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ARTICLE

Associations between Turkish incarcerated mothers' sensitivity and their co-residing children's attachment: The moderating role of children's temperament

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ABSTRACT

This study investigated the associations between incarcerated mothers' sensitivity and their co-residing children's attachment security. Furthermore, the moderating role of children's temperament on the associations between maternal sensitivity and children's attachment security was examined. The study sample consisted of 84 incarcerated mothers (M_{age} = 29.9, SD = 5.6) and their 12- to 43-month-old (M = 25.3, SD = 8.3) children who co-resided with them in prison facilities. Maternal sensitivity and child's attachment were assessed by observation of mother-child interaction using the Maternal Sensitivity Scale and the Turkish Toddler Attachment Sort-60, respectively. Mothers reported their children's temperamental features (i.e. negative emotionality and effortful control) using the Early Childhood Behavior Questionnaire. Results showed that maternal sensitivity was related positively to children's secure attachment and negatively to children's disorganized attachment. Furthermore, children's negative emotionality and effortful control moderated the associations between maternal sensitivity and children's attachment. Specifically, maternal sensitivity negatively predicted children's avoidant attachment only for children with low negative emotionality and with high effortful control. Additionally, maternal sensitivity negatively predicted children's anxious attachment only for children with low effortful control. Results are discussed in terms of sample-specific experiences, contextual factors, and the differential susceptibility hypothesis.

KEYWORDS

Maternal incarceration; co-residing children; attachment; maternal sensitivity; temperament

Introduction

The number of women serving time in prison has increased dramatically over the last few decades in Turkey (Fisher, 2018) as well as the other countries such as the United States (Dallaire & Shlafer, 2018). Most incarcerated women have young children, and were the primary or only caregiver before their imprisonment (Glaze & Maruschak, 2010). Early separation from the primary caregiver has been considered as a risk factor that deteriorates children's later development (for a reiew see Kobak et al., 2016). Prison co-residency is an alternative to mother-child separation, which is a significant threat to children's

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formation of secure attachment to their mothers (Poehlmann, 2005b). Although many countries allow eligible incarcerated mothers to care for their young children in prison facilities (for a review see Alejos, 2005), there is little known about the quality of attachment co-residing children have with their mothers.

Secure attachment in early years promotes children's interpersonal functioning and mental health (Groh et al., 2017), and is closely associated with resilience in high-risk children (Belsky & Fearon, 2002). Not only is the protective role of attachment security on later development greater for disadvantaged children, but the deteriorating effect of insecure attachment on later maladjustment is magnified when children experience contextual risk factors (Graham & Easterbrooks, 2000). It therefore remains important to understand what influences the development of attachment security among disadvantaged children residing with their mothers in prison and the capacity of their mothers to function as sensitive caregivers. Moreover, it may be suggested that the stress experienced by mother-child dyads during their confinement in a restrictive prison environment may serve to stimulate children's temperamental reactivity and impair mothers' ability to engage in effective caregiving. Therefore, the present study aims to investigate (1) the associations between maternal sensitivity and co-residing children's attachment (2) and the moderating role of children's temperamental characteristics (i.e. negative emotionality and effortful control) on the sensitivity-attachment link.

Incarcerated mothers and their co-residing children

It has been widely recognized that incarcerated mothers and their children represent a highly disadvantaged group. Many incarcerated women have experienced a number of difficulties including economic hardship, low educational attainment, substance abuse, physical and sexual victimization, elevated mental health problems, and lack of a social support network (Fedock, 2017; Glaze & Maruschak, 2010; Poehlmann, 2005a). Furthermore, a study conducted with incarcerated mothers co-residing with their infants revealed that a majority of the sample was rated as non-autonomous; specifically, 20% of mothers were rated as dismissing, 13% were preoccupied, and 30% were unresolved (Borelli et al., 2010). Evidence suggests that parental risk factors (for a meta-analysis see Cyr et al., 2010) and their non-autonomous attachment representations (for a meta-analysis see Verhage et al., 2018) pose important risks to their children's secure attachment. In this regard, it may be suggested that not only children separated from their incarcerated mothers but also children who reside with them are at risk of developing insecure attachment.

Maternal incarceration is thought to be highly detrimental to children's adjustment (Poehlmann-Tynan & Arditti, 2018). Dallaire and Wilson (2010) reported that children of incarcerated mothers, compared to children of incarcerated fathers, experience more anxiety and depression and exhibit rule-breaking behaviors more frequently. They are also at increased risk for a myriad of problems compared to their peers including internalizing and externalizing difficulties (Dallaire et al., 2015), academic failure (Trice & Brewster, 2004), and being involved in criminal activity in adulthood (Dallaire, 2007). Furthermore, Poehlmann (2005b) found that young children react to separation from their incarcerated mothers with crying, sadness, confusion, fear, anger, sleep problems, and developmental regression. Additionally, Poehlmann's

(2005b) study also indicated that children living in a stable caregiving situation during their mothers' incarceration were significantly more likely to be categorized as securely attached, compared to the ones whose caregivers changed more frequently. Therefore, it may be suggested that maternal separation and inconsistent living arrangements during their mothers' incarceration may deteriorate children's development. Prison co-residency may therefore enable mother-child dyads with an opportunity to stay together in a relatively stable environment.

Eligible female prisoners are allowed to care for their young children within prison facilities in many countries (see Alejos, 2005). In Turkey, incarcerated mothers are allowed to co-reside with their children younger than six years of age in prison facilities. Although there is a debate about whether staying in correctional institutions is in the best interest for these children (e.g. Bastick & Townhead, 2008), to our knowledge, only one previous study has compared the developmental outcomes of children who co-resided with, versus being separated from their incarcerated mothers (Goshin et al., 2014). This study found that co-residing children were significantly less anxious and depressed and exhibited less withdrawal behavior than children who were separated from their incarcerated mothers during early years of life, even after controlling for risks in the caregiving environment (e.g. prenatal substance abuse, poverty). Although this study indicated that co-residing with their mothers may support children's socioemotional development, there remains a scarcity of research focusing on their social and emotional outcomes. To date, studies conducted with this group of children have mainly considered their physical development (e.g. fine motor, gross motor), nourishment, living settings, and health conditions such as body weight, respiratory problems, or immunization status (e.g. Ferrara et al., 2006; Makau et al., 2017).

Attachment security of children with incarcerated mothers: The role of maternal sensitivity

Attachment representations play a significant role in how we appraise, feel, and behave throughout our lives (Bowlby, 1982). Numerous studies have emphasized the protective role secure attachment has on various aspects of later development including self-esteem, emotional regulation, ego resiliency, and social competence (Groh et al., 2017; for a review see Thompson, 2016). Contrary to secure attachment, insecure attachment has been indicated as a risk factor in a number of areas such as academic underachievement, conduct problems, and poor social competence (Evans et al., 2013). Although many incarcerated mothers are allowed to reside with their children in order to protect the mother-child bond, there is little known about these children's attachment to their mothers. To our knowledge, only two studies have directly investigated co-residing children's attachment to their incarcerated mothers (Byrne et al., 2010; Cassidy et al., 2010). Both studies included implementation of attachment-based intervention programs that were initiated at birth. Children's attachment was then evaluated at 12-months, and both studies found that children's secure attachment rates were comparable to those typically found in low-risk samples (and more favorable than those typically found in disadvantaged samples). Such results suggest that prison nurseries can be used as a setting to promote incarcerated mothers' parenting skills to raise securely attached children. However, the key determinants of co-residing children's attachment security appear not to have been sufficiently investigated.

Maternal sensitivity is defined as a mother's ability to perceive and interpret accurately as well as respond promptly and appropriately to the child's attachment signals (Ainsworth et al., 2015). The supporting role of maternal sensitivity on children's attachment security has been shown in a number of studies including experimental (Klein Velderman et al., 2006), cross-cultural (Posada et al., 2016), and meta-analytical (De Wolff & Van IJzendoorn, 1997) research. To our knowledge, there are only two studies evaluating children's attachment whose motherswere involved in a jail-diversion program (Cassidy et al., 2010) and residing in a prison nursery (Byrne et al., 2010). Both studies implemented attachment-based intervention programs, and their results showed that intervention efforts created a significant improvement in maternal sensitive caregiving behaviors. However, Cassidy et al. (2010) did not examine the relationship between maternal sensitivity and children's attachment security, probably due to the limited sample size (n = 20). Furthermore, Sleed et al. (2013) did not evaluate children's attachment in their study. Thus, to the best of our knowledge, the associations between incarcerated mothers' sensitivity and their co-residing children's attachment security have not been investigated. Considering that maternal sensitivity is especially crucial for children's attachment security under stressful conditions (Leerkes, 2011), it is important to examine the links between these mothers' sensitivity and their children's attachment security.

The moderating role of children's temperament on the sensitivity-attachment link

Although there is a well-established link between maternal sensitivity and children's attachment, this link is not as predictive as presumed by attachment theory (De Wolff & Van IJzendoorn, 1997). This moderate relationship between maternal sensitivity and children's attachment security is explained as the *moderator gap* suggesting that unidentified third variables may moderate the sensitivity-attachment link (Fearon & Belsky, 2016, p. 295). In line with this, the differential susceptibility hypothesis proposes that the influence of rearing experiences on children's developmental outcomes, including attachment security, might vary significantly as a function of children's individual characteristics (Belsky, 1997a, 1997b). Specifically, the hypothesis, along with the supporting empirical findings, indicates that individuals with heightened susceptibility may disproportionately benefit from enriched caregiving environments, and they may also be at particular risk when they are exposed to adverse rearing influences (Belsky et al., 2007; Belsky & Pluess, 2013; De Schipper et al., 2004; Zhang et al., 2021).

Temperament is defined as constitutionally based individual differences in emotional, motor, and attentional reactivity and self-regulatory capacities seen early in development (Rothbart, 2011). Temperamental reactivity has been one of the most investigated individual characteristics in research focusing on the susceptibility to rearing environments (Belsky et al., 1998; for a review, see Van IJzendoorn & Bakermans-Kranenburg, 2012). For instance, studies indicated that rearing influences may play a greater role in more temperamentally reactive children's externalizing (Belsky et al., 1998; Zhang et al., 2021) and internalizing problems (De Schipper et al., 2004) compared to less temperamentally reactive children. It has also been shown that the attachment security of children with reactive temperament may be strongly susceptible to rearing effects, compared to the children with less reactive temperamental characteristics (Cassidy et al., 2011; Crockenberg, 1981). To illustrate, it was found that highly

temperamentally reactive children's attachment security seems to be more strongly influenced by their mothers' experimentally induced sensitivity compared to less reactive children (Klein Velderman et al., 2006). Nevertheless, there is still a scarcity of research investigating the moderating role of child's temperament on the relationship between caregiving behaviors and child's attachment, particularly for disadvantaged populations.

Children co-residing with their mothers constantly experience frustration due to the restrictive nature of a prison environment. In Turkey, incarcerated mothers and their children usually share their rooms and communal areas (e.g. kitchen, bathroom) with several other inmates who do not have co-residing children (İşcanoğlu, 2019). With these limited resources, other inmates may be less patient with more reactive children compared to children with higher ability to regulate their emotions and behaviors. Anaraki and Boostani (2014) conducted in-depth interviews with mothers experiencing imprisonment with their co-residing infants. Most of the participant mothers stated that other prisoners who do not have co-residing children object to the noise made by their children. Based on these findings, it may be argued that irritable children who tend to be more fussy and loud compared to their less reactive peers may cause heightened tension between their mothers and other inmates in this stress-filled environment. Given the adverse conditions, temperamental dispositions towards elevated negative emotions, frustration, difficulties in emotion regulation, and soothability may be especially detrimental to co-residing children's and their mothers' prison experience. However, no prior study has investigated the temperamental characteristics of children co-residing with their incarcerated mothers. Therefore, the present study focuses on two of the temperamental characteristics, namely negative emotionality and effortful control. Negative emotionality reflects children's reactive temperamental features when experiencing discomfort, fear, sadness, frustration, and being susceptible to low levels of soothability (Putnam et al., 2006). Effortful control, on the other hand, is used to define a child's capacity to control their emotions, behaviors, and attention (Rothbart, 2011).

Considering that mothers may have reduced psychological functioning during such stressful periods (Baradon et al., 2008; Borelli et al., 2010), it could be suggested that having a reactive co-residing child would be an additional burden for a mother, and may diminish her maternal capacity to provide sensitive care to her children consistently. Social support given by other inmates may therefore be an important contributing factor to maternal psychosocial functioning and sensitive caregiving behaviors (for a meta-analysis see Booth et al., 2018), and in turn, children's attachment security (for a meta-analysis see Atkinson et al., 2000). Accordingly, we also set out to evaluate maternal perceptions of social support and satisfaction with such support as potential covariate variables.

The present study

Given the protective role of attachment security reducing the likelihood of poor outcomes for disadvantaged children (Belsky & Fearon, 2002), our study aimed to investigate the factors explaining attachment of children co-residing with incarcerated mothers. We therefore aimed to examine the moderating role of children's temperament (i.e. negative emotionality and effortful control) on the associations between maternal sensitivity and children's attachment. We hypothesized that the relationship between maternal sensitivity and children's attachment would be moderated by the children's temperamental features. Specifically, the most

reactive children (i.e. those with high negative emotionality and low effortful control) would benefit more from the sensitive care provided by their mothers. Additionally, the relationships between maternal sensitivity and children's attachment would not be significant for the least reactive ones.

Method

Participants

The study sample consists of 84 incarcerated mothers who range in age between 20 and 43 (M = 29.9, SD = 5.6) and their 12- to 43-month-old (M = 25.3, SD = 8.3, 57.1% boys) children who were residing with them in prison. Most of the mothers were married (91.6%). Their average marriage duration was 10.3 years (SD = 5.7, range = 2–24). In addition to their co-residing child, the majority of mothers (84.5%) had one or more children who were living elsewhere outside of the prison. A significant number of the mothers (42.2%) were illiterate. Of the remainder who were literate, one in five had not completed primary school having either dropped out of formal education or schooled at home (21.7%), they were followed by mothers who had completed primary school (14.5%) but did not continue formal education, those whose education was not continued after middle school (12.0%), with fewer than one in ten having either gone on to obtain a high school diploma (7.2%), or a university degree (2.4%).

More than half reported that they were stay-home mothers (53.6%) before imprisonment; of those who were employed, they were generally working in temporary and unskilled jobs. Mothers and their co-residing children generally entered the prison together and they had spent an average of 10 months (SD = 9.8, range = 1–42) in prison prior to data collection. Some mothers (30.1%) indicated that their co-residing children were sometimes under the care of their fathers or other outside relatives for short periods and then returned to reside with their mothers in prison. However, the majority of mothers (69.9%) stated that their children had not left the prison since their entry. Most mothers (77.1%) had been sentenced for an average duration of 7.3 months (SD = 6.5, range = 1–28). The rest of the mothers' trials were still ongoing, and their sentences had not been determined at time of data was collected. The majority of mothers (60.2%) were recurring offenders. Most women in our sample were incarcerated for economically motivated crimes (57.8%) such as burglary and larceny, followed by those accused of drug-related offences (33.7%), and violent crimes (8.5%) including homicide and incitement to homicide. All participants were Caucasian with dominantly Turkish ethnic background.

Procedure

Ethical and data collection approvals for the study were obtained from the Institutional Review Board of the Hacettepe University and the Turkish Ministry of Justice, respectively. Data was collected from eight different prison facilities located in seven cities, varying in size, from four distinct geographical regions of Turkey. The prisons were selected from a list obtained from the Ministry of Justice that showed the number of mothers co-residing with a 1-to −3-year-old child. In Turkey, as they arrive in prison, all mothers are screened by a committee that includes civilian prison staff (e.g. psychologists, social workers) in

terms of their psychosocial functioning and parenting competency to care for their young children in prison. After this evaluation, eligible mothers are allowed to co-reside with their children. Therefore, the current study includes no exclusion criteria regarding the mothers' psychosocial functioning or crime type.

Mothers incarcerated at one of the eight selected prisons and who had spent more than one month in prison with their 1-to −3-year-old co-residing children were eligible to participate in the study. Once eligibility was determined, we explained the details of the study to the mothers and asked them to participate. We informed them that they could terminate their participation in the study at any time with no consequences. We obtained informed consent from the mothers regarding their own participation as well as their children's participation. Data collection was conducted in rooms deemed appropriate by the penitentiary authorities. Due to the high prevalence of illiteracy in the sample, data regarding participants' socio-demographic characteristics, children's temperament, and maternal social support were obtained via face-to-face interviews.

Mother-child interaction observation

Due to the limited data collection time afforded by the Ministry, maternal sensitivity and children's attachment security were evaluated together using a semi-structured mother-child interaction observation. The interaction procedure lasted 45-minutes and included tasks such as free-play, separation-reunion, child playing with an observer, the mother-child dyad solving a slightly challenging puzzle, and a robot/clown enters the room as a low level stress provoking situation (see Berument et al., 2018). Maternal sensitivity and child's attachment behaviors were observed and coded by the same two raters (the first author and a developmental psychology doctoral student who was blind to the study aims). The raters were trained extensively for implementing and rating the instruments before data collection using practice videos that were recorded for another study. The training continued until intraclass correlation (ICC) coefficients were above .70 both for the ratings of maternal sensitivity and children's attachment behaviors. As the Ministry disallows voice and video recordings, the two coders located in different corners of the room, simultaneously took notes about their observations of mother-child interactions, and rated maternal caregiving and children's attachment behaviors immediately after the observation.

Measures

Maternal sensitivity

Maternal sensitivity was evaluated by the raters after each of the aforementioned mother-child interaction observation using the Maternal Sensitivity Scale (MSS) devised to assess parental sensitive caregiving behaviors in interactions with 1-to −3-year-old children (Berument et al., 2018). The scale provides an overall summary index of the quality of care primarily based on three domains: maternal support/encouragement, responsiveness, and warmth. MSS was developed using items obtained from the Maternal Behavior Q-Sort (MBQS; Pederson & Moran, 1995), such as, "Even when doing other activities, such as answering the questions of the researcher, responds to all the child's signs with and without stress.," and "Realizes the child's desire to explore the environment/toys and supports/encourages child's exploration." During the adaptation to use in Turkish, 35 items from the 90 items of the MBQS were chosen which reflect different aspects of sensitivity, that are easily observable, and can

be objectively coded. Then examples were added to the items for specific maternal behaviors using culturally oriented expressions to make them more specific for the raters. After the reliability codings, the number of items was reduced to 29 by excluding those items that were overlapping. The items were coded by two raters independently on a 3-point Likert scale (*0 = not defining, 1 = somewhat defining, 2 = absolutely defining, NA = not applicable*). ICC scores ranged from .70 to .97, and the average ICC was .86. The ratings of the two observers were averaged to create a composite score for maternal sensitivity. Factor analysis indicated one-factor solution, and Cronbach's Alpha internal consistency score of the scale was .91, with higher scores indicating higher maternal sensitivity.

Children's attachment behaviors

Children's attachment behaviors was also evaluated by the raters after each of the mother-child interactions they observed, using the Turkish adaptation of the Toddler Attachment Sort-45 (TAS-45; Kirkland et al., 2004). Although TAS-45 consists of 45 items (e.g. "Enjoys and is comforted by close physical contact with mother" and "Fusses, cries, becomes angry if mother's responses are not immediate."), its Turkish adaptation includes 15 additional items and is titled Turkish Toddler Attachment Sort-60 (TTAS-60; Berument & Sümer, 2017). The 15 additional items in the Turkish adaptation were added in collaboration with the developers of the original measure. The aim of adding the new items was to create a more comprehensive measurement tool. Although the item construct is not different from the original items, the additional items allowed the researchers to evaluate toddlers' attachment behaviors in more various situations. Additionally, TTAS-60 also includes more examples and illustrations embedded in the items (e.g. "The child gets angry with the mother for no reason – the child hits, slaps, pushes, or bites the mother").

Trained observers firstly sorted all items based on the target child's behavior into three groups (i.e. applies, undecided/unobserved, does not apply). Then, items in the undecided/unobserved group were eliminated from the coding, and the "applies" and "does not apply" groups were placed into one of two groups again according to the level of applicability to the child. Items were sorted using a website designed for TAS (http://www.suchandsuch.biz/tots/). As mentioned above, voice or video recordings were not allowed to be made in the prison facilities. Therefore, the ratings needed to be completed immediately after the observations. Because the prison authorities provided only one computer to the researchers, and they were not permitted to bring any technological device into the prison facilities, the two coders rated the TTAS-60 items based on consensus. Based on the sorting, four continuous attachment scores (i.e. avoidant, secure, anxious, and disorganized) were generated by the TAS coding website for each child. Higher scores reflected a greater representation of the relevant attachment scale.

Children's temperament

Mothers reported their children's temperament using the Early Childhood Behavior Questionnaire (ECBQ; Putnam et al., 2006), which was adapted to Turkish by Berument and Sümer (2017). ECBQ assesses temperament of children between 1.5 and 3 years old on a 5-point Likert scale ranging from *never* to *always*. It includes 18 subscales that load onto three temperament dimensions (i.e. surgency, negative emotionality, and effortful control). Only negative emotionality (assessed with the composite score of frustration and reversed soothability) and effortful control (assessed using inhibitory control subscale) dimensions were used

in the present study. Frustration reflects a child's negative emotions related to interruption of ongoing tasks or goal blocking (12 items; e.g. "How often did your child get easily irritated?"). Soothability is defined as the rate of recovery from peak distress, excitement, or general arousal (9 items; e.g. "When patting or gently rubbing some part of the child's body, how often did s/he soothe immediately?"). Inhibitory control subscale reflects children's capacity to stop, moderate, or refrain from a behavior under instruction (13 items; e.g. "When asked to do so, how often was your child able to stop an ongoing activity?"). Factor analysis revealed a 2-factor solution confirming that frustration and soothability (loading negatively) items loaded onto the negative emotionality dimension, and inhibitory control items loaded onto the effortful control dimension. Cronbach's Alpha internal consistency scores of negative emotionality (α = .86) and effortful control (α = .87) scales were satisfactory. Higher scores indicate greater negative emotionality and effortful control.

Maternal social support

Mothers' social support perception was evaluated as a potential control variable using the short form of the Social Support Questionnaire (SSQ; Sarason et al., 1987). The short form of SSQ includes six items (e.g. "Whom can you really count on to help you feel more relaxed when you are under pressure or tense?"). The questionnaire yields two scores for (a) perceived number of social supports and (b) satisfaction with the perceived social support. The participants were asked to list the individuals who provide the type of support described in each item. Then, they rated their level of satisfaction with the total support received regarding each item. The questionnaire was translated into Turkish in the scope of the present study. Factor analysis revealed a 2-factor solution confirming that the number and satisfaction scores loaded onto different factors. Cronbach's Alpha internal consistency scores for number of support (α = .82) and satisfaction with this support (α = .76) were acceptable. Higher scores indicate greater perceived social support and mothers' higher satisfaction with this support.

Data analytic plan

The moderation analyses with 5000 bootstrapping were performed using Model 1 of PROCESS macro for SPSS (version 3.5; Hayes, 2018). PROCESS estimates coefficients using maximum likelihood logistic regression, and uses asymmetric bootstrap confidence intervals (CI) for inference. Bootstrapping is more appropriate for smaller samples and provides more power reducing Type I error (MacKinnon et al., 2004). Separate regression analyses were conducted to examine whether negative emotionality and effortful control scores moderated the association between maternal sensitivity and children's attachment scores (i.e. avoidant, secure, anxious, and disorganized). All continuous variables were mean-centered to avoid multicollinearity in the interaction terms (Aiken & West, 1991).

Results

Preliminary analyses

Descriptive statistics and zero-order bivariate correlations for study variables are presented in Table 1. Results revealed that children's secure attachment was positively associated with their avoidant attachment. Children's anxious attachment was negatively

related to their avoidant, secure, and disorganized attachment. Additionally, children's disorganized attachment was correlated positively with avoidant, and negatively with secure attachment. Furthermore, negative emotionality and effortful control temperamental dimensions were negatively associated. Maternal sensitivity was related positively to children's secure attachment, and negatively to disorganized attachment scores. Additionally, the relationships between study variables and descriptive variables were examined. Results revealed that the number of years that mothers maintained formal education was correlated positively with children's avoidant and disorganized attachment. Finally, children's age was found to be positively correlated with children's effortful control. Based on the aforementioned significant associations, maternal educational attainment and child's age were controlled in all further regression analyses.

The majority of mothers reported that their relatives who were residing in the same wards (20.5%) and other inmates (34.9%) provided some help to them taking care of their co-residing children. The rest of the mothers reported that they did not get any help with taking care of their child. Therefore, we investigated the associations between maternal social support indexes (i.e. the number of people providing social support to the mothers and their satisfaction with this support) and the study variables. Because the correlations were not significant, maternal social support indexes were not controlled in further regression analyses.

As mentioned before, mothers were first classified into three groups according to the type of offences they had committed: (1) economically motivated crimes (57.8%), (2) drug-related crimes (33.7%), (3) and violent crimes (8.5%). We conducted a One-Way ANOVA analysis to investigate whether there are group differences in the study variables associated with the maternal crime type. Results indicated significant group differences in children's negative emotionality, $F(2, 79) = 4.73$, $p < .01$, partial eta$^2 = .11$. A Tukey post hoc test revealed that the negative emotionality scores of children ($M = 2.69$, $SD = .76$) whose mothers committed economically motivated crimes was significantly higher compared to children ($M = 2.49$, $SD = .69$) whose mothers were imprisoned for drug-related offenses ($p < .05$). Based on this difference, maternal crime type was controlled in all regression analyses.

The moderating role of children's temperament

The moderating role of negative emotionality

As mentioned above, the age of the children, maternal educational attainment, and maternal crime type are included as covariates in all regression analyses. Analysis revealed that children's negative emotionality was a significant moderator on the relationship between maternal sensitivity and children's avoidant attachment scores, $F(6, 74) = 3.58$, $p < .01$, $R^2 = .23$. Interaction between maternal sensitivity and children's negative emotionality significantly increased the explained variance of the model, $\Delta R^2 = .07$, $F(1, 74) = 7.07$, $p < .01$. Simple slope analysis showed that maternal sensitivity negatively predicted children's avoidant attachment only for children with low negative emotionality ($B = -2.70$, SE = .84, $t(74) = -3.20$, $p < .01$, 95% CI = [−4.38, −1.02]). In contrast, maternal sensitivity did not significantly predict children's avoidant attachment for children high in negative emotionality ($B = .81$, SE = .83, $t(74) = .97$, $p > .05$, 95% CI = [−.85, 2.46]). The details are presented in Table 2 and Figure 1.

Table 1. Descriptive statistics and zero-order bivariate correlations for study variables.

	M (*SD*)	range	1	2	3	4	5	6	7	8	9	10
1. Avoidant attachment	4.62 (1.83)	.00 – 7.92	–									
2. Secure attachment	2.85 (.97)	.00 – 3.87	**.23***	–								
3. Anxious attachment	4.10 (2.22)	.00 – 7.87	**−.73****	**−.56****	–							
4. Disorganized attachment	−.53 (.18)	−.87 – −.03	**.60****	**−.42****	**−.24***	–						
5. Negative emotionality	2.48 (.76)	1.14 – 4.90	.09	−.11	−.00	.05	–					
6. Effortful control	3.78 (1.06)	1.00 – 5.00	.02	.16	−.18	.00	**−.44****	–				
7. Maternal sensitivity	1.52 (.37)	.45 – 2.00	−.21	**.36****	−.08	**−.40****	−.13	−.01	–			
8. Maternal education (years)	3.30 (4.05)	0 – 17	**.23***	−.15	−.22	**.33****	−.16	.05	.08	–		
9. Child's age (months)	25.25 (8.32)	11 – 43	.20	.10	−.21	.21	.10	**.24***	−.09	−.13	–	
10. Number of SS	1.79 (.79)	.00 – 4.18	−.11	.01	.07	−.08	−.19	.13	.06	−.08	.17	–
11. Satisfaction with SS	5.17 (1.02)	2.32 – 6.00	−.06	.05	.06	−.11	−.05	.03	.06	−.07	.12	**.47****

1. $*p < .05$, $**p < .01$; SS = Social support.

2. Disorganized attachment scores are generated using a different norm than the other three organized attachment scores. Therefore, it cannot be compared with the other three attachment scores based on the mean values and ranges.

The moderating role of effortful control

Analysis indicated that children's effortful control was a significant moderator on the association between maternal sensitivity and children's avoidant attachment, $F(6, 74) = 4.30$, $p < .001$, $R^2 = .26$. Interaction between maternal sensitivity and children's effortful control significantly increased the explained variance of the model, $\Delta R^2 = .11$, $F(1, 74) = 11.02$, $p < .01$. Simple slope analysis revealed that maternal sensitivity negatively predicted children's avoidant attachment only for children with high effortful control ($B = -2.83$, SE = .76, $t(74) = -3.74$, $p < .001$, 95% CI = [−4.34, −1.32]). In contrast, maternal sensitivity did not significantly predict children's avoidant attachment for children low in effortful control ($B = .23$, SE = .61, $t(74) = .38$, $p > .05$, 95% CI = [−.99, 1.45]). The details are presented in Table 3 and Figure 2.

Finally, analysis revealed that children's effortful control also moderated the relationship between maternal sensitivity and children's anxious attachment, $F(6, 74) = 2.94$, $p < .01$, $R^2 = .19$. Interaction between maternal sensitivity and children's negative emotionality significantly increased the explained variance of the model, $\Delta R^2 = .07$, $F(1, 74) = 6.63$, $p < .05$. Simple slope analysis indicated that maternal sensitivity negatively predicted children's anxious attachment only for children with low effortful control ($B = -1.76$, SE = .77, $t(74) = -2.29$, $p < .05$, 95% CI = [−3.30, −.23]). In contrast, maternal

Table 2. The moderating role of children's negative emotionality on the association between maternal sensitivity and children's avoidant attachment scores (N = 81).

	B	SE	*t*	95% CI
Constant	3.75	.76	4.97***	[2.25, 5.26]
Maternal sensitivity	−.95	.51	−1.84	[−1.97, .08]
Negative emotionality	.12	.27	.44	[−.41, .65]
Interaction[a]	2.30	.87	2.66**	[.58, 4.03]
Covariates				
Child's age (months)	.04	.02	1.45	[−.01, .08]
Maternal education (years)	.14	.05	2.87**	[.04, .24]
Maternal crime	−.29	.33	−.87	[−.94, .37]

[a]Interaction between maternal sensitivity and child's negative emotionality; CI = Confidence interval, *B* = Unstandardized coefficient.
*$p < .05$, **$p < .01$, *** $p < .001$.

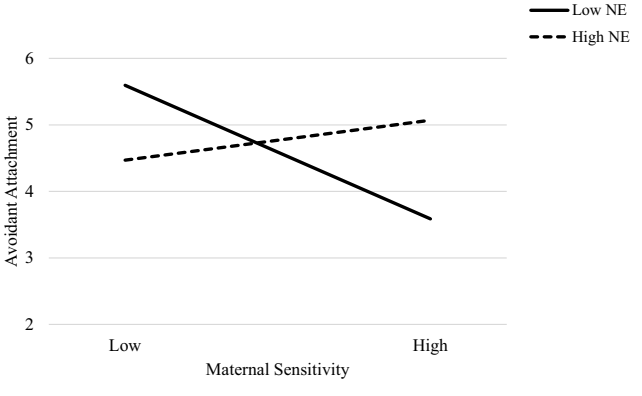

Figure 1. The interaction between maternal sensitivity and children's negative emotionality (NE) on children's avoidant attachment (Low = 1 SD below the mean, High = 1 SD above the mean).

Table 3. The moderating role of children's effortful control on the association between maternal sensitivity and children's avoidant attachment scores (N = 81).

	B	SE	*t*	95% CI
Constant	3.43	.76	4.54***	[1.93, 4.94]
Maternal sensitivity	−1.30	.51	−2.54*	[−2.32, −.28]
Effortful control	−.13	.19	−.67	[−.49, .24]
Interaction[a]	−1.44	.43	−3.32**	[−2.30, −.57]
Covariates				
Child's age (months)	.05	.02	2.25*	[.01, .10]
Maternal education (years)	.17	.05	3.46**	[.07, .27]
Maternal crime	−.50	.32	−1.57	[−1.14, .13]

[a]Interaction between maternal sensitivity and child's effortful control; CI = Confidence interval, *B* = Unstandardized coefficient.
*p < .05, **p < .01, *** p < .001.

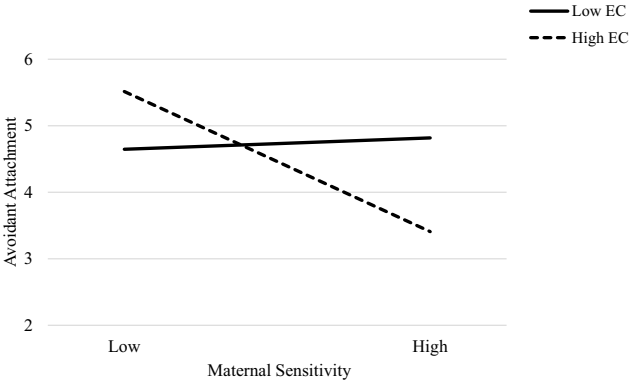

Figure 2. The interaction between maternal sensitivity and children's effortful control (EC) on children's avoidant attachment (Low = 1 SD below the mean, High = 1 SD above the mean).

sensitivity did not significantly predict children's anxious attachment for children high in effortful control (B = 1.21, SE = .95, $t(74)$ = 1.28, $p > .05$, 95% CI = [−.68, 3.10]). The details are presented in Table 4 and Figure 3.

Discussion

The present study examined the relationships between incarcerated mothers' sensitivity and their co-residing children's attachment as well as the moderating role of child temperament on these associations. Before discussing our main findings, we note that contrary to other studies (e.g. Tarabulsy et al., 2005), maternal educational attainment was positively related to children's avoidant and disorganized attachment scores in the current study. Further analysis indicated that maternal educational attainment was also negatively related to the frequency of maternal conviction ($r = -.27$, $p < .05$). In line with this, it may be suggested that less educated and more frequently convicted mothers would be more familiar with correctional institutions than relatively more educated and less frequently convicted mothers. Therefore, relatively more educated mothers' psychological functioning may be more deteriorated during their time spent in prison, and in turn, their parenting practices more likely to be negatively impacted (Booth et al.,

Table 4. The moderating role of children's effortful control on the association between maternal sensitivity and children's anxious attachment scores (N = 81).

	B	SE	*t*	95% CI
Constant	5.55	.95	5.86***	[3.66, 7.44]
Maternal sensitivity	−.28	.64	−.43	[−1.55, 1.00]
Effortful control	−.19	.23	−.82	[−.65, .27]
Interaction[a]	1.40	.54	2.58*	[.32, 2.48]
Covariates				
Child's age (months)	−.06	.03	−1.92	[−.12, .00]
Maternal education (years)	−.16	.06	−2.63*	[−.29, −.04]
Maternal crime	.39	.40	.96	[−.41, 1.18]

[a]Interaction between maternal sensitivity and child's effortful control; CI = Confidence interval, *B* = Unstandardized coefficient.
*p < .05, **p < .01, *** p < .001.

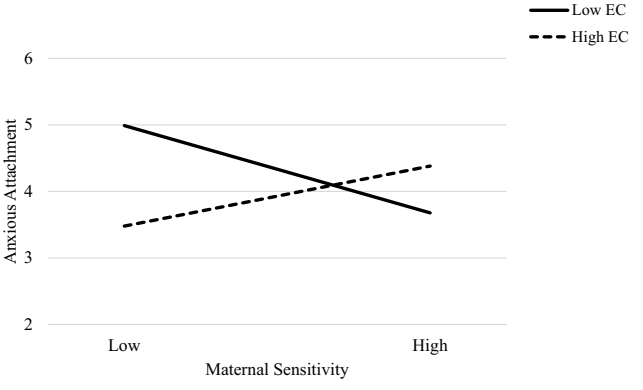

Figure 3. The interaction between maternal sensitivity and children's effortful control (EC) on children's anxious attachment (Low = 1 SD below the mean, High = 1 SD above the mean).

2018). Although the relationship between maternal education and sensitivity were not significant in the present study, maternal sensitivity is not the only parenting dimension that influences children's attachment security (De Wolff & Van IJzendoorn, 1997). For example, a study indicated that the relationship between maternal autonomy support and child attachment is stronger than the association between maternal sensitivity and child attachment (Bernier et al., 2014). Thus, further research examining various aspects of incarcerated mothers' parenting may explain the factors underlying the relationships between maternal educational attainment and their co-residing children's attachment.

Our results showed that maternal sensitive caregiving was related positively to children's secure attachment and negatively to children's disorganized attachment. These findings are in line with previous studies demonstrating that children of sensitive mothers tend to exhibit secure attachment behaviors, and on the contrary, insensitive caregiving is usually related to children's insecure attachment behaviors (Atkinson et al., 2005; Posada et al., 2016; Tarabulsy et al., 2005). It is also known that disorganized children are at the greatest risk of exhibiting problematic behaviors in later years compared to the children classified into the three organized attachment categories (for meta-analyses, see Fearon et al., 2010; Groh et al., 2017). In this regard, particularly the finding indicating a moderate negative association ($r = -.40$, $p < .01$) between maternal sensitivity and children's disorganized attachment

behaviors may be important for future intervention studies. Specifically, based on these findings, it may be argued that future interventions supporting incarcerated mothers' sensitivity may be especially effective in terms of improving their children's secure attachment behaviors and minimizing disorganized attachment behaviors.

The results of our moderation analyses partially supported our hypothesis. Findings indicated that maternal sensitivity was negatively associated with children's anxious attachment only for those children with low effortful control. This finding was in line with our hypothesis and also the differential susceptibility model (Belsky, 1997a, 1997b, 2005; Belsky et al., 2007). In other words, this finding indicated that for the most reactive children, the more sensitive their mother was, the less they exhibited anxious attachment behaviors. On the other hand, when their mothers' sensitivity was low, these same children exhibited more anxious attachment behaviors. It was shown that anxious children maximize their attachment signals (e.g. crying) to capture their caregivers' attention and fail to regulate their emotions compared to children classified in the other attachment categories (Crugnola et al., 2011). The anxious children's disproportionate effort to activate their caregivers' attention may have been shaped by their early experiences with their inconsistently responsive caregivers (Ainsworth et al., 2015; Main, 2000). Incarcerated mothers are the only caregivers of their co-residing children in a highly chaotic environment during a highly distressful experience. Considering the constellation of adverse factors that they experience, it may be argued that these mothers tend to be inattentive or inconsistently sensitive to their children's attachment needs. Therefore, temperamental reactivity might be particularly crucial to encourage distressed, and possibly, inattentive incarcerated mothers to be responsive to their children's anxious attachment behaviors more consistently. In sum, consistently provided sensitive care, which may have initially been a response to a child's highly reactive temperament, may forecast significantly fewer anxious attachment behaviors, such as crying or clinging to their mother.

We hypothesized that the relationships between maternal sensitivity and children's attachment scores would not be significant for the least reactive children. However, the findings revealed that for the least reactive children, the more sensitive their mother was, the lower their avoidant attachment scores. In other words, results showed that maternal sensitivity and children's avoidant attachment were negatively associated only for those children with the highest effortful control and the lowest negative emotionality. Sensitive caregiving includes skillful understanding and interpretation of a child's attachment needs, and to respond to them promptly and appropriately. However, considering the highly stressful imprisonment experience, interpreting particularly irritable children's attachment needs and responding to them in a sensitive way may be difficult for incarcerated mothers who also tend to have increased depressive symptoms (Borelli et al., 2010; Poehlmann, 2005a). In line with this, these distressed mothers may be more successful providing consistent sensitive care for the least reactive children who have greater capacity to regulate their emotions, attention, and behaviors during the period of confinement in prison. Contrary to inconsistently responsive caregivers of anxious children, mothers of avoidant children seem to be consistently unresponsive and rejecting of the emotions and needs of their children (Main, 2000). As a consequence, avoidant infants tend to shift their attention from the rejecting caregiver, deactivate their attachment signals, and inhibit the expression of negative emotions (Ainsworth et al., 2015; Crugnola et al., 2011). Therefore, sensitive maternal care may have been more easily provided with the help of the children's greater capacity to regulate their

emotions and behaviors, and may be particularly beneficial for the least reactive children to be able to express their negative emotions and to use their mothers as a safe haven when their attachment system is activated.

Similar to the present study, a number of other studies also partially supported the propositions of the differential susceptibility hypothesis (e.g. Zhang et al., 2021). Although the differential susceptibility hypothesis suggests that reactive children would benefit more from their caregivers' socialization efforts compared to those who are less susceptible to rearing effects (*i.e. less "plastic" more "fixed"*), it has been emphasized that less reactive children who followed their caregivers' lead would thrive in other circumstances as well (Belsky, 2005, p. 142). Additionally, Belsky (2005) indicated that differential susceptibility may be considered in domain-specific rather than a domain-general terms. In other words, it may make more sense to think children's susceptibility as varying *with respect to particular developmental outcomes* (p. 159). Considering the results of the present study supported differential susceptibility only for predicting children's anxious attachment, these findings may provide evidence for the domain-specificity proposition of the differential susceptibility model with respect to different attachment behaviors. Moreover, a meta-analysis has revealed that the findings supported differential susceptibility only when temperament was assessed during infancy (Slagt et al., 2016). According to the researchers, children's susceptibility may be greater during the first year of life because of the highly sensitive nervous system during infancy, and it may be decreased when children learn to regulate their emotions as they get older. Considering the data collected during toddlerhood in the present study, future studies evaluating children's temperament during infancy may reveal more compatible results with the differential susceptibility hypothesis.

Limitations and future directions

The results of the present study should be considered in light of several limitations. Foremost being the various restrictions imposed on researchers working in Turkish penitentiaries. Given the brevity of contact we would have with the participants in the sample and with no opportunity to use recording devices, we determined that maternal sensitivity and children's attachment security would be coded using the same semi-structured mother-child interaction observation by the same two raters. Both raters were highly trained, and items in the MSS and TTAS-60 were created on a behavioral level, which requires objective ratings independent of subjective factors related to the raters. Fearon and his colleagues' (2010) meta-analysis revealed that attachment studies using direct observation produced greater effect sizes (d = .58) compared to studies using parent-report (d = 22). In light of this finding, despite the highly restrictive nature of the penal institutions, evaluating maternal sensitivity and children's attachment security through direct observation, rather than mother-report, may be considered as a key strength of the current study. In future research, stronger results with less error variance may be possible with the use of raters who are unaware of the study aims and sample characteristics. Finally, we used a mother-reported questionnaire to assess children's temperament. Using mother-reported assessments to evaluate children's temperament is common in temperament research (e.g. Klein Velderman et al., 2006), and several studies indicated a convergence between parent-reported and laboratory-based

measures of temperament (e.g. Morasch & Bell, 2011). Nevertheless, future studies which involve observational measures to assess child temperament are needed to provide additional insights into how these children regulate and control their emotions and behaviors. Furthermore, future studies examining the goodness-of-fit between the incarcerated mothers' personality characteristics and their co-residing children's temperament would provide additional insight to explain co-residing children's attachment (see Mangelsdorf et al., 1990).

In spite of these limitations, the present study provides one of the most comprehensive investigations into the role of the interaction between child temperament and parenting on the attachment of children that are exposed to extremely adverse environmental influences. Because research in the area of attachment is quite labor-intensive and prevents investigators from including large samples, the current study reached out to more mother-child dyads in comparison to prior studies conducted with this disadvantaged group. Additionally, the current study investigated the role of not only the reactive but also the regulatory temperament characteristics of children on the association between maternal caregiving and child attachment. Finally, using validated measures through various methods (e.g. mother-child interaction observation, self-report questionnaire) is another strength of the present study.

Conclusions

This study provides an important first examination of the factors explaining attachment security of children co-residing with their incarcerated mothers in prison facilities. Our results suggest that maternal sensitivity and children's temperament play a significant role on co-residing children's attachment to their mothers. Our results indicated that during a highly stressful experience, children who have greater capacity for emotion regulation are less likely to exhibit avoidant attachment behaviors when their mother is more sensitive. In contrast, for the most reactive children, maternal sensitivity was negatively associated with anxious attachment behaviors. Although the findings of the current study partially support the differential susceptibility hypothesis, our results largely indicated that the least reactive, most easily soothed children exhibited less insecure attachment behaviors when their mothers were more sensitive. Future research may investigate not only the role of incarcerated mothers' caregiving practices and their co-residing children's individual characteristics, but also maternal psychological functioning and contextual stressors to explain attachment security, as well as other child developmental outcomes. Furthermore, given the evidence indicating that a prison nursery stay may reduce the possibility of mothers' future recidivism (for a review, see Dodson et al., 2019), more research is needed to investigate the role of mother-child co-residency on mothers' psychosocial functioning as well.

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