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THE ROLE OF THE RIGHT INFERIOR FRONTAL GYRUS (rIFG) IN THE INTERGENERATIONAL TRANSMISSION OF PARENTING

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Adult's ability to attune to the infant's needs and feelings, seems to play a primary role in organizing infant's psychic structure and subjectivity. One of the factors that contribute to shape adult's capability of being a "responsive enough" human being, is the quality of care he/she experienced during his/her own childhood (Belsky, 2009). We hypothesized that the rIFG, a brain area that is essential for emotional empathy and the mirror neurons system, could be one of the mechanisms that allow the intergenerational transmission of parenting abilities. Moreover, neuroimaging studies confirm the role of rIFG during the perception of infant crying (Riem et al., 2011) and infant faces with different emotional expressions (Montoya et al., 2012). We designed two studies in order to inhibit rIFG functionality in nulliparous women by means of Transcranic Magnetic Stimulation (TMS) and test behavioral responses to infant's crying and emotional faces. In the first study we extended to infants' faces the bias adults show when they are asked to approach emotionally negative faces. We show that this bias toward infant's sad faces is caused by rIFG functionality. More specifically, infants' faces processing depends on the stimulation and the quality of the care participants experienced during their own childhood, retrospectively measured with the Childhood Trauma Questionnaire (CTQ). In the second study we tested the use of excessive force in response to infant's cry by means of a dynamometer (Bakermans-Kranenburg et al., 2011). Results show that rIFG inhibition increases the use of excessive force, but only in those participants reporting no experience of maltreatment during childhood. Both studies confirm a causal role of rIFG in determining the behavioral response to infant stimuli and that subjective experience during childhood moderates this association. The role of rIFG functionality in determining the intergenerational transmission of parenting behavior seems confirmed.

NEURAL EMPATHIC RESPONSE IN DRUG-ADDICTED MOTHERS

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Several studies showed that a history of substance abuse can compromise mothers' competences of caring for their children (i.e., parenting). Indeed, it has been shown that neural circuits associated with parental behavior overlap with circuitry involved in addiction; in this vein, substance abuse may subtract neural resources for parenting. According to the neurocognitive model, empathy is the

ability of sharing and understanding others' emotional states. At a neural level, these two aspects result to be dissociable at an either functional and temporal level. Empathy is a fundamental element of parental abilities as it allows to response properly to children's needs. Empathy deficits might explain the failure reported by drug addicted mothers in caring for their children. In the present study, we monitored event-related potentials (ERPs) during a pain decision task, which is classically used to activate an empathic response, with the aim to track the time-course of neural activity of mothers with (i.e., clinical) and without history of drug addiction (i.e., control group). Stimuli were pictures of adults' and children's hand depicted with a harmful tool either hurting the hand or placed nearby. At a behavioral level, drug addicted mothers showed a reduced reactivity to pain when compared to the control group. This difference has been corroborated at a neural level by ERPs results, starting from an early time-window. The neural reaction to pain in the control group correlated with some self-report scales of empathy, reinforcing the idea that the clinical group might report a lack of empathy when compared to a control group. These results are discussed in light of the two components of empathy proposed by the neurocognitive model.

THE INTERACTION BETWEEN PARENTAL RELATIONSHIPS AND ENVIRONMENT MODERATES PHYSIOLOGICAL RESPONSES TO INFANT CRY IN ADULTHOOD

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The promptness to correctly interpret and respond to infant cry is determinant for children's well-being and survival. However, parental responsiveness towards infant cry is influenced by two factors: early social experiences with parents and individuals' genetic predispositions. The present study aims to investigate how adults' unconscious responses to distressing stimuli are influenced by the interaction between individuals' genetic predispositions and early experiences of parental behaviors. We assessed heart rate and peripheral temperature (tip of the nose) in 42 non-parent male adults during presentation of distress vocalizations (female human, infants and bonobo cries). The two physiological responses index, respectively, state of arousal and readiness to action. Participants' parental attachment in childhood was assessed through the self-report Parental Bonding Instrument. To map participants' genetic predispositions in genes linked to affiliative and social behaviors, buccal mucosa cell samples were collected. Region rs2254298 of the oxytocin receptor gene and and the serotonin-transporter-linked polymorphic region (X5HTTLPR) were analyzed. For both genes results show an effect of the interaction between genotype and early environmental conditions in determining adults' responses to cry. Specifically, concerning the