Maternal attachment style influences cognitive processes of infant sensitivity

Authors: Yue Jiaying, Liu Xinyi, Zhang Mengke, Chen Xu, Chen Xu

Date: 2023-11-22T00:00:00+00:00

Abstract

Maternal sensitivity is crucial for children's development and growth. Although numerous previous studies have found that attachment style influences maternal sensitivity, these studies have largely neglected the relationship between attachment style and the cognitive processes underlying maternal sensitivity. Consequently, existing research cannot explain why attachment style affects maternal sensitivity. The social information processing model of maternal sensitivity integrates key cognitive structures and processes related to maternal sensitivity, dividing its cognitive processes into four stages. Based on this model, we review the individual differences and mechanisms through which attachment style operates across the four stages of maternal emotional perception, attribution, motivational response, and response selection. Future research should deepen our understanding of the influence of attachment style on the cognitive processes of maternal sensitivity from a temporal dimension, expand investigations into the joint effects of multiple cognitive structures of maternal sensitivity on its cognitive processes, and examine the role of contextual factors in the relationship between attachment style and the cognitive processes of maternal sensitivity. Furthermore, the dual impact of attachment style on both emotional and cognitive processes of maternal sensitivity should be further explored.

Full Text

Maternal Attachment Style Influences the Cognitive Processing of Infant Sensitivity

Yue Jiaying, Liu Xinyi, Zhang Mengke, Chen Xu*
Faculty of Psychology, Southwest University, Chongqing 400715

Abstract

Maternal sensitivity is crucial for children's development. Although numerous studies have found that attachment style influences maternal sensitivity, they have largely neglected the relationship between attachment style and the cognitive processes underlying maternal sensitivity. Consequently, existing research cannot explain *why* attachment style affects maternal sensitivity. The social information processing (SIP) model of maternal sensitivity integrates key cognitive structures and processes related to maternal sensitivity, dividing its cognitive processing into four stages. Based on this model, we review individual differences and mechanisms of attachment style across four stages: maternal emotional perception, maternal attribution, motivational response, and response selection. Future research should deepen the investigation of attachment style's influence on maternal sensitivity cognitive processes from a temporal dimension; expand research on the joint influence of multiple cognitive structures on these processes; and examine the role of contextual factors in the relationship between attachment style and maternal sensitivity cognitive processing. Additionally, further exploration of attachment style's dual impact on both emotional and cognitive processes of maternal sensitivity is needed.

Keywords: attachment style, maternal sensitivity, social information processing model, emotion perception, maternal attribution

---

Maternal sensitivity—the ability to accurately perceive and interpret infant signals and respond appropriately [8]—is a cornerstone of caregiving capacity. Given its critical role in fostering secure attachment [9] and socioemotional development [10], researchers have long sought to understand its composition and determinants. Bowlby's definition encompasses both cognitive and behavioral sensitivity, yet previous research has primarily operationalized "maternal sensitivity" as appropriate parenting behaviors during mother-infant interactions [11, 12]. Only recently have studies begun examining cognitive factors, approaching maternal sensitivity from a social information processing (SIP) perspective and proposing that maternal cognitive processes and structures may antecede behavioral sensitivity [7].

Building on the SIP model, Fuths et al. (2017) proposed that maternal sensitivity involves four cognitive stages: perception, interpretation, motivation, and behavioral selection. Integrating Bowlby's definition with Fuths's framework, we conceptualize maternal sensitivity as the process of accurately perceiving and interpreting infant signals, developing motivational orientations, and selecting behavioral responses.

Attachment represents an emotional bond formed through early interactions with primary caregivers, during which individuals develop positive or negative mental representations of self-other relationships—internal working models (IWM) [2]. Different combinations of self- and other-models yield distinct

attachment styles: secure attachment (positive self, positive other), anxious attachment (negative self, positive other), and avoidant attachment (positive self, negative other) [2]. Research suggests that IWMs, as a key cognitive structure of maternal sensitivity, may influence its cognitive processes, thereby producing differential behavioral sensitivity [13]. Previous studies have addressed two main questions: first, *what* impact attachment style has on maternal sensitivity, revealing that secure mothers show higher global sensitivity than insecure mothers in parent-child interactions [14, 15]; second, the underlying mechanisms, demonstrating differences in cognitive factors like emotion perception [16] and maternal attribution [17]. However, lacking a theoretical framework for the *process* of maternal sensitivity, these studies could not deeply uncover the mechanisms and process characteristics of how attachment style influences it.

Fuths et al.'s (2017) SIP model provides a new perspective by integrating key cognitive structures and processes of maternal sensitivity. In this model, behavioral sensitivity is determined by both stable implicit cognitive structures (including IWMs, infant mental representations, self-efficacy, and attribution patterns) and event-dependent cognitive processes (perception, interpretation, motivation, and response selection). These structures and processes interact to shape maternal behavioral sensitivity. While previous research has noted relationships between attachment style and cognitive factors [18], a systematic examination based on the SIP model can clarify how cognitive structures (e.g., IWMs) relate to cognitive processes and delineate performance differences across attachment styles at each stage. This review synthesizes attachment theory and the SIP model's four stages to examine individual differences and characteristics of attachment style in maternal sensitivity cognitive processing (emotion perception, maternal attribution, motivational response, and behavioral selection), offering insights into the underlying mechanisms.

2. Influence of Attachment Style on Emotional Perception

The SIP model posits that maternal sensitivity begins with the perception stage, where mothers must detect emotional cues from faces, voices, and movements. While research has focused predominantly on facial cues, studies show that maternal attention to infant faces facilitates emotional cue identification and interpretation, serving as a prerequisite for maternal sensitivity [19, 20]. Different attachment styles, shaped by prior attachment experiences, employ distinct strategies for perceiving and encoding emotional information, influencing how mothers process infant facial expressions.

Securely attached individuals develop positive self- and other-models through safe relational experiences, employing a secure-base strategy that enables flexible evaluation and regulation of emotional information under threat [21-23]. Consequently, secure mothers exhibit heightened attentional sensitivity, identifying infant emotional cues more accurately and rapidly [4]. Specifically, they show smaller N170 amplitudes and larger P300 amplitudes in response to unfa-

miliar infant faces, indicating easier structural encoding and greater attention allocation [24]. Regardless of emotional valence or familiarity, secure mothers demonstrate shorter P300 latencies than insecure mothers, allowing faster attentional deployment [4]. However, infant facial emotion may modulate attention patterns: secure mothers show smaller N170 amplitudes for negative infant faces and larger LPP amplitudes for both negative and positive emotions [24], suggesting that while they attend less to negative information during automatic processing, they can flexibly allocate cognitive resources during controlled processing to respond sensitively to varying infant needs.

Anxiously attached individuals hold negative self- and positive other-models, employing hyperactivating strategies that exaggerate environmental threats [23, 25] to gain caregiver attention and alleviate anxiety [26, 27]. Empirical findings indicate they report emotional faces faster, showing heightened sensitivity [28]. However, anxious mothers may be overly sensitive to infant emotions, exaggerating negative affect and misperceiving cues during interactions. Compared to avoidant women, anxious women exhibit larger N170 amplitudes to infant faces, investing excessive early cognitive resources in structural processing [29]. This overconsumption may reduce resources for sustained attention later, as evidenced by larger P300 amplitudes only for crying faces [29]. Thus, anxious mothers' attention is modulated by emotional valence, potentially failing to meet diverse infant needs.

Avoidantly attached individuals possess positive self- and negative other-models, employing deactivating strategies to suppress attachment system activation and information processing [23, 30]. Viewing emotionally volatile, needy infants as threatening stimuli, avoidant mothers may ignore or avoid infant faces to suppress processing [31], significantly affecting attention. They show fewer and shorter fixations on infant faces [32], demonstrating attentional avoidance with consistent responses across emotional valences [29]—an attentional deficit. Compared to secure mothers, avoidant mothers exhibit larger N170 amplitudes and smaller P300 amplitudes, particularly for crying faces [33], reflecting a dual processing pattern of early vigilance followed by late suppression [34]. Consequently, avoidant mothers' emotional perception is often constrained.

In summary, attachment style significantly impacts emotional perception through distinct attentional patterns: secure mothers use secure-base strategies [23] with early vigilance and flexible sustained attention regulation, yielding high attentional sensitivity; anxious mothers use hyperactivating strategies [23] with early vigilance but inflexible sustained attention, yielding lower sensitivity; avoidant mothers use deactivating strategies [23] with early vigilance and late suppression (Tang et al., 2017), associated with lower attentional sensitivity.

Current research has limitations. First, most studies focus on facial emotion perception, with limited and inconsistent findings for other sensory modalities (e.g., auditory, tactile). Some research shows secure individuals identify surprised and sad voices more accurately [3], respond faster to infant cries [4], and show reduced amygdala activation to prevent being overwhelmed by anxiety

or aversion [5]. Other studies find no accuracy differences between secure and insecure individuals in voice processing [6]. These studies primarily compare secure versus insecure groups, leaving differences between anxious and avoidant styles in auditory processing unclear. Given differential processing mechanisms for faces and voices [35], future research should examine whether attachment style affects different cue modalities similarly.

Second, research has focused on single-sensory modes (e.g., faces only), neglecting multi-sensory integration. Studies show faster and more accurate emotion judgments in multi-sensory (e.g., face plus voice) versus single-sensory conditions [36]. Future work should compare performance differences across single-sensory modes and explore the unique role of multi-sensory integration to comprehensively understand attachment style's influence on maternal emotion perception.

3. Influence of Attachment Style on Maternal Attribution

The SIP model's interpretation stage involves explaining and evaluating emotional cues, essentially forming *maternal attributions* about the child [37]. Internal working models guide expectations about others' intentions and produce information-processing differences, affecting maternal attributions.

Secure mothers' positive IWMs enable effective threat processing and stress mitigation, reducing the need for frequent attachment system activation—relevant because intense activation may deactivate the medial prefrontal cortex region involved in intention attribution [38]. Research shows secure mothers provide more appropriate interpretations of infants' mental states during interactions with 6-month-olds [39], correctly interpreting behavioral intentions and linking current behaviors to similar events [40]. They also demonstrate better understanding [17] and fewer negative attributions [1].

Insecure mothers (avoidant and anxious) possess negative IWMs, processing social information more negatively and potentially attributing hostile intentions [27]. Empirical studies find insecure mothers make inappropriate attributions and show poorer understanding [41]. They are also more susceptible to parenting stress [42, 43], processing information automatically and habitually, which reduces attention to contextual information and increases child-blame, yielding inappropriate interpretations [44].

Anxious and avoidant mothers show different attribution patterns stemming from divergent attachment needs and secondary strategies. Anxious individuals intensely seek closeness, fear rejection, and hyperactivate their attachment system, becoming highly vigilant to potential threats [29]. This consumes cognitive resources, impairing their ability to block negative thoughts and increasing emotional reactivity [45], leading to over-attribution [46]. Compared to secure and avoidant mothers, anxious mothers generate more mental state interpretations [47], yet high attachment anxiety correlates with fewer appropriate interpretations [48], suggesting they over-interpret but misread infant needs. High attach-

ment anxiety also predicts more negative attributions for infant crying [49], and anxious women misidentify infant fear, attributing fear and anger to temporary physical factors [1]—reflecting asynchrony that impedes sensitive caregiving.

Avoidant mothers, needing independence and distance, use deactivating strategies to suppress emotional perception [23]. This over-regulation may prevent consideration of infants' complex mental states, causing under-attribution [46]. Avoidant mothers show the fewest mental state interpretations [47], with attachment avoidance unrelated to mentalization [48]. Reduced right temporoparietal junction activation in avoidant individuals [50]—a key region for intention attribution [51]—may represent a neural mechanism for under-attribution. However, some argue that while avoidant women ignore emotional information, they maintain executive function activation, potentially leading to intellectualized over-attribution [52]—a hypothesis requiring empirical testing in parent-child contexts. Additionally, avoidant mothers' emotional attributions may be modulated by infant emotion valence: they make situational attributions for anger but internal attributions for fear [1]. While situational attributions for negative emotions are adaptive, internal attributions for negative behaviors may relate to harsh, insensitive, or abusive parenting [53, 54].

Overall, attachment style significantly influences maternal attribution: secure mothers make appropriate attributions, while insecure mothers make inappropriate ones (over- or under-attribution). Anxious individuals show consistent over-attribution, whereas avoidant individuals show more contradictory patterns—potentially over- or under-attributing. This may stem from failure to distinguish attribution types (intention vs. emotion) or consider contextual factors. Future research should examine avoidant individuals' performance across different attribution tasks and contexts. Furthermore, infant gender may moderate attributions: when attributing infant distress, individuals make more situational attributions for girls [55], suggesting gender role expectations influence behavioral interpretation. Future studies should explore potential moderating effects of infant gender.

4. Influence of Attachment Style on Motivational Response

Sensitive caregiving requires not only appropriate abilities and psychological resources to perceive and interpret cues but also sufficient motivation to provide care, encompassing both motivational activation and goal establishment. The former refers to caregiving motivation—whether mothers are willing to provide care; the latter refers to caregiving goals—whether motivation is infant-directed or self-directed. Maternal motivational responses are closely linked to their attachment systems, with attachment style influencing both caregiving motivation and goals.

Secure mothers' positive self- and other-models foster positive caregiving representations [55], enabling them to recognize their caregiving capacity and view infants as worthy of help, yielding higher caregiving motivation. For instance,

secure individuals show more positive motivational responses to infant crying faces [56]. Secure attachment priming enhances positive, clear attitudes toward children [57] and increases motivational responses to infant faces [58]. According to attachment theory, threat activates the attachment system, prompting support-seeking rather than caregiving. Only when individuals possess sufficient attachment security can they invest time and energy addressing others' needs [59]. Thus, secure mothers effectively manage threats, reducing attachment system activation and enabling infant-directed motivation for more effective caregiving [55].

Anxious mothers' desire for intimacy may prompt support provision. However, high attachment anxiety shows no significant association with caregiving motivation [60], possibly because high anxiety correlates with greater hostility toward infants [61], creating a conflict that inhibits motivational responses. Anxious individuals also hold negative caregiving representations, doubting their support capacity [62], reflecting uncertainty about their caregiving role rather than unwillingness. Thus, anxious mothers may experience contradictory caregiving motivation. When facing others' distress, they adopt self-centered perspectives and maladaptive emotion regulation strategies (rumination, catastrophizing) [63], generating high personal distress [64] and self-directed motivation [65]. Indeed, high attachment anxiety predicts self-directed caregiving goals [55]. However, some argue anxious individuals have mixed goals, providing help out of concern for close others' welfare [66], potentially explaining their contradictory behaviors—simultaneously effective and ineffective caregiving.

Avoidant mothers likely show low caregiving motivation with self-directed goals. High attachment avoidance correlates with viewing others as unworthy of care [62]. While this independence reduces caregiving pressure, it also diminishes interest in infants, viewing needy infants as threatening and reducing caregiving motivation. High attachment avoidance negatively correlates with willingness to care for infants [60]. Avoidant individuals use response inhibition to minimize negative emotions and maintain emotional distance [25, 63], appearing indifferent to others' distress. They may provide care out of obligation [67] with self-directed motivation [62], though this may ineffectively reduce infant distress.

In summary, attachment style significantly affects motivational responses, with differences in both caregiving motivation and goals: secure mothers show high motivation with infant-directed goals; anxious mothers show ambivalent motivation with self-directed goals; avoidant mothers show low motivation with self-directed goals.

5. Influence of Attachment Style on Behavioral Selection

According to the SIP model, behavioral selection is determined by all prior processing stages. Having processed infant cues and developed caregiving goals, mothers generate potential behavioral responses, evaluate their feasibility, and

select specific actions [13]. Through repeated interactions with attachment figures, different attachment styles develop distinct IWMs and caregiving representations that internalize caregiving patterns, guiding behavioral selection.

Secure individuals hold positive caregiving representations for both self and infant, viewing infant distress as normative and believing in their caregiving efficacy [68]. This confidence enables timely, sensitive caregiving [8, 18, 69, 70]. Having experienced sensitive, consistent care themselves, secure mothers possess resources and exemplars for appropriate behavioral selection, such as maintaining positive attitudes, promptly attending to infant needs, and remaining synchronized [71, 72].

Insecure mothers more frequently exhibit negative parenting behaviors [73-76], likely reflecting internalized negative attachment experiences (rejection, 冷漠) [2]. These experiences become caregiving patterns that bias behavioral preferences. After viewing videos of secure mothers, high attachment anxiety and avoidance correlate with negative implicit attitudes toward the mother, but positive attitudes after viewing videos consistent with their own IWMs [77], suggesting insecure individuals prefer IWM-congruent patterns that may promote negative caregiving.

Anxious mothers' negative self-model may interfere with behavioral selection. Believing they lack support capacity [62], they may adopt easily implemented caregiving patterns that satisfy their own attachment needs, such as overdirecting or interfering with infants' activities [22, 73]. However, when facing infant crying, high attachment anxiety may prompt withdrawal to prolong infant need and maintain closeness (Haltigan et al., 2014). Avoidant mothers' positive self- and negative other-models create discomfort with intimacy and lack of support knowledge [65], making them unlikely to generate appropriate alternatives. They tend toward 冷漠, 迟钝 responses [22, 78], showing negative, passive responses with less warmth, intimacy, and support [79, 80], and prefer monitoring behaviors—watching without interacting [15].

In summary, attachment style significantly influences behavioral selection: secure mothers choose positive, responsive, sensitive behaviors; anxious and avoidant mothers choose negative behaviors, with anxious mothers being overly active and avoidant mothers passive. However, most studies statically examine attachment-behavior relations, neglecting the dynamic process. Unclear factors include the number of generated behavioral options, dependence on specific caregiving patterns, and response evaluation processes. Moreover, whether specific behaviors constitute low sensitivity may depend on emotional context. Haltigan et al. (2014) found avoidant mothers' monitoring may be adaptive when infants are calm (providing exploration space) but insensitive when infants are distressed (failing to reduce distress). Thus, infant emotional valence is crucial. Future research should examine how attachment style affects specific behavioral selections across contexts, combining particular sensitivity behaviors with infant emotional cues to identify potential adaptive advantages of insecure mothers in specific contexts.

6. Future Research Directions

Maternal sensitivity is vital for child development, and attachment style may explain individual differences. Despite prior explorations, an integrative theoretical framework explaining *how* and *why* attachment style influences maternal sensitivity is lacking. This article, grounded in the SIP model and empirical research, explicates attachment style's impact on maternal sensitivity's cognitive processes (emotion perception, maternal attribution, motivational response, behavioral selection), delineating differential mechanisms across stages. This provides new avenues for exploring underlying mechanisms and clarifies how attachment style and cognitive processes jointly shape behavioral sensitivity, advancing understanding of maternal sensitivity's antecedents. However, several issues warrant investigation:

First, deepen research on temporal dimensions. The SIP model presents four linear stages, implying that early-stage effects of attachment style may cause later behavioral differences. Yet evidence for this sequence and attachment style's holistic, processual, continuous dynamic impact is lacking. The SIP model also emphasizes non-linear processing—individuals may skip stages or allow backward information flow, potentially exacerbating cognitive distortions and insensitive behaviors [13]. The feasibility of non-linear processing and attachment style's unique role require empirical support. Future research should employ refined paradigms and high-temporal-precision tools to verify stage sequences and explore how attachment style influences potential alterations under specific conditions.

Second, expand research on multiple cognitive structures' joint influence. The SIP model includes IWMs, infant mental representations, self-efficacy, and attribution patterns. IWMs not only directly affect cognitive processes but also interact with the other three structures. Current research largely ignores these interactions. For instance, high attachment anxiety correlates with low parenting efficacy [81], which may bias behavioral selection toward easily implemented behaviors. While IWMs are relatively stable, they can adapt to new information [2, 82]. High-anxiety parents whose efficacy increases show decreased attachment anxiety over time [83], potentially reducing information-processing biases. Future studies should simultaneously examine these three cognitive structures to explore their interactive effects on cognitive processes.

Third, examine contextual factors. Maternal sensitivity processing occurs dynamically during parent-child interactions, influenced by both traits and contexts. Yet prior research has overlooked contextual impacts. Parenting stress may be a key environmental factor [44, 84]. Attachment-related differences in cognitive skills and resources may interact with parenting stress to jointly influence processing. Stress may activate the attachment system, leading insecure mothers to show more biased processing and IWM-congruent strategies (hyperactivating or deactivating), resulting in less sensitive caregiving [85]. Infant emotional valence also matters; while its moderating role is established in emo-

tion perception [1, 24], its effects on attribution, motivation, and behavioral selection require clarification. Future research should manipulate contextual variables to compare performance differences across attachment styles.

Finally, explore attachment style's dual impact on emotional and cognitive processes. During parent-child interactions, cognitive and emotional processes intertwine to determine behavioral sensitivity [86, 87], yet prior research has rarely examined both simultaneously. Attachment theory is fundamentally an emotion regulation theory [68]; thus, attachment style influences both cognitive processing and emotional responses. For example, high avoidance correlates with positive emotions toward infant distress, while high anxiety correlates with hostility and intolerance [61, 88], reflecting inappropriate emotional reactions. Insecure individuals also use maladaptive emotion regulation strategies and experience greater difficulties [Henschel et al., 2020], which may disrupt cognitive processes [89] and impair behavioral sensitivity. Future research should simultaneously examine both processes to clarify how attachment style shapes behavioral sensitivity through their dual influence.

References

[1] Bowlby J. Attachment and loss: vol. 1. Attachment: praxis der kinderpsychologie und kinderpsychiatrie[M]. New York: Basic Books, 1969.
[2] Gagné K, Lemelin J, Tarabulsy G M. Non-verbal and verbal parental mentalization as predictors of infant attachment security: contributions of parental embodied mentalizing and mind-mindedness and the mediating role of maternal sensitivity[J]. Infant Behavior and Development, 2021,65:101622.
[3] Deans C L. Maternal sensitivity, its relationship with child outcomes, and interventions that address it: a systematic literature review[J]. Early Child Development and Care, 2020,190(2):252-275.
[4] Alvarenga P, Cerezo M A, Wiese E, et al. Effects of a short video feedback intervention on enhancing maternal sensitivity and infant development in low-income families[J]. Attachment & Human Development, 2020,22(5):534-554.
[5] Deneault A A, Cabrera N J, Bureau J F. A meta-analysis on observed paternal and maternal sensitivity[J]. Child Development, 2022,93(6):1631-1648.
[6] Fuths S, Seehagen S, Schneider S. How a mother processes her infant's distress: cognitive pathways to maternal insensitivity[J]. Mental Health & Prevention, 2017,6:19-25.
[7] Behrens K Y, Haltigan J D, Bahm N. Infant attachment, adult attachment, and maternal sensitivity: revisiting the intergenerational transmission gap[J]. Attachment & Human Development, 2016,18(4):337-353.
[8] Haltigan J D, Leerkes E M, Supple A J, et al. Infant negative affect and maternal interactive behavior during the still-face procedure: the moderating role of adult attachment states of mind[J]. Attachment & Human Development, 2014,16(2):149-173.
[9] Groh A M, Haydon K C. Mothers' neural and behavioral responses to their infants' distress cues: the role of secure base script knowledge[J]. Psychological

Science, 2018,29(2):242-253.
[10] Pazzagli C, Delvecchio E, Raspa V, et al. The parental reflective functioning questionnaire in mothers and fathers of school-aged children[J]. Journal of Child and Family Studies, 2018,27(1):80-90.
[11] Jones J D, Cassidy J, Shaver P R. Parents' self-reported attachment styles: a review of links with parenting behaviors, emotions, and cognitions[J]. Personality and Social Psychology Review, 2015,19(1):44-76.
[12] Dudek J, Haley D W. Attention bias to infant faces in pregnant women predicts maternal sensitivity[J]. Biological Psychology, 2020,153:107890.
[13] Endendijk J J, Spencer H, van Baar A L, et al. Mothers' neural responses to infant faces are associated with activation of the maternal care system and observed intrusiveness with their own child[J]. Cognitive, Affective, & Behavioral Neuroscience, 2018,18(4):609-621.
[14] Bai X J, Chen X, Zhou M, et al. The effects of negative context and attachment security priming on working memory updating among anxiously attached individuals[J]. Biological Psychology, 2019,143:41-52.
[15] Mikulincer M, Shaver P R. Attachment in adulthood :structure, dynamics, and change[M]. 2007.
[16] Mikulincer M, Shaver P R, Pereg D. Attachment theory and affect regulation: the dynamics, development, and cognitive consequences of attachment-related strategies[J]. Motivation and Emotion, 2003,27(2):77-102.
[17] Leyh R, Heinisch C, Behringer J, et al. Maternal attachment representation and neurophysiological processing during the perception of infants' emotional expressions[J]. Plos One, 2016,11(2).
[18] Mikulincer M, Shaver P R. Attachment orientations and emotion regulation[J]. Current Opinion in Psychology, 2019,25:6-10.
[19] 马原啸, 陈旭. 阈下安全启动改善非安全依恋女性的注意加工 [J]. 心理发展与教育, 2019,35(01):11-22.
[20] Dykas M J, Cassidy J. Attachment and the processing of social information across the life span: theory and evidence[J]. Psychological Bulletin, 2011,137(1):19-46.
[21] Fraley R C, Niedenthal P M, Marks M, et al. Adult attachment and the perception of emotional expressions: probing the hyperactivating strategies underlying anxious attachment[J]. Journal of Personality, 2006,74(4):1163-1190.
[22] Ma Y X, Ran G M, Chen X, et al. Adult attachment styles associated with brain activity in response to infant faces in nulliparous women: an event-related potentials study[J]. Frontiers in Psychology, 2017,8:627.
[23] Schumann K, Orehek E. Avoidant and defensive: adult attachment and quality of apologies[J]. Journal of Social and Personal Relationships, 2019,36(3):809-833.
[24] Long N, Yu W, Wang Y, et al. Do infant faces maintain the attention of adults with high avoidant attachment?[J]. Frontiers in Psychology, 2021,12:631751.
[25] Jia Y C, Cheng G, Zhang D J, et al. Attachment avoidance is significantly related to attentional preference for infant faces: evidence from eye movement data[J]. Frontiers in Psychology, 2017,8:85.

[26] Fraedrich E M, Lakatos K, Spangler G. Brain activity during emotion perception: the role of attachment representation[J]. Attachment & Human Development, 2010,12(3):231-248.
[27] 唐清婷, 胡佳, 陈旭, 等. 回避型依恋者对消极情绪信息防御性加工特征 [J]. Advances in Psychology, 2017,7:199.
[28] Young A W, Frühholz S, Schweinberger S R. Face and voice perception: understanding commonalities and differences[J]. Trends in Cognitive Sciences, 2020,24(5):398-410.
[29] Klasen M, Chen Y H, Mathiak K. Multisensory emotions: perception, combination and underlying neural processes[J]. Reviews in the Neurosciences, 2012,23(4):381-392.
[30] Wang Z, Deater-Deckard K, Bell M A. The role of negative affect and physiological regulation in maternal attribution[J]. Parenting-Science and Practice, 2016,16(3):206-218.
[31] Luyten P, Fonagy P. The neurobiology of mentalizing[J]. Personality Disorders-Theory Research and Treatment, 2015,6(4):366-379.
[32] Arnott B, Meins E. Links among antenatal attachment representations, postnatal mind-mindedness, and infant attachment security: a preliminary study of mothers and fathers[J]. Bulletin of the Menninger Clinic, 2007,71(2):132-149.
[33] 柯竞怡, 胡平. 共心力: 概念, 测量, 影响因素与作用 [J]. 中国临床心理学杂志, 2017,25(02):294-298.
[34] Nijssens L, Bleys D, Casalin S, et al. Parental attachment dimensions and parenting stress: the mediating role of parental reflective functioning[J]. Journal of Child and Family Studies, 2018,27(6):2025-2036.
[35] Nordahl D, Rognmo K, Bohne A, et al. Adult attachment style and maternal-infant bonding: the indirect path of parenting stress[J]. Bmc Psychology, 2020,8(1):58.
[36] Kim D H, Kang N R, Kwack Y S. Differences in parenting stress, parenting attitudes, and parents' mental health according to parental adult attachment style[J]. Journal of the Korean Academy of Child and Adolescent Psychiatry, 2019,30(1):17.
[37] Beckerman M, van Berkel S R, Mesman J, et al. The role of negative parental attributions in the associations between daily stressors, maltreatment history, and harsh and abusive discipline[J]. Child Abuse & Neglect, 2017,64:109-116.
[38] Letourneau N L, Hart J M, MacMaster F P. Association between non-parenting adult's attachment patterns and brain structure and function: a systematic review of neuroimaging studies[J]. Sage Open Nursing, 2017,3.
[39] Henry A, Allain P, Potard C. Relationships between theory of mind and attachment styles in emerging adulthood[J]. Journal of Adult Development, 2022,29(3):179-191.
[40] Milligan K, Khoury J E, Benoit D, et al. Maternal attachment and mind-mindedness: the role of emotional specificity[J]. Attachment & Human Development, 2015,17(3):302-318.
[41] Dollberg D G. Mothers' parental mentalization, attachment dimensions

and mother-infant relational patterns[J]. Attachment & Human Development, 2022,24(2):189-207.
[42] Gross J T, Stern J A, Brett B E, et al. Mothers' attachment style predicts response to child distress: the role of maternal emotions and attributions[J]. Journal of Child and Family Studies,
[43] Baskak B, Kir Y, Sedes N, et al. Attachment style predicts cortical activity in temporoparietal junction (TPJ): an fNIRS study using a theory of mind (tom) task in healthy university students[J]. Journal of Psychophysiology, 2020,34(2):99-109.
[44] Vistoli D, Brunet-Gouet E, Baup-Bobin E, et al. Anatomical and temporal architecture of theory of mind: a meg insight into the early stages[J]. Neuroimage, 2011,54(2):1406-1414.
[45] Luyten P, Malcorps S, Fonagy P, et al. Assessment of mentalizing[M]//BATEMAN A, FONAGY P. Handbook of Mentalizing in Mental Health Practice. 2. American Psychiatric Association, 2019:37-62.
[46] Beckerman M, van Berkel S R, Mesman J, et al. Negative parental attributions mediate associations between risk factors and dysfunctional parenting: a replication and extension[J]. Child Abuse & Neglect, 2018,81:249-258.
[47] Mouton B, Weeland J, Leijten P, et al. When parents wear dark glasses: an experimental study on parental negative attributions and parenting behavior[J]. Journal of Child and Family Studies, 2022,31(12):3468-3484.
[48] Moreira H, Canavarro M C. Individual and gender differences in mindful parenting: the role of attachment and caregiving representations[J]. Personality and Individual Differences, 2015,87:13-19.
[49] Ding F Y, Zhang D J, Cheng G. The effect of secure attachment state and infant facial expressions on childless adults' parental motivation[J]. Frontiers in Psychology, 2016,7:1237.
[50] Jones J D, Stern J A, Fitter M H, et al. Attachment and attitudes toward children: effects of security priming in parents and non-parents[J]. Attachment & Human Development, 2022,24(2):147-168.
[51] Ding F Y, Jia Y C, Cheng G, et al. Secure attachment priming amplifies approach motivation for infant faces among childless adults[J]. Frontiers in Psychology, 2021,12:736379.
[52] Shaver P R, Mikulincer M, Cassidy J. Attachment, caregiving in couple relationships, and prosocial behavior in the wider world[J]. Current Opinion in Psychology, 2019,25:16-20.
[53] Jia Y C, Cheng G, Ding F Y, et al. Mediation effect of adult attachment orientations between perceived parental warmth and the preference for infants[J]. Current Psychology, 2021,40(1):113-125.
[54] Rousseau S, Feldman T, Harroy L, et al. High emotionality to infant cry: associations with adult attachment, gender, and age[J]. Early Child Development and Care, 2020,190(15):2449-2458.
[55] Fonseca A, Nazaré B, Canavarro M C. Mothers' and fathers' attachment and caregiving representations during transition to parenthood: an actor–partner approach[J]. Journal of Reproductive and Infant Psychology, 2018,36(3):246-260.

[56] Brandao T, Brites R, Hipolito J, et al. Attachment orientations, emotion goals, and emotion regulation[J]. Personality and Individual Differences, 2023,204.
[57] Henschel S, Nandrino J, Doba K. Emotion regulation and empathic abilities in young adults: the role of attachment styles[J]. Personality and Individual Differences, 2020,156:109763.
[58] Feeney B C, Collins N L. Predictors of caregiving in adult intimate relationships: an attachment theoretical perspective[J]. Journal of Personality and Social Psychology, 2001,80(6):972-994.
[59] Mikulincer M, Shaver P R. Prosocial motives, emotions, and behavior: the better angels of our nature.[M]. American Psychological Association, 2010.
[60] Feeney B C, Collins N L. Motivations for caregiving in adult intimate relationships: influences on caregiving behavior and relationship functioning[J]. Personality and Social Psychology Bulletin, 2003,29(8):950-968.
[61] Mikulincer M, Shaver P R. Attachment in adulthood :structure, dynamics, and change.[M]. 2. The Guilford Press, 2016.
[62] Zvara B J, Lathren C, Mills Koonce R, et al. Maternal and paternal attachment style and chaos as risk factors for parenting behavior[J]. Family Relations, 2020,69(2):233-246.
[63] Gross J T, Stern J A, Brett B E, et al. Mothers' attachment style predicts response to child distress: the role of maternal emotions and attributions[J]. Journal of Child and Family Studies, 2023,32(3):876-891.
[64] Crugnola C R, Gazzotti S, Spinelli M, et al. Maternal attachment influences mother infant styles of regulation and play with objects at nine months[J]. Attachment & Human Development, 2013,15(2):107-131.
[65] Bailey H N, Bernier A, Bouvette-Turcot A A, et al. Deconstructing maternal sensitivity: predictive relations to mother-child attachment in home and laboratory settings[J]. Social Development, 2017,26(4):679-693.
[66] Safyer P, Volling B L, Schultheiss O C, et al. Adult attachment, implicit motives, and mothers' and fathers' parenting behaviors[J]. Motivation Science, 2019,5(3):220-234.
[67] Olsavsky A L, Berrigan M, Schoppe-Sullivan S J. Self-reported adult attachment and observed parenting behavior of new mothers and fathers[J]. Social Psychological and Personality Science, 2020,11(6):821-834.
[68] Riva Crugnola C, Ierardi E, Canevini M P. Reflective functioning, maternal attachment, mind-mindedness, and emotional availability in adolescent and adult mothers at infant 3 months[J]. Attachment & Human Development, 2018,20(1):84-106.
[69] Jones J D, Fraley R C, Ehrlich K B, et al. Stability of attachment style in adolescence: an empirical test of alternative developmental processes[J]. Child Development, 2018,89(3):871-880.
[70] De Carli P, Tagini A, Sarracino D, et al. Implicit attitude toward caregiving: the moderating role of adult attachment styles[J]. Frontiers in Psychology, 2016,6:1906.
[71] Gillath O, Bunge S A, Shaver P R, et al. Attachment-style differences in the ability to suppress negative thoughts: exploring the neural correlates[J].

Neuroimage, 2005,28(4):835-847.
[72] Jones J D, Cassidy J. Parental attachment style: examination of links with parent secure base provision and adolescent secure base use[J]. Attachment & Human Development, 2014,16(5):437-461.
[73] Mikulincer M, Shaver P R. Attachment in adulthood :structure, dynamics, and change[M]. New York: The Guilford Press, 2007.
[74] Calvo V, Bianco F. Influence of adult attachment insecurities on parenting self-esteem: the mediating role of dyadic adjustment[J]. Frontiers in Psychology, 2015,6:1461.
[75] Stern J A, Fraley R C, Jones J D, et al. Developmental processes across the first two years of parenthood: stability and change in adult attachment style[J]. Developmental Psychology, 2018,54(5):975-988.
[76] Arriaga X B, Eller J, Kumashiro M, et al. Self-efficacy and declines over time in attachment anxiety during the transition to parenthood[J]. Social Psychological and Personality Science, 2021,12(5):658-666.
[77] Johnston C, Park J L, Miller N V. Parental cognitions: relations to parenting and child behavior[M]//SANDERS M R, MORAWSKA A. Handbook of Parenting and Child Development Across the Lifespan. Cham: Springer, 2018:395-414.
[78] Tognasso G, Gorla L, Ambrosini C, et al. Parenting stress, maternal self-efficacy and confidence in caretaking in a sample of mothers with newborns (0–1 month)[J]. International Journal of Environmental Research and Public Health, 2022,19(15):9651.
[79] Carreras J, Carter A S, Heberle A, et al. Emotion regulation and parent distress: getting at the heart of sensitive parenting among parents of preschool children experiencing high sociodemographic risk[J]. Journal of Child and Family Studies, 2019,28(11):2953-2962.
[80] Gershy N, Gray S. Parental emotion regulation and mentalization in families of children with ADHD[J]. Journal of Attention Disorders, 2020,24(14):2084-2099.
[81] River L M, Borelli J L, Nelson-Coffey S K. Tolerance of infant distress among working parents: examining the roles of attachment anxiety and work-family conflict[J]. Parenting-Science and Practice, 2019,19(1-2):137-159.
[82] Schultheis A M, Mayes L C, Rutherford H. Associations between emotion regulation and parental reflective functioning[J]. Journal of Child and Family Studies, 2019,28(4):1094-1104.

Note: Figure translations are in progress. See original paper for figures.