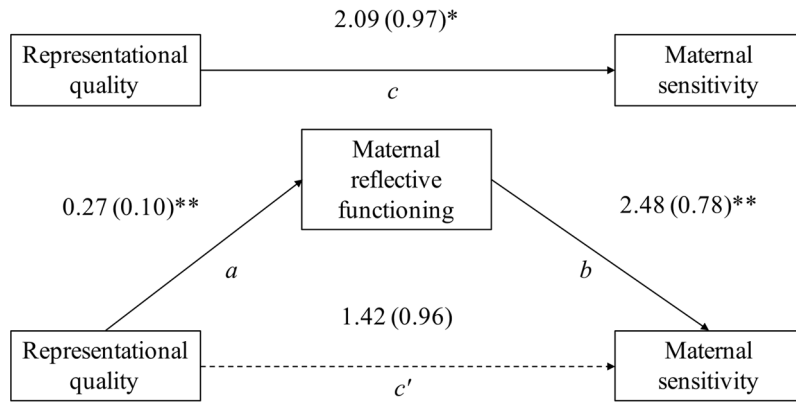
Figure 1.
Summary of statistical tests for mediation of the relationship between maternal representation of caregiving and maternal sensitivity by maternal reflective functioning. Values represent unstandardized coefficients (*se*).
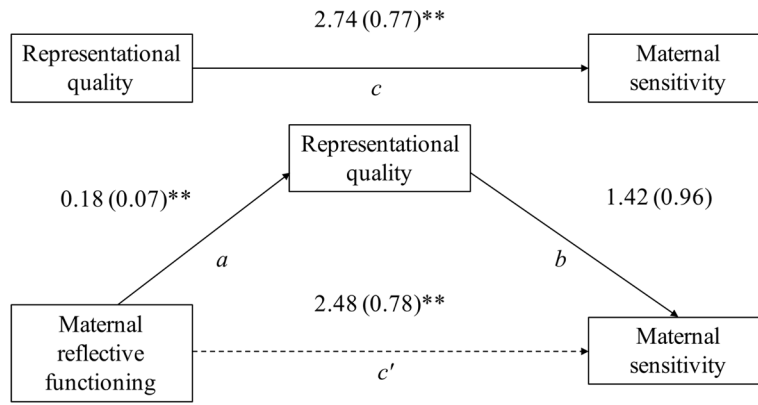*$p < .05$; **$p < .01$

Figure 2.
Summary of statistical tests for mediation of the relationship between maternal reflective functioning and maternal sensitivity by maternal representation of caregiving functioning. Values represent unstandardized coefficients (*se*).
*p < .05; **p < .01

Table 1

Demographic characteristics of the sample

Maternal factors	RCT1 M (SD)	RCT2 M (SD)	Total M (SD)	Range
Age	29.74 (6.78)	29.85 (5.24)	29.81 (5.85)	19–45
Education (years)	12.32 (1.28)	12.35 (2.30)	12.34 (1.97)	5–18
Somatic preoccupation	0.71 (0.67)	0.84 (0.78)	0.79 (0.74)	0–3.57
Number of trauma symptoms	2.34 (1.35)	2.56 (1.39)	2.47 (1.37)	0–4
Severity of depression	15.15 (9.46)	15.40 (11.09)	15.30 (10.47)	0–50
Ethnicity[*]	%	%	%	
Hispanic/Latino	11.3	3.5	6.5	
Black	24.5	12.8	17.3	
White	64.2	79.1	73.4	
Other ethnicity	0.0	4.7	2.9	
Marital Status				
Never married	49.1	41.9	44.6	
Cohabiting	17.0	34.9	28.1	
Divorced	7.6	7.0	7.2	
Married	18.9	14.0	15.8	
Separated	7.6	2.3	4.3	
Number of children				
1	41.5	40.7	41.1	
2	26.4	33.7	31.0	
3	18.9	17.4	18.0	
4	9.4	4.7	6.5	
5	0.0	1.2	0.7	
6	3.8	2.3	2.9	
DCF involvement[***]	60.4	30.6	42.0	
Primary drug use[***]				
Alcohol	5.8	6.1	6.0	
Cannabis	11.5	0.0	4.5	
Opioid	69.2	86.6	79.9	
Cocaine	13.5	3.7	7.5	
PCP	0.0	3.7	2.2	
Methadone maintenance	62.3	73.4	69.1	
Child characteristics	M (SD)	M (SD)	M (SD)	Range
Age (months) at baseline[*]	17.43 (13.51)	27.98 (14.76)	24.04 (15.15)	1–71
	%	%	%	
Male	50.9	52.8	52.1	

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Maternal factors	RCT1	RCT2	Total	
	M (SD)	M (SD)	M (SD)	Range
Study variables	M (SD)	M (SD)	M (SD)	Range
Representational quality (WMCI)[*]	2.74 (0.45)	2.53 (0.36)	2.61 (0.38)	1.83–3.83
Reflective functioning (PDI)	3.08 (0.49)	3.10 (0.49)	3.09 (0.47)	1.93–4.36
Maternal sensitivity (NCAST)	35.93 (4.13)	36.31 (4.79)	36.14 (4.44)	25–47
Somatic complaints (BSI)	0.71 (0.67)	0.83 (0.77)	0.79 (0.73)	0–3.57
Depressive symptoms (Beck)	15.15 (9.46)	15.37 (10.91)	15.29 (10.36)	0–50
Trauma symptoms (DSM IV-TR)	2.32 (1.34)	2.55 (1.35)	2.47 (1.35)	0–4

Note: N = 142. DCF = Department of Children and Families, PCP = Phencyclidine, WMCI = Working Model of the Child Interview, PDI = Parent Development Interview, NCAST = Nursing Child Assessment Satellite Training Teaching Scale, BSI = Brief Symptom Index, Beck = Beck Depression Inventory.

[*]
$p < .05$,

[**]
$p < .01$,

[***]
$p < .001$

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Table 2

Correlations among all variables involved in the model

	1	2	3	4	5	6	7
1. Maternal age	—						
2. Child age	0.27^{**}	—					
3. Somatic preoccupation	0.02	0.11	—				
4. Number of trauma symptoms	0.13	−0.02	0.32^{**}	—			
5. Severity of depression	0.14	0.10	0.68^{**}	0.24^{**}	—		
6. Maternal reflective functioning (PDI)	0.22^{**}	0.15	0.17^{*}	0.13	0.33^{**}	—	
7. Maternal sensitivity (NCAST)	0.06	0.19^{*}	0.09	0.24^{**}	−0.00	0.29^{**}	—
8. Representational quality (WMCI)	0.03	−0.08	−0.19	0.01	0.01	0.22^{*}	0.18^{*}

Note: DCF = Department of Children and Families, PDI = Parent Development Interview, NCAST = Nursing Child Assessment Satellite Training Teaching Scale, WMCI = Working Model of the Child Interview.

* $p < .05,$

** $p < .01$