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From emotional mutual to self-regulation in attention deficit/hyperactivity disorder: A pilot study on a sample of preschool-age children and their parents

Michela Di Trani[a], Giulia Ballarotto[a], Alessia Renzi[a], Carla Sogos[b], Maria Romani[b], Miriam Vigliante[b], Renata Tambelli[a]

[a] *Department of Dynamic and Clinical Psychology, Sapienza University of Rome, Rome, Italy*
[b] *Department of Human Neuroscience, Child Neurology, and Psychiatry, Sapienza University of Rome, Rome, Italy*

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Abstract

The present study aimed to verify the relationship between parent-child interaction characteristics and the ability of children with attention deficit/hyperactivity disorder (ADHD) to self-regulate their emotions. The sample included 60 participants: 20 mothers, 20 fathers, and 20 preschool-age males with a diagnosis of ADHD. Parents completed the 20-Item Toronto Alexithymia Scale. The Child Emotional Abilities Task was administered to the child and Autobiographical Emotional Events Dialogues were administered to mother-child and father-child dyads. Several characteristics of parent-child interactions, such as maternal ability to accept an active role of the child during the task, correlated with the child's ability to identify and describe his own feelings. Parental abilities to involve the child in a reciprocal narrative and avoid boundary dissolution also correlated with the individual capability of the child in imaginative processes. In conclusion, parental emotional abilities were related to the ways in which parents interacted with their children with ADHD during an emotional task. The characteristics of these interactions were related to child emotional self-regulation abilities.

Keywords: ADHD; emotional regulation; alexithymia; parent-child emotion dialogues; preschool children.

*Corresponding author
Michela Di Trani
Department of Dynamic
and Clinical Psychology
Sapienza University of Rome
Via degli Apuli 1, 00185, Rome, Italy
Phone: +39 06 49917989
Email: michela.ditrani@uniroma1.it
(M. Di Trani)

Introduction

Attention deficit/hyperactivity disorder (ADHD) is a neurodevelopmental disorder characterized by symptoms of inattention, hyperactivity, and/or impulsivity and is associated with significant impairments across functional domains (APA, 2013). ADHD represents one of the most prevalent psychiatric disorders during childhood, affecting 3-5% of all children (Donfrancesco et al., 2015; Thomas et al., 2015). ADHD may emerge as early as the preschool years or into adulthood (Barkley, 2016). The aetiology of ADHD involves genetic, environmental, and social factors, though the roles of these factors are still not clearly understood (Storebø et al., 2019).

Although ADHD is generally conceptualized as a deficit in attention or executive functioning, recent studies have established the need to integrate emotional dysregulation into the conceptualization of this disorder (Graziano & Garcia, 2016; Landis et al., 2020; Morris et al., 2020) and into clinical settings (Barkley & Fischer, 2010). Behaviours that commonly characterize emotional dysregulation among children and youth with ADHD include emotional impulsiveness and difficulty managing the intensity of emotional states (Bunford et al., 2015; Landis et al., 2020; Morris et al., 2020). Emotional dysregulation represents the state in which individuals fail to modulate their emotions in order to promote adaptive behaviour (Özbarana et al., 2018). A meta-analysis found that children with ADHD have executive functioning deficits, as well as deficits in emotional regulation, including impairments in the ability to recognize and understand emotion, react to emotional events, and regulate emotion through effective strategies (Graziano & Garcia, 2016). Furthermore, a recent study showed that the theory of mind impairment partially explained emotional dysregulation in children with ADHD (Özbarana et al., 2018).

The alexithymia construct, literally meaning "a lack of words to express emotion", is closely associated with theory of mind and emotional dysregulation concepts (Luminet et al., 2018). Alexithymia has been conceptualized as an emotional dysregulation disorder characterized by difficulties in identifying and expressing emotions, employing fantasy to regulate painful feelings, finding creative solutions to problems, and communicating needs (Luminet et al., 2018). Only one study explored alexithymia levels in children with ADHD, and this study demonstrated that alexithymia was significantly associated with ADHD severity, specifically hyperactivity/impulsivity symptoms (Donfrancesco et al., 2013). Parental sensitivity and responsiveness are fundamental elements for the development of a child's emotional self-regulation abilities (Field et al., 2006). Over time, alexithymia has also been related to the concept of emotional regulation, which is a function closely linked to the relationship with the primary caregiver, who plays a key role in interpreting and regulating the child's emotions (Taylor et al., 1997).

Studies concerning mother-child interactions have found that mothers with psychopathological diagnoses show fewer positive facial expressions and non-attuned and non-contingent turn-taking when interacting with their child (Field et al., 2006; Porreca et al., 2018), which was found to be associated with increased psychopathological risk in children (Murray et al., 2010). When children develop language and increase their linguistic and conversational maturity, mothers continue to play an important role in the co-construction of meaning in daily conversations about their child's emotional experiences (Thompson, 2006). In particular, a sensitive maternal guide during dialogues on emotionally significant events represents a fundamental element to allow children to represent their internal experiences (Madigan et al., 2006). Literature emphasizes that congruent dialogues on emotions are associated with secure attachment (Oppenheim et al., 2007), the development of emotional regulation abilities (Laible, 2011), and the child's mental health (Fivush et al., 2009). It can be concluded that children need their parents to co-construct the meaning of the emotions they feel and to guide them in expressing and organizing their emotions (Oppenheim & Koren-Karie, 2013). Therefore, by adopting an intergenerational perspective, it is possible to hypothesize that high parental alexithymia levels have consequences on parental ability to regulate emotions within the relationship with the child, thus depriving the child of a necessary aspect for the development of the skills necessary for emotional self-regulation (Yates et al., 2012).

Alexithymia represents a dimensional construct that is sensitive to individual experiences. During childhood, it is possible to identify situations in which a child shows emotional competences related to the identification and communication of emotions and imaginative processes that are below the average of the general population of the corresponding age range (Di Trani et al., 2016). Deficiencies in the abilities to identify and describe emotions may be defined as alexithymia.

International literature currently seems to support an association between alexithymia and somatic and mental pathologies in adulthood, adolescence, and childhood. Nevertheless, further studies are needed to confirm this relationship in childhood considering the relatively small body of empirical research on alexithymia in different developmental stages (Di Trani et al., 2016). Furthermore, it may be particularly useful to investigate emotional regulation in relation to ADHD in preschool-age children (Martel, 2009) considering the lack of studies in this field.

Aims

In order to verify the relationship between emotional mutual and self-regulation in parents and children with ADHD, we investigated whether parent-child interaction quality during a narrative task about emotions was related to the child's abilities to identify and describe his own emotions. Specifically, we hypothesized that parental ability to regulate emotions during the interactive task was related to child emotional self-regulation abilities. Furthermore, we hypothesized that parental abilities to regulate emotions and emotional interactions during the task were related to the child's ability to process emotions.

Methods

Participants and procedure

The study was conducted between June 2018 and June 2019 and was performed in accordance with the ethics code of the World Medical Association (Declaration of Helsinki) for

experiments involving humans. The study was approved by the ethics committee of the Department of Dynamic and Clinical Psychology.

The study included 20 family units in which the child had a diagnosis of ADHD and was between 4-6 years of age. Families were informed of the study at the end of the diagnostic evaluation at the Department of Human Neuroscience, Child Neurology, and Psychiatry, Sapienza University of Rome. All children were stimulant naïve since none had previously been diagnosed with ADHD. ADHD diagnosis was made by a child psychiatrist according to Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5) criteria (APA, 2013), the Kiddie Schedule for Affective Disorders and Schizophrenia for School Age Children Present and Lifetime version (K-SADS-PL) (Sogos, 2004) interview administered to the mother and father, and the Conners Parent Rating Scale Short Form (CPRS-R) (Conners, 1989). All children were diagnosed with combined type ADHD without comorbidities. We excluded families in which the child was or had been under psychological treatment or had mental delay, autistic spectrum-related symptoms, or language difficulties.

Parents who agreed to participate signed an informed consent form that explained the different phases of the study. The study was performed during three sessions. In the first session, mothers and fathers separately completed the 20-Item Toronto Alexithymia Scale (Bressi et al., 1996) in the presence of a clinician, whereas children were administered the Child Emotional Abilities Task (Di Trani et al., 2016). In a second and third session on non-consecutive days, mother-child and father-child dyads were invited in a randomized order to develop a dialogue about the emotions experienced by the child according to Autobiographical Emotional Events Dialogues (Koren-Karie et al., 2003). Socioeconomic information was collected from the clinical schedule.

In the present study, all children were males, with a mean age of 5.25 years (*SD* = .71). The mean age of mothers was 41.25 years (*SD* = 4.20), while the mean age of fathers was 44.60 years (*SD* = 4.22).

Measures

Autobiographical Emotional Events Dialogues (AEEDs; Koren-Karie et al., 2003). According to the AEED procedure, the parent-child dyad was presented with five cards. On each card, the name of a feeling was written and images representing facial expressions of different emotions (sadness, happiness, anger, pride, and fear) were depicted. The parent and child were invited to tell stories together about the child's life when he experienced these different emotions. The dialogues were audio-recorded and subsequently transcribed verbatim. The transcripts were coded using 7 parental and 7 parallel child scales and 2 scales pertaining to the narrative produced by the parent and child. These scales ranged from 1 to 9. In all scales except hostility, higher scores reflected more positive behaviours. Based on the rating scales and descriptions of the dialogue classifications, dialogues were also classified as emotionally matched, emotionally unmatched—excessive, emotionally unmatched—flat, emotionally unmatched—inconsistent, or cannot classify. Emotionally matched dyads were able to create coherent stories, with a clear link between the emotion and story. Excessive dialogues included dysregulated emotional issues. Some themes were immediately blocked after being raised and there was a lack of coherence in the stories and a tendency towards excessive dramatization or boundary dissolution. Flat dialogues were characterized by poor story development and a lack of involvement. Both parent and child showed little interest in the task. The coding of the transcripts was performed by two blind coders who were trained in the AEED coding system and had established adequate reliability. Interrater reliability measured using Cohen's kappa ranged from .76 to .89.

Child Emotional Abilities Task (CEAT; Di Trani et al., 2016). This task consisted of two sections that measured children's emotional competences related to primary emotions (happiness, anger, sadness, fear) and secondary emotions (shame, loneliness, guilt, envy). Each section included several pictures that described one emotion. Children were asked to identify and nominate the emotion, and to describe the story represented in the picture. The children also had to imagine a story about each emotion presented. The administrator attributed scores from 1 to 3 on two distinct scales: identifying and describing feelings (IDF) and imaginative processes (IP). The task was validated for children from 4 to 7 years old, and demonstrated good validity and adequate internal reliability (IDF Cronbach's alpha = .79; IP Cronbach's alpha = .76).

20-Item Toronto Alexithymia Scale (TAS-20; Bressi et al., 1996). The TAS-20 is a self-report questionnaire for the evaluation of alexithymia in adolescents and adults that identifies three main factors: difficulty in identifying feelings, difficulty in describing feelings, and externally oriented thinking. In this study, Cronbach's alpha ranged from .73 to .89.

Statistical Analysis

All statistical analyses were performed using SPSS v. 25. Pearson's correlation analyses were used to investigate the association between the quality of parent-child narratives and child emotional abilities; the quality of parent-child narratives and parental emotional abilities; and parental and child emotional abilities. A p value < .05 was considered significant.

Results

Before analysis of the data results, AEEDs were classified to describe mother-child and father-child emotional dialogues from a qualitative perspective (see Table 1).

Tab. 1. Mother-child and father-child dialogue classification

	Mother-child	Father-child
Emotionally matched	9 (45%)	3 (15%)
Emotionally unmatched- extreme	6 (30%)	10 (50%)
Emotionally unmatched- flat	5 (25%)	7 (35%)

Regarding CEAT and TAS-20 scores, the mean child CEAT score for identifying and describing feelings was 17.40 (*SD* = 2.44), while the mean child CEAT score for imaginative processes was 13.45 (*SD* = 3.33). The mean maternal TAS-20 total score was 35.23 (*SD* = 8.67), while the mean paternal TAS-20 total score was= 39.83 (*SD* = 7.83).

Associations between quality of parent-child dialogues and child emotional competences

Several significant correlations emerged between AEED and CEAT scores (see Table 2). With regard to mother-child AEED scores, maternal abilities to involve the child during the task in a reciprocal narrative and avoid boundary dissolution correlated with the child's individual capacity in imaginative processes (involvement and reciprocity, r=.43; boundary dissolution, r=-.59), whereas both the mother's and child's abilities to accept and tolerate the role of the other during storytelling positively correlated with the child's ability to identify and describe his own feelings (maternal acceptance and tolerance, r=.50; child acceptance and tolerance, r=.49). Moreover, child cooperation levels during the task with their mother positively correlated with their ability in imaginative processes (cooperation and reciprocity, r=.43). Finally, the overall adequacy and coherence levels of narrative production correlated with child fantasy abilities (respectively, r=.53; r=.46).

Regarding father-child AEEDs, child hostility during the dialogues negatively correlated with the child's ability to identify and describe feelings (r=-.52). Paternal difficulty in boundary containment during the narratives was negatively associated with child imaginative processes (r=-.53).

Tab. 2. Correlations between CEAT and AEED scales

	CEAT Abilities in identifying/ describing feelings	CEAT Imaginative processes
AEED mother-child		
Maternal scales		
Shift of focus	r=.22	r=-.03
Boundary dissolution	r=-.32	r=-.59**
Acceptance and tolerance	r=.50*	r=.23
Involvement and reciprocity	r=.29	r=.45*
Hostility	r=-.29	r=-.11
Closure of negative feelings	r=.30	r=.34
Structuring of the interaction	r=.23	r=.42
Child scales		
Shift of focus	r=-.19	r=-.31
Boundary dissolution	r=.26	r=.05
Acceptance and tolerance	r=.49*	r=.11
Cooperation and reciprocity	r=.15	r=.43*
Hostility	r=-.09	r=.09
Resolution of negative feelings	r=.24	r=.24
Elaboration of the story	r=.22	r=.39
Overall scales		
Adequacy of the stories	r=.16	r=.53*
Coherence	r=.19	r=.46*
AEED father-child		
Paternal scales		
Shift of focus	r=-.20	r=-.13
Boundary dissolution	r=-.37	r=-.53*
Acceptance and tolerance	r=.24	r=.28
Involvement and reciprocity	r=.07	r=-.06
Hostility	r=-.05	r=.01
Closure of negative feelings	r=.12	r=.08
Structuring of the interaction	r=.20	r=-.01
Child scales		
Shift of focus	r=-.14	r=-.01
Boundary dissolution	r=.22	r=.05
Acceptance and tolerance	r=.20	r=.10
Cooperation and reciprocity	r=.07	r=-.07
Hostility	r=-.52*	r=-.24
Resolution of negative feelings	r=.18	r=-.08
Elaboration of the story	r=.16	r=.10
Overall scales		
Adequacy of the stories	r=-.10	r=.04
Coherence	r=.01	r=.12

Note: *p<.05; **p<.01; CEAT: Child Emotional Abilities Task; AEED: Autobiographical Emotional Events Dialogues

Associations between quality of parent-child dialogues and parental alexithymia

Significant correlations were found for both mothers and fathers. As regards mothers, task focus and hostility levels during emotional dialogues with the child were related to maternal difficulties in identifying (shift of focus, r=.61; p<.05; hostility, r=.55; p<.05;) and describing emotions (shift of focus, r=.62; p<.05; hostility, r=.73; p<.01), whereas difficulties in accepting and tolerating the child's initiatives in storytelling were related to the mother's difficulty in describing her own emotions (acceptance and tolerance, r=-.57; p<.05). In addition, child task focus levels significantly correlated with maternal total alexithymia levels (r=.55; p<.05) and with maternal difficulty in identifying feelings (r=.60; p<.05).

Regarding fathers, paternal difficulties in involving the child during the task and playing an active role in structuring the interaction correlated with paternal difficulties in identifying their own emotions (involvement and reciprocity, r=-.67; p<.05; structuring of the interaction, r=-.69; p<.05). Paternal difficulty in closuring stories of negative emotions with

positive endings was related to both total paternal alexithymia levels (r=-.61; p<.05) and externally oriented thinking (r=-.59; p<.05). Moreover, children's difficulties in accepting the role of the father during the task and elaborating the narratives correlated with paternal difficulties in identifying their own emotions (acceptance and tolerance, r=-.59; p<.05; elaboration of the stories, r=-.61; p<.05), whereas children's difficulties in resolving negative stories in a positive way during storytelling correlated with both paternal total alexithymia levels (r=-.71; p<.05) and externally oriented thinking scores (r=-.57; p<.05). Finally, the overall scale related to storytelling coherence negatively correlated with paternal difficulties in describing their own emotions (r=-.70; p<.05).

Associations between parental alexithymia and child emotional competences

No significant Pearson's correlations were found between maternal and paternal TAS-20 and CEAT scores.

Discussion

Although ADHD is conceptualized as an attention and hyperactivity disorder, recent studies have highlighted the need to integrate emotional functioning into the conceptualization of this disorder (Graziano & Garcia, 2016) and clinical care (Barkley & Fischer, 2010).

Emotional processing, including emotion identification, regulation, and response, has been shown to be closely related to the construct of alexithymia (Swart et al., 2009). Several studies have analysed alexithymia features in adults with ADHD (Edel et al., 2010; Roshani et al., 2017), though only one study demonstrated the presence of high alexithymia levels in children with ADHD as compared with a control group (Donfrancesco et al., 2013). The multifactorial aetiology of alexithymia suggests that a child's early relationship with his or her parents is a crucial factor in the development of emotional self-regulation abilities. In addition, it is well established that early childhood experiences influence the development of emotion schemas, imagination, and other cognitive skills involved in emotional regulation (Fonagy & Target, 1997).

In the present study, we explored the emotional abilities of family members. Despite the absence of a control group, it was possible to observe low alexithymia levels in the mothers (M=35.23; SD=8.67) and fathers (M=39.83; SD=7.83) of children with ADHD, as compared with the Italian general population where the total mean TAS-20 score is 44.70 (Bressi et al., 1996). Child CEAT scores in identifying and describing feelings and imaginative processes were very similar to the general population group of those aged 4-6 years (Di Trani et al., 2016).

Moreover, AEED classification showed that 45% of mother-child and 15% of father-child dialogues were emotionally matched. This result is very interesting. While the trend of mother-child dialogues was similar to that of mothers with depression or anxiety, as found by Cimino et al. (2020), no study has investigated the quality of father-child dialogues with AEEDs. Our results demonstrate that fathers of children with ADHD had dialogues with their child that were characterized by high levels of dramatization and boundary dissolution. These fathers seemed to have difficulty focusing on their child's emotional experiences, which created confusion for the child or led to the child not feeling emotionally involved. In both cases, it may be noted that not enough space was left for the child.

We will discuss results regarding the relationships between the quality of parent-child narratives about emotions and child abilities to identify and describe their own emotions separately for mother-child and father-child groups. Since the study design precluded drawing definitive conclusions on the direction of relationships or possible causal relationships between parent-child dimensions, associations reported within the dyads should be considered circular and mutually influencing.

Regarding the mother-child group, the abilities of both the mother and child to accept the role of the other during storytelling and to tolerate the contribution of the other in building an emotional story were related to the ability of the child to identify and describe his own emotions. Moreover, maternal abilities to involve the child during the task in a reciprocal development of the story and avoid boundary dissolution and child cooperation levels were related to child imaginative process ability.

Regarding the father-child group, our results confirmed an association between the father's ability to maintain a boundary between his own and other's contributions during the interaction and the child's ability to develop fantasies, whereas child hostility levels during the narrative task were related to the child's abilities to identify and describe his own emotions. In general, interaction quality during an emotional task, such as co-telling stories on an emotional topic, seemed to be related to child development in identifying and describing emotions.

A second topic of the study was to verify the relationship between parental alexithymia levels and parent-child interaction quality during the narrative task. Results seemed to confirm that parental emotional self-regulation ability was related to parental relational abilities during parent-child interactions. Regarding mothers, maternal difficulties in identifying feelings were associated with the tendency to maintain focus on the child's emotions during the task, whereas maternal difficulties in describing feelings were associated with acceptance or tolerance of the role of the child in storytelling and a greater focus on the child's emotions. A specific role of maternal hostility may be related to maternal difficulties in both identifying and describing feelings. It is possible to hypothesize that the more confused the emotions of the mother, the less tolerant the mother is towards the child's interventions during interactions, and therefore the hostility level may increase as a consequence.

Regarding fathers, paternal difficulties in describing feelings appeared to be related to some qualitative aspects of the interaction, such as paternal abilities to involve the child and structure the interaction. Total alexithymia levels and externally oriented thinking were instead related to paternal ability to end stories about negative emotions positively.

No significant results emerged regarding the relationship between parental alexithymia levels and child emotional self-

regulation abilities. It is possible that a direct relationship between parental and child emotional skills does not exist at the developmental stage examined. Conversely, interaction quality during this early stage of development appears to be relevant since it plays a mediating role between parental and child competences.

This study has several limitations. First, the sample size was very limited, partially due to the inclusion of children of a specific age range and both parents. A second limitation regards the absence of a control group, which should be added in future investigations in order to perform comparative analyses. The presence of only male children represents a further limitation, although the prevalence of male gender in ADHD has been established. Moreover, the observational study design precluded drawing definitive conclusions on the direction of relationships or the causal relationships between variables.

However, one important strength of the study was the inclusion of fathers, whose role is often neglected in research on children, especially in clinical populations. Furthermore, we investigated a preschool-age population, an age group that is neglected in both alexithymia and ADHD studies. Moreover, we used measures that allowed clinicians to attribute a score to the dimensions explored, thus overcoming the limitations of self-report tools. Lastly, we included only children with pure or combined type ADHD.

From a clinical perspective, our results support the importance of treatments focused on parent-child interactions. In ADHD treatment, parents are often involved in parental training while the child undergoes individual therapy, and therapies rarely include space for parent-child interactions in a clinical setting. These preliminary data highlight the need to focus on emotional regulation in early ADHD in order to support the development of emotional mutual to self-regulation abilities.

Compliance with ethical standards

Conflict of interest
The authors declare that they have no competing interests.

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Ethical approval
All procedures in studies involving human participants were performed in accordance with the ethics standards of institutional and national research committees and with the 1964 Declaration of Helsinki and its later amendments or comparable ethics standards. Ethical approval for the study was provided by the Department of Dynamic and Clinical Psychology, Sapienza University of Rome.

Informed consent
Informed consent was obtained from all individual participants in the study.

Data accessibility statement
Data supporting the results shown in the paper are available from the corresponding author on request.

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