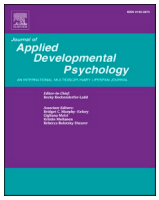
Journal of Applied Developmental Psychology 94 (2024) 101678

Contents lists available at ScienceDirect

Journal of Applied Developmental Psychology

journal homepage: www.elsevier.com/locate/jappdp



Dispositional and state sadness, interpersonal features, and internalizing/externalizing symptoms: A network analysis

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ARTICLE INFO

Keywords:
Children
State sadness
Dispositional sadness
Interpersonal features
Psychopathological symptoms
Network analysis

ABSTRACT

Sadness serves adaptive functions in restructuring one's objectives and strategies in loss situations. This study examined the relationship between the effects of sadness, social components, and psychopathological issues in children, distinguishing between state and dispositional sadness. A semi-structured written interview about a specific moment of sadness and questionnaires to measure interpersonal features (empathy, prosocial behavior, and attachment) and psychopathological symptoms (internalizing/externalizing symptoms) were administered to 476 children (age range: 7–10 years, $M = 8.81$, $SD = 1.07$; 52.3% female; 91% White) from various primary schools in central Italy, along with their teachers. Network Analysis and Multivariate Linear Regression Analysis showed that state sadness was positively associated with affective empathy, whereas dispositional sadness was positively associated with internalizing/externalizing symptoms. The findings offer insights to parents and educators on the importance of recognizing and accepting sadness as an adaptive response contingent on sad events.

Sadness has often been regarded as a maladaptive emotion, although this is not always the case (Taylor & Rachman, 1991). Despite an increasing interest in recent years, research has scarcely focused on sadness emotion, especially in middle childhood (Arias et al., 2020; Zeman et al., 2019). However, during middle childhood, children learn to navigate complex social environments and to manage a growing range of emotions in a variety of contexts (Eisenberg, 2000). Furthermore, studies on the adaptive function of sadness are even more limited (Lomas, 2018). The purpose of this study is to analyze which features make sadness adaptive versus maladaptive during middle-childhood, a critical developmental stage for emotion regulation (Thompson, 2015a). Understanding in what circumstances sadness functions adaptively or maladaptively during childhood can provide crucial insights into the developmental trajectories that affect both immediate and long-term emotional health. Thus, the present study seeks to fill the gaps in the literature and to expand our knowledge on the factors either relieving or worsening sadness experience in children. Filling this gap in the literature is critical, since increasing our knowledge on the experience of sadness in children could contribute to prevent psychopathological symptoms during the different stages of development. This study has the potential to improve children well-being and provide insights for both educational and clinical interventions.

State sadness, dispositional sadness, and depressive disorders

The process of dealing with sadness aligns with the broader concept of emotion regulation coping. Zeman et al. (2002) asserted that the regulation of negative emotions includes at least two components: (1) emotional awareness, which refers to the ability to recognize one's own emotions, and (2) emotional coping, which includes strategies for managing emotions constructively. While coping is an effortful process of responding to stress with an active effort to regulate external and/or internal stressors (Compas et al., 2017; Lazarus & Folkman, 1984; Zeman et al., 2002), "emotion regulation coping" regards the ability to manage effectively negative emotions by controlling emotional arousal to prevent undesirable consequences (Zeman et al., 2001, p. 188). Thus,

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https://doi.org/10.1016/j.appdev.2024.101678
Received 6 December 2023; Received in revised form 22 July 2024; Accepted 22 July 2024

positive or negative outcomes of sadness are not influenced by the emotion itself, but rather by its management, since emotional regulation coping processes guide the emotional experience itself.

Sadness in child research has often been pooled together with other negative emotions (Jenkins & Ball, 2000; Lench et al., 2016) and is frequently conflated with clinical depression (Lomas, 2018; Zeman et al., 2019), making the specific influence of sadness on children's social, psychological, and behavioral health unclear. In this study, we argue that *state sadness, dispositional sadness*, and *depressive disorders* can and need to be distinguished. This distinction between different dimensions of sadness provides a novel contribution to the field of emotion research, and more specifically to the study of emotions in children, allowing for a clearer differentiation of when sadness is adaptive versus maladaptive.

State sadness, similarly to other state negative emotions, refers to the intensity of the feeling of sadness at a particular time (Spielberger & Reheiser, 2009). State sadness is an adaptive reaction in response to distressing events, such as the loss of health, status, resources, beloved persons or objects, and is aimed at restructuring one's objectives and strategies (Arias et al., 2020; Ekman, 1992; Nesse, 1990; Verduyn et al., 2020; Zaid et al., 2021). Consequently, state sadness is related to a particular event at a particular point in time (Leventhal, 2008), and even if it lasts for days or weeks, its arousal is limited to the events which caused it. State sadness represents a relevant signal for individuals to temporarily withdraw in response to loss in order to restructure their objectives and strategies. Thus, state sadness may allow individuals to limit the impact of the loss and reflect on its consequences on their lives (Forgas, 2013; Lazarus, 1991; Verduyn et al., 2020). Evolutionary scholars suggest that mild state sadness may enhance cognitive and behavioral strategies aimed at coping with emotionally demanding events (Arias et al., 2020; Forgas, 2013; Panksepp, 2015). Furthermore, sadness may serve the adaptive purpose of eliciting attention and obtaining social support to alleviate discomfort (Buss & Kiel, 2004; Kunzmann & Thomas, 2014; Sanders et al., 2015; Verduyn et al., 2020).

Once children find a way to manage the sad event and regulate the triggered negative emotions, they overcome state sadness. Overcoming sadness leads to the subjective perception of having managed sad events and the emotions associated with them, contributing to children's adaptive adjustment (Brush et al., 2011).

Dispositional sadness is a facet of the temperamental dimension of negative affect and refers to the propensity of an individual to experience negative emotions, which include, but are not limited to, sadness (e.g., Rettew & McKee, 2005; Rothbart et al., 2001). This predisposition to experience states of sadness is not necessarily associated with contingent events (Lemerise & Arsenio, 2000; Nozadi et al., 2018). Edwards et al. (2015) define this propensity to sadness as *dispositional sadness*, in that is "general low mood, or lowered mood and activity related to personal suffering, physical state, object loss, or inability to perform a desired action" (Gartstein & Rothbart, 2003, p. 68). Contrary to state sadness, dispositional sadness lacks the evolutionary function of allowing one to manage specific sad events.

Depressive disorders may share many of the characteristics of dispositional sadness, such as enduring diminished interest in activities and perceived loss of energy. However, depressive disorders also include symptoms distinctly different from the individual's usual mood, such as significant weight loss or weight gain or impairment in concentration and in other important areas of functioning. Extreme feelings of worthlessness or guilt, or even thoughts of death may also be present, and, in contrast to dispositional sadness, "significantly affect the individual's capacity to function" (American Psychiatric Association, 2013, p. 155). Consequently, depressive disorders lack clear evolutionary value, as they lead to dysfunctional behaviors such as isolation, avoidance and social withdrawal. On the other hand, dispositional sadness does not trigger such maladaptive responses, even though it does not lead to functional and adaptive behaviors either. Finally, state sadness fosters adaptive behaviors aimed at changing unfavorable events (Karnaze & Levine, 2018; Leventhal, 2008). Furthermore, the intensity of state sadness is related to increased sensitivity to others' feelings (Forgas, 2013; Forgas, 2017; Spinrad & Eisenberg, 2019). These distinctions between state sadness, dispositional sadness, and depressive disorders are crucial to understand the different emotional experiences and their impacts on behavior and functioning.

Sadness and interpersonal features

Recent research on sadness has examined its role in promoting effective interpersonal strategies in childhood (Spinrad & Eisenberg, 2019). Particularly, sadness is related to prosocial behaviors such as helping, sharing, and comforting (Edwards et al., 2015; Guo & Wu, 2021; Miller et al., 2016). However, Guo and Wu (2021) highlighted that research about a possible link between sadness and prosocial behaviors is inconsistent. Some studies show that sadness generally reduces prosocial behaviors in children (Guo et al., 2019), except in children with high empathy, in which sadness increases prosocial behaviors (Guo & Wu, 2021). Other studies have found that if sadness is recognized and well-regulated, it can increase prosocial behaviors and empathetic responses to the suffering of others (Debono & Muraven, 2020; Eisenberg, 2000; Hein et al., 2018; Miller et al., 2016; Song et al., 2018). Conversely, dysregulated sadness could decrease empathic responses because preoccupation with one's own emotional dysregulation reduces the ability to pay attention to the emotional states of others (Edwards et al., 2015). Along these lines, Galarneau et al. (2022) found, in a sample of 4 and 8-year-olds, that both sadness recognition and sadness regulation predicted higher levels of sympathy. These inconsistent results could be due to the confusion between dispositional sadness, state sadness, and depressive disorders (Leventhal, 2008). Dispositional and state aspects of sadness could be differentially related to empathy and prosocial behaviors. Surprisingly, to our knowledge, no studies have examined and compared both types of sadness.

However, studies on children have shown the crucial value of recognizing sadness (Eisenberg, 2000; Galarneau et al., 2022; Hein et al., 2018). Consequently, instead of using objective measures of responses to a single task and/or accounting for the frequency of sadness, it is important to explore children's subjective awareness of their own sadness, i.e., the perception of sadness a child has experienced within a situation that made them feel sad, and the relations among sadness awareness, their interpersonal features, and externalizing/internalizing symptoms.

Attachment security and experience of sadness

Emotion regulation in coping with distressing events, including sad events, is a crucial function of attachment relationships. Through the experience of parents' emotion regulation, children learn to self-regulate emotions and to develop adaptive coping with negative emotions (Calkins & Leerkes, 2011; Cassidy, 1994; Thompson, 2015b). A meta-analysis by Cooke et al. (2019) and a review by Parrigon et al. (2015) show that securely attached children, compared to insecurely attached children, are more capable of regulating emotions, and more often use adaptive emotion regulation coping strategies, such as seeking help or social referencing. During both the preschool years and middle childhood, securely attached children, compared to insecurely attached children, use more adaptive coping strategies when experiencing negative emotions, such as seeking comfort and self-regulation (Contreras et al., 2000; Kerns et al., 2007; Psouni & Apetroaia, 2014; Saija et al., 2023; Ştefan et al., 2017). Secure attachment has also been linked to children's recognition and expressions of sadness. For example, Harold et al. (2004) found that in middle childhood, securely attached children who watched a scene of conflict between adults reported feeling sadder than insecure children. Secure parents may encourage their children to recognize and freely talk about their negative emotions, specifically about their sadness. Sanders et al. (2015) found that

encouraging children to express negative emotions, specifically sadness, when justified by the situations at hand, helped them manage sadness, whereas unsupportive responses were associated with less adaptive sadness regulation coping strategies and more depressive symptoms. These findings highlight the fundamental role of attachment security in enhancing effective emotion regulation and coping strategies in children, ultimately contributing to their emotional well-being and resilience.

Internalizing/externalizing symptoms, interpersonal features, and sadness dysregulation

Internalizing and externalizing symptoms are two macro-categories of emotional, behavioral, and social problems. While internalizing symptoms refer to difficulties with anxiety, depressive, and somatic symptoms, externalizing problems refer to difficulties with impulsive and disruptive conduct behaviors and substance use (Achenbach et al., 2016; American Psychiatric Association, 2013; Pozza et al., 2020). Following Goodman (1997), the macro-category externalizing symptoms encompasses hyperactivity/inattention and conduct problems, whereas the macro-category internalizing problems includes peer problems and emotional symptoms.

Most research has found that dysregulated sadness is related to higher levels of both internalizing and externalizing symptoms (Aldao et al., 2016, for a review; Di Giunta et al., 2022; Feng et al., 2009), with some exceptions (i.e., Zeman et al., 2002). While most studies support a link between sadness and both internalizing and externalizing symptoms, the link to internalizing symptoms appears to be particularly strong. Indeed, children with more internalizing symptoms use less effective sadness regulation strategies (Cooley et al., 2020; Harmon et al., 2019). Several studies have highlighted an inverse association between social abilities and internalizing or externalizing symptoms in children (Flouri & Sarmadi, 2016; Nantel-Vivier et al., 2014), even if children with externalizing difficulties are more capable than internalizing children to empathetically respond to negative emotional states of others (Bandstra et al., 2011; Gambin & Sharp, 2016). Bandstra et al. (2011) found that children with higher internalizing symptoms were less likely to show empathic concern for the physical pain of others and more likely to respond to the sadness of others through social referencing, whereas children with higher externalizing symptoms were more likely to show empathic concern, but less likely to react with distress. Moreover, research supports a strong link between sadness and adverse peer relations (Fanti & Henrich, 2010; Hoglund & Chisholm, 2014). Primary school children with peer problems, such as asociality, isolation, or victimization, are at risk of being unable to manage feelings of sadness (Fanti & Henrich, 2010; Hoglund & Chisholm, 2014). The relation between sadness and social problems seems to be biunivocal: dispositionally sad children may be easily rejected, but, at the same time, isolated or victimized children may be at risk of developing an enduring sadness.

Finally, insecure attachment has been associated with an increased likelihood of developing internalizing and externalizing symptoms (Madigan et al., 2013). Given that emotion regulation and coping strategies develop in the interactions between parents and children, insecure patterns of relationships can contribute to impaired emotion regulation and coping, and subsequent internalizing and externalizing symptoms. Indeed, research has found that insecure attachment (anxious or avoidant) is linked to higher internalizing symptoms through the mediation of emotion regulation strategies (Brumariu & Kerns, 2010; Ştefan & Avram, 2017), and children with internalizing/externalizing symptoms tend to have less emotionally supportive parents (Eisenberg et al., 2001; Hale & Zeman, 2023). On the other hand, the literature on the field evidenced that the experience of a secure attachment relationship contributes to the ability of regulating sadness and prevents the development of internalizing/externalizing symptoms. Furthermore, as previously illustrated, the relations among sadness and other relevant variables vary depending on whether sadness is either state- or dispositional. This study contributes to explore the complexity of these relations, emphasizing the need for comprehensive approaches when addressing children's psychological development.

Aims of the current study

Based on the considerations described above, the current study aimed to address gaps in literature on sadness in children. Specifically, we explored how dispositional sadness and state sadness in middle-childhood differ in terms of relations with other psychological dimensions such as coping with sadness, overcoming sadness, interpersonal features (attachment, prosociality, empathy), and internalizing/externalizing symptoms (Fig. 1). The use of Network Analysis (Epskamp et al., 2018), which allows to visually represent and interpret the structure of relations among variables, corresponds also to the exploratory aim of examining which critical nodes are most strongly related to other variables in the network.

As summarized in Fig. 1, and taking into consideration the adaptive function of state sadness and the maladaptive function of dispositional sadness, we expected that: (1) dispositional sadness would be unrelated to state sadness, i.e., the subjective awareness of their own sadness that children experience during distressing events would be unrelated to their tendency to be sad; (2) state sadness, coping of sadness, and overcoming sadness would be positively associated and dispositional sadness would be negatively associated with empathy, prosociality, and secure attachment; (3) state sadness, coping of sadness, and overcoming sadness would be negatively associated, and dispositional sadness would be positively associated with internalizing and externalizing symptoms. Furthermore, we explored if different nodes, particularly attachment, coping of sadness, overcoming sadness, prosociality, and cognitive and affective empathy are reciprocally related.

Method

Participants and procedure

A total of 620 children and their teachers participated in the study. Initially, all the parents and teachers of the recruited students gave their informed consent to participate. Out of these 620 children, 144 were subsequently excluded due to non-response to one or more scales used in the research. A final sample of 476 children between the ages of 7 and 10 years ($M = 8.81$, $SD = 1.07$; 52.3% female) and their teachers were included in the analyses for this study. The children were selected from 22 middle-class primary schools located in central Italy. The research adhered to the guidelines outlined in the Declaration of Helsinki, and the Ethics Committee of Roma Tre University approved the study protocol.

Informed consent was provided to participants' parents, teachers, and school managers. Children verbally assented to participate in the research at the outset of data collection. Children who did not assent to participate were excluded. Data were collected between December 2022 and February 2023. Children and teachers completed a battery of questionnaires and written interviews during school time and were supervised by the researchers involved in this study. While both children and teachers independently completed the questionnaires, researchers assisted in cases of comprehension difficulties. Moreover, all instructions, questions, and response options were tailored to suit the cognitive abilities of 7 to 10-year-old children.

Measures

Sadness interview (Saija et al., 2023)

This is a semi-structured interview assessing the experience of sadness in children. The questions were designed to be developmentally appropriate, ensuring that 7-year-old children could readily provide fundamental details concerning the events causing sadness. Questions of

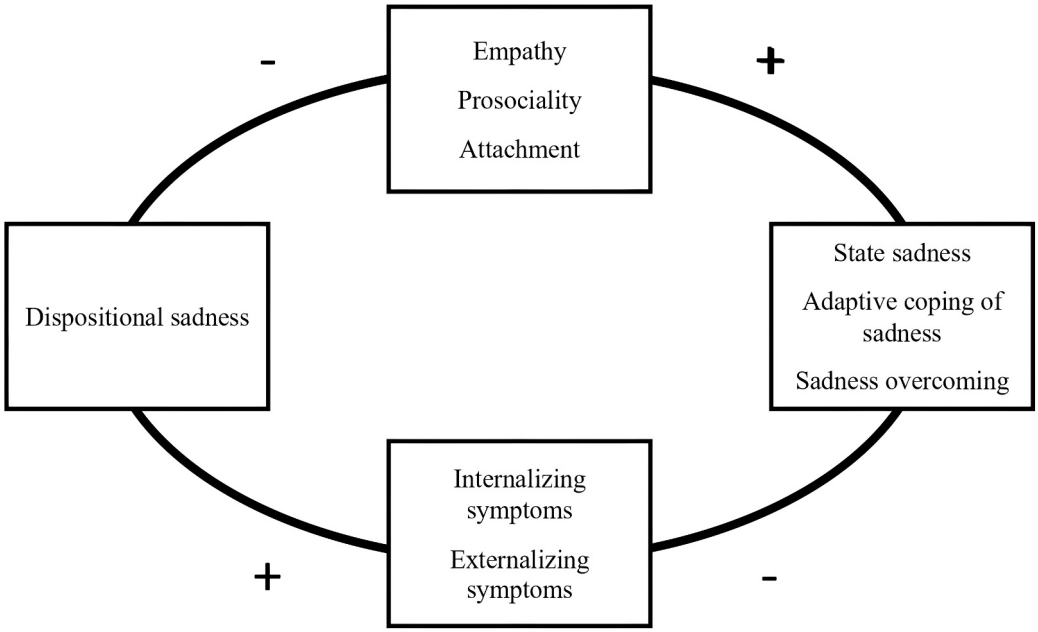

Fig. 1. Research Hypothesis Model.

a highly abstract nature were avoided to maintain clarity and accessibility for the participants.

Following the Quiñones-Camacho and Davis (2019) method, children were asked (a) to provide a written description of an event that made them sad ("Let's think about a time recently when you felt very sad and all the little details you can remember about it. Would you like to describe it in writing?"); (b) to evaluate the intensity of the experienced sadness on a 10-point scale (from 1 = *Not at all*, to 10 = *Very much*) ("Describe how sad you felt at that time"); (c) to describe their coping strategies ("What did you do to make yourself feel less sad?"); (d) to specify if they had succeeded in managing their emotion of sadness on a 6-point scale (1 = *Not at all*; 2 = *A little*; 3 = *Partially*; 4 = *Quite a bit*; 5 = *A lot*; 6 = *Very much*) ("Did you succeed in overcoming the sadness?"). The intensity of the state sadness variable was derived from question (b), the coping of sadness variable was derived from question (c), and the sadness overcoming variable was derived from question (d).

Children's answers were coded into three overarching categories of coping informed by Abraham and Kerns (2013), Compas et al. (2017), and Saija et al. (2023): constructive strategies (emotional and behavioral modulation, seeking help, cognitive reappraisal, problem-solving); disengagement strategies (redirecting attention away from the event, receiving help from an adult without asking for it); and dysregulation (emotion dysregulation, inaction). Then, we used the created variable as an ordinal variable to analyze the data systematically. Responses were transcribed and coded by experienced coders (first and second author). The inter-rater reliability was determined for 42% of total responses, showing strong agreement for all coping strategies (constructive strategies k = 0.87; disengagement strategies k = 0.89; dysregulation k = 1.00). Disagreements were resolved through discussion.

Security scale (SS, Kerns et al., 1996)

This self-report questionnaire assesses attachment security in children, namely the children's perceptions of their mothers' and fathers' communication styles, accessibility, and responsiveness. It is composed of 30 items (15 for each parent) in the "Some kids/Other kids" format (Harter, 1982). For each sentence, children were presented with two contrasting statements and asked to indicate which alternative was true for them, and the extent to which it was true (i.e., "Some kids turn to their mom when they feel upset, while other kids don't turn to their mom when they feel upset"). Children selected the statement best representing them and indicated whether it was "*Really true*" or "*Sort of true*" for them. A global scoring was calculated (sum of scores of children's mother and father). Each item was scored on a four-point scale. In this sample, the scale's internal consistency was high (Cronbach's α = 0.81).

Prosocial behavior scale (PBS, Caprara & Pastorelli, 1993)

This self-report scale measures the presence or absence of prosocial behavior in children and adolescents and consists of seven items (i.e., "I share things I like with my friends"), each rated on a 3-point scale (1 = *Never*; 2 = *Few times*; 3 = *Many times*). In this sample, the scale's internal consistency was adequate (Cronbach's α = 0.70).

Empathy questionnaire (EmQue, Overgaauw et al., 2017)

This questionnaire measures two dimensions of empathy: cognitive empathy (i.e., "If my mother is happy, I also feel happy") and affective empathy (i.e., "When a friend is angry, I tend to know why"). The questionnaire is composed of 12 items, each rated on a 3-point scale (1 = *Not true*; 2 = *Sometimes true*; 3 = *Often true*). In this sample, the consistency of the scale was acceptable (Cronbach's α Cognitive empathy = 0.61; Cronbach's α Affective empathy = 0.68).

Strengths and difficulties questionnaire (SDQ, Goodman, 1997)

This teacher-report questionnaire assesses children's individual and social functioning. It is composed of 20 items each rated on a 3-point scale (0 = *Not true*; 1 = *Partially true*; 2 = *Absolutely true*) subdivided into four sub-dimensions, each consisting of 5 items: emotional symptoms (i.e., "Many worries or often seems worried"), conduct problems (i.e., "Often fights with other children or bullies them"), hyperactivity/inattention (i.e., "Restless, overactive, cannot stay still for long") and peer problems (i.e., "Rather solitary, prefers to play alone"). In this sample, the internal consistency of the scales ranged from acceptable to high (Cronbach's α Emotional symptoms = 0.77; Conduct problems = 0.72; Hyperactivity/Inattention = 0.84; Peer problems = 0.63).

Temperament in middle childhood questionnaire – sadness (TMCQ, Simonds & Rothbart, 2004)

This teacher-report questionnaire measures children's sadness temperament and consists of 10 items (i.e., "Feels sad frequently"), each rated on a 5-point scale (1 = *Almost always false*, 2 = *Usually false*; 3 =

Sometimes true, sometimes false; 4 = *Usually true*; 5 = *Almost always true*). The internal consistency in this sample was very high (Cronbach's α = 0.91). Table 1 shows the mean and standard deviation for each variable.

Statistical analysis

Following Epskamp and colleagues' methodology (Epskamp et al., 2018), we used the Network Analysis approach to study how the variables of interest are interrelated. The network approach allows to visually represent and interpret the structure of relations among constructs conceptualizing them as elements that interact reciprocally. It highlights connections among constructs in a complex network, rather than conceptualizing them as a set of variables related through causal relationships (Borsboom & Cramer, 2013). Subsequently, to assess which variables would predict state and dispositional sadness, respectively, we conducted multiple regressions.

A network includes nodes (observed variables) and edges (statistical relationships). This type of analysis requires three main steps: (1) create a model identifying variables as a weighted network that represents the relations between observed variables, (2) use graph theory measures (Newman, 2010) to examine the network's weighted structure and deduce key central nodes, and (3) evaluate the precision of the network parameters, estimates and measures (Epskamp et al., 2018). Preliminarily, three groups of nodes were defined: sadness variables (state sadness, dispositional sadness, coping of sadness, and sadness overcoming), interpersonal features (attachment, prosociality, affective and cognitive empathy), and internalizing/externalizing symptoms (emotional symptoms, conduct problems, hyperactivity/inattention, and peer problems). The interconnectedness of a node can be measured via how much variance in the node can be explained by other nodes in the network, which is similar to R^2 and termed predictability (Barcaccia et al., 2020; Haslbeck & Waldorp, 2018). The predictability of each node was shown as a circle around the node, and the degree to which this circle was filled indicated the predictability of the node (in %).

Then, bridge strength centrality was estimated. Bridge strength centrality measures the importance of a node relative to others in the network using specific indices represented by *Z*-points, to allow for the identification of more influential variables within the network (Hevey, 2018). Previous studies have estimated bridge strength centrality to examine the relations among groups of variables and determine the significance of specific nodes in linking these groups (Barcaccia et al., 2020; Jones et al., 2021; Medvedev et al., 2021). The estimates were normalized by adjusting the bridge value to account for the number of possible nodes that can be connected. The correlation Stability coefficient (CS) was computed to assess the accuracy of the network parameters. Following the recommendations by Epskamp et al. (2018), a coefficient equal to |0.25| was considered acceptable, and a value of |0.50| robust, while the maximum value is |0.75|. Bootstrapped 95% confidence intervals were estimated for all edge weights.

Network analysis was conducted using the software R (4.2.2). The package *bootnet* was used to estimate the network, visualize using the package *qgraph*, and calculate the CS coefficient. The Fruchterman-Reingold algorithm was used to create a graph where closely linked nodes are placed closely together, and nodes with many links to other nodes are placed centrally in the network. The package *networktools* was used to estimate bridge strength centrality using the *bridge* function. Finally, a multivariate linear regression analysis was conducted, incorporating multiple dependent variables. This analysis aimed to explore the associations of state and dispositional sadness with interpersonal variables (i.e., empathy and prosocial behavior), as well as internalizing and externalizing symptoms using gender and age as covariates. The regression modeling was executed using Mplus 8.10.

Table 1
Variables' mean and standard deviation.

Variable	Abbreviation	Measure	Mean (SD)	Range score
State sadness	STATE	SI	7.99 (2.38)	1–10
Dispositional sadness	DISP	TMCQ	2.26 (0.85)	1–5
Coping of sadness	COPING	SI	2.15 (0.85)	1–3
Sadness overcoming	OVER	SI	4.13 (1.64)	1–6
Attachment	ATT	SS	45.24 (5.76)	15–60
Prosociality	PROS	PBS	15.78 (2.13)	6–18
Affective empathy	AFEM	EmQue	8.11 (2.78)	0–21
Cognitive empathy	COEM	EmQue	6.75 (2.02)	0–15
Emotional symptoms	ES	SDQ	1.71 (2.13)	0–10
Conduct problems	CP	SDQ	1.21 (1.78)	0–10
Hyperactivity/ inattention	HI	SDQ	2.32 (2.48)	0–10
Peer problems	PP	SDQ	1.44 (1.75)	0–10

Note. SI = Sadness Interview; TMCQ = Temperament in Middle Childhood Questionnaire; SS = Security Scale; PBS = Prosocial Behavior Scale; EmQue = Empathy Questionnaire; SDQ = Strengths and Difficulties Questionnaire.

Results

Initially, a correlation analysis was performed to assess the bivariate relations among all the key variables (Table 2). Regarding the Network Analysis, the network structure is presented in the network plot (Fig. 2). The network's mean predictability was 0.28, suggesting that 28% of the variation among nodes can be attributed to variation in other nodes. A CS coefficient of 0.60 was found, indicating a large strength in the differences for node centrality. Finally, the edge weights were tightly bounded by 95% Confidence Intervals.

Several edges were statistically significantly different from zero. Coping with sadness had positive edges to attachment and overcoming. State sadness was negatively linked to overcoming and dispositional sadness was positively linked to emotional symptoms and peer problems. Peer problems had significant positive edges to emotional symptoms and conduct problems. Prosociality was positively linked to cognitive empathy, affective empathy, and attachment. Conduct problems had a positive edge to hyperactivity and affective and cognitive empathy were positively linked. Lastly, attachment was negatively linked to peer problems. See Fig. 3 for a visual representation of the full set of network relations.

Supporting the first hypothesis, the network plot shows that state sadness and dispositional sadness were not significantly correlated with each other, confirming the necessity in future research to distinguish and not conflate these constructs. Results partially confirm the second hypothesis on the positive relations among state sadness, coping of sadness, and overcoming sadness with the interpersonal features, and the negative relation between dispositional sadness with the interpersonal features. Indeed, according to the network analysis, neither state sadness nor dispositional sadness were significantly related to interpersonal features. In particular, state sadness was exclusively and negatively related to overcoming, whereas coping was related to attachment and sadness overcoming. Results partially confirm the third hypothesis on how state and dispositional sadness were related to internalizing/externalizing symptoms. Specifically, state sadness was unrelated to both internalizing and externalizing symptoms. Instead, dispositional sadness was positively related to emotional symptoms and peer problems.

The strength centrality of each node was estimated to evaluate which were the most important nodes in the network. Results are presented in Fig. 4. The most important nodes were emotional symptoms, conduct problems, hyperactivity/inattention, and dispositional sadness. The dispositional sadness was the most central node among the sadness nodes and had stronger edges than state sadness. The third node is attachment, positively related to prosociality, coping of sadness and sadness overcoming, but not to state and dispositional sadness. Dispositional sadness was related to internalizing/externalizing symptoms,

Table 2
Correlation matrix.

	Age	Gender	STATE	DISP	COPING	OVER	ATT	PROS	AFEM	COEM	ES	CP	HI
Age	–												
Gender	−0.02	–											
STATE	0.11**	0.12**	–										
DISP	0.08	−0.02	0.01	–									
COPING	0.03	0.16***	0.04	−0.01	–								
OVER	−0.04	−0.07	−0.19***	−0.05	0.12**	–							
ATT	−0.02	0.02	0.02	0.00	0.17***	0.09*	–						
PROS	0.04	0.16***	0.08	0.00	0.11**	0.02	0.26***	–					
AFEM	−0.05	0.18***	0.13**	0.01	0.05	−0.09*	0.09*	0.39***	–				
COEM	0.04	0.09*	0.08*	0.02	0.07	0.01	0.10*	0.40***	0.34***	–			
ES	0.09*	−0.04	−0.01	0.75***	−0.02	−0.05	−0.04	0.01	0.05	0.02	–		
CP	0.07	−0.23***	−0.00	0.35***	−0.10*	−0.01	−0.04	−0.10*	−0.03	−0.06	0.39***	–	
HI	−0.00	−0.29***	−0.07	0.33***	−0.11**	0.01	−0.09*	−0.11**	−0.00	−0.01	0.39***	0.66***	–
PP	0.13***	−0.04	0.01	0.45***	−0.09*	−0.01	−0.12**	−0.09*	−0.05	−0.01	0.52***	0.41***	0.38***

Note. 1) *$p < .05$,**$p < .01$,***$p < .001$. 2) STATE = State sadness; DISP = Dispositional sadness; COPING = Coping of sadness; OVER = Sadness overcoming; ATT = Attachment; PROS = Prosociality; AFEM = Affective empathy; COEM = Cognitive empathy; ES = Emotional symptoms; CP = Conduct problems; HI = Hyperactivity/inattention; PP = Peer problems.

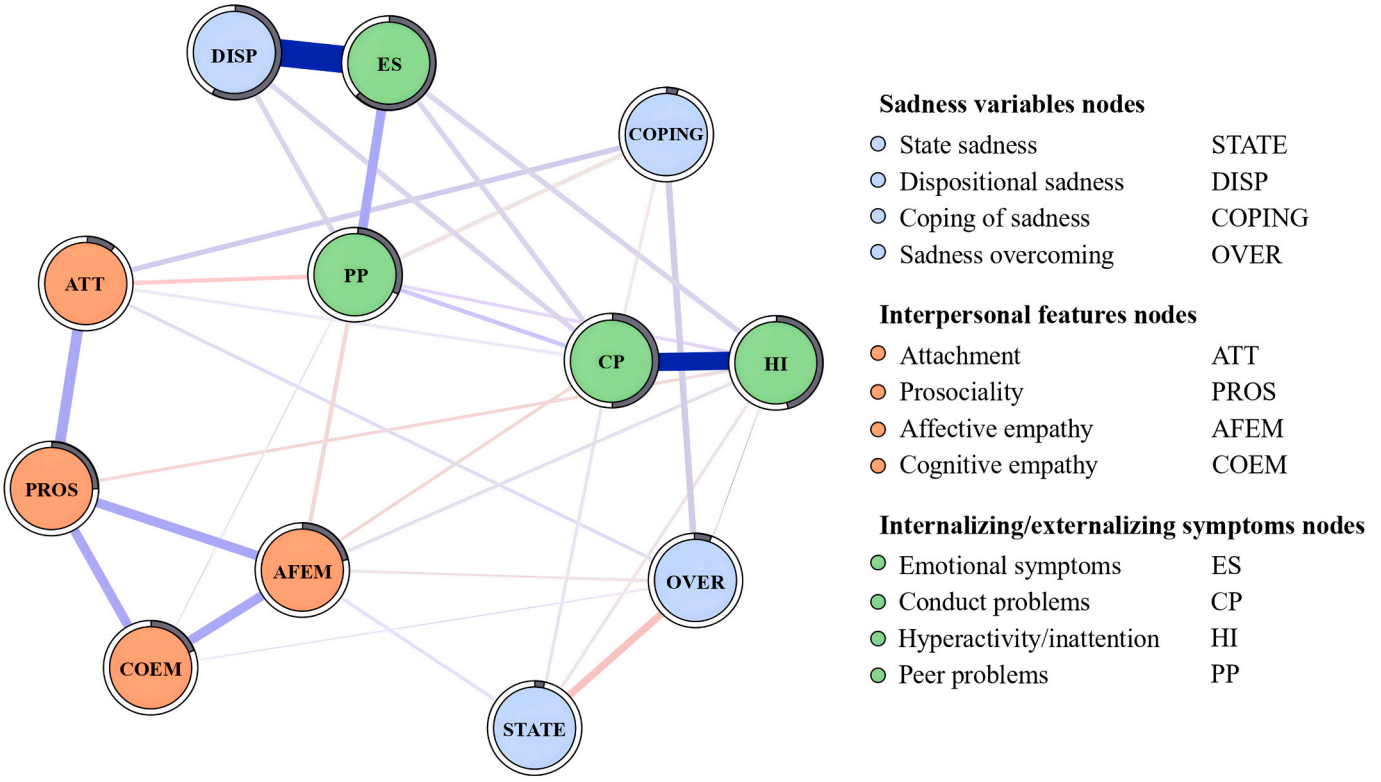

Fig. 2. Network structure for sadness variables, interpersonal features, and internalizing/externalizing symptoms nodes. Each variable is depicted as a node on the plot, with lines connecting the nodes representing the edges (partial correlations). While red edges indicate a negative association, blue edges indicate a positive association. The broadness and saturation of edges reflect the strength of associations. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

whereas state sadness was related to interpersonal features.

In addition to the Network Analysis, a multivariate regression model was used to examine the associations of state and dispositional sadness with interpersonal variables and internalizing/externalizing symptoms, while controlling for age and gender as covariates. Confirming the second hypothesis on the relationship between state sadness and interpersonal features, results showed that state sadness was significantly associated with affective empathy, $\beta = 0.44$, $SE = 0.04$, $p = .012$, differently by dispositional sadness that was significantly associated with emotional symptoms, $\beta = 0.75$, $SE = 0.02$, $p < .001$, conduct problems, $\beta = 0.37$, $SE = 0.04$, $p < .001$, hyperactivity/inattention, $\beta = 0.33$, $SE = 0.04$, $p < .001$, and peer problems, $\beta = 0.43$, $SE = 0.03$, $p < .001$. The model explained approximately 5% of the variance in affective empathy, $R^2 = 0.05$, $SE = 0.02$, $p = .007$, 57% of the variance in emotional symptoms, $R^2 = 0.57$, $SE = 0.03$, $p < .001$, 18% of the variance in emotional symptoms, $R^2 = 0.18$, $SE = 0.03$, $p < .001$, and hyperactivity/inattention, $R^2 = 0.18$, $SE = 0.03$, $p < .001$, and 22% of the variance in peer problems, $R^2 = 0.22$, $SE = 0.03$, $p < .001$. However, cognitive empathy variance was not statistically significant, $R^2 = 0.01$, $SE = 0.01$, $p = .234$, and gender differences accounted for 3% of the variance in prosocial behavior, $R^2 = 0.03$, $SE = 0.02$, $p = .034$.

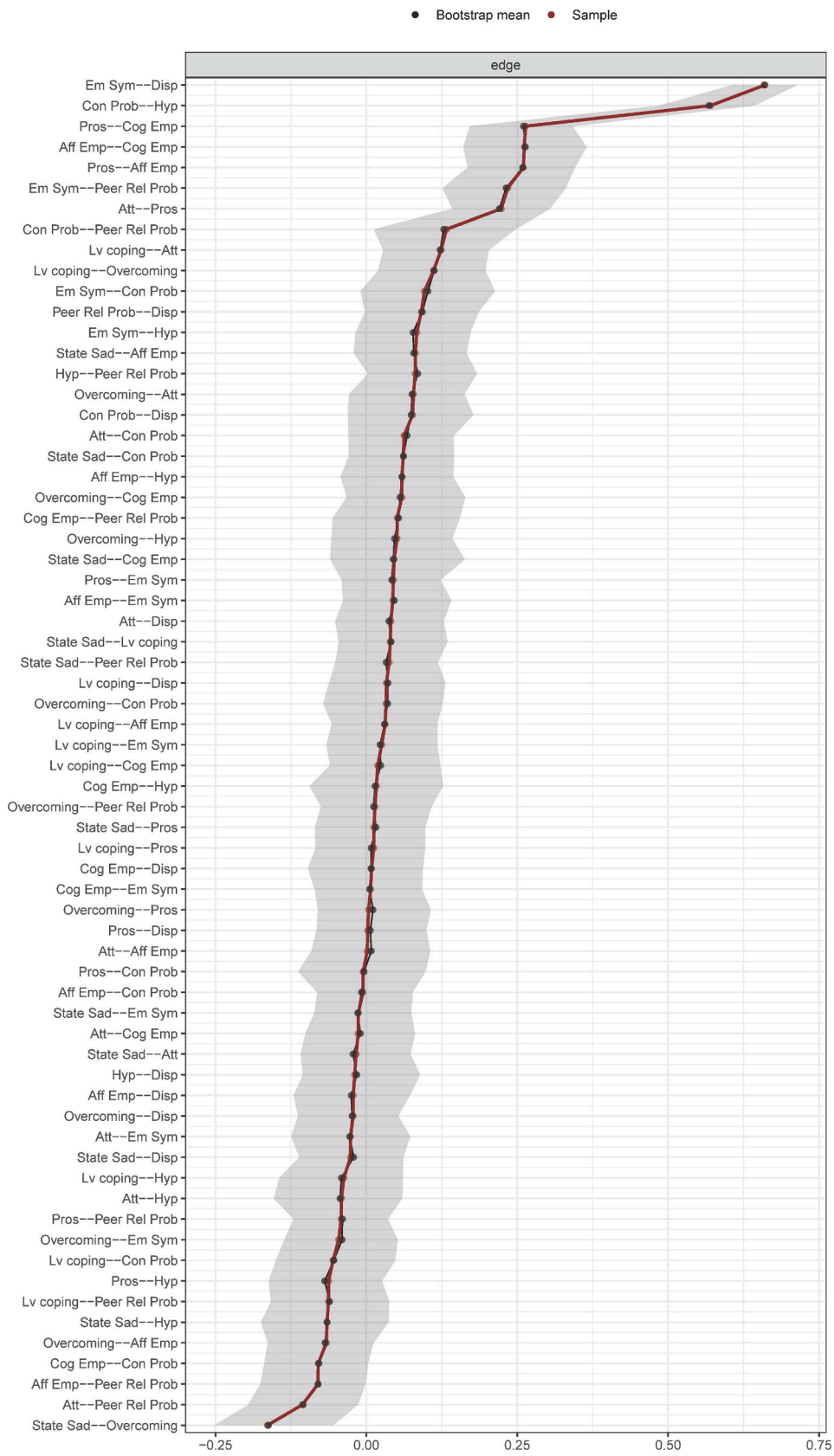

Fig. 3. 95% edge weight CI of the Network structure. *Note*. STATE: State sadness; DISP: Dispositional sadness; COPING: Coping of sadness; OVER: Sadness overcoming; ATT: Attachment; PROS: Prosociality; AFEM: Affective empathy; COEM: Cognitive empathy; ES: Emotional symptoms; CP: Conduct problems: HI: Hyperactivity/inattention; PP: Peer problems.

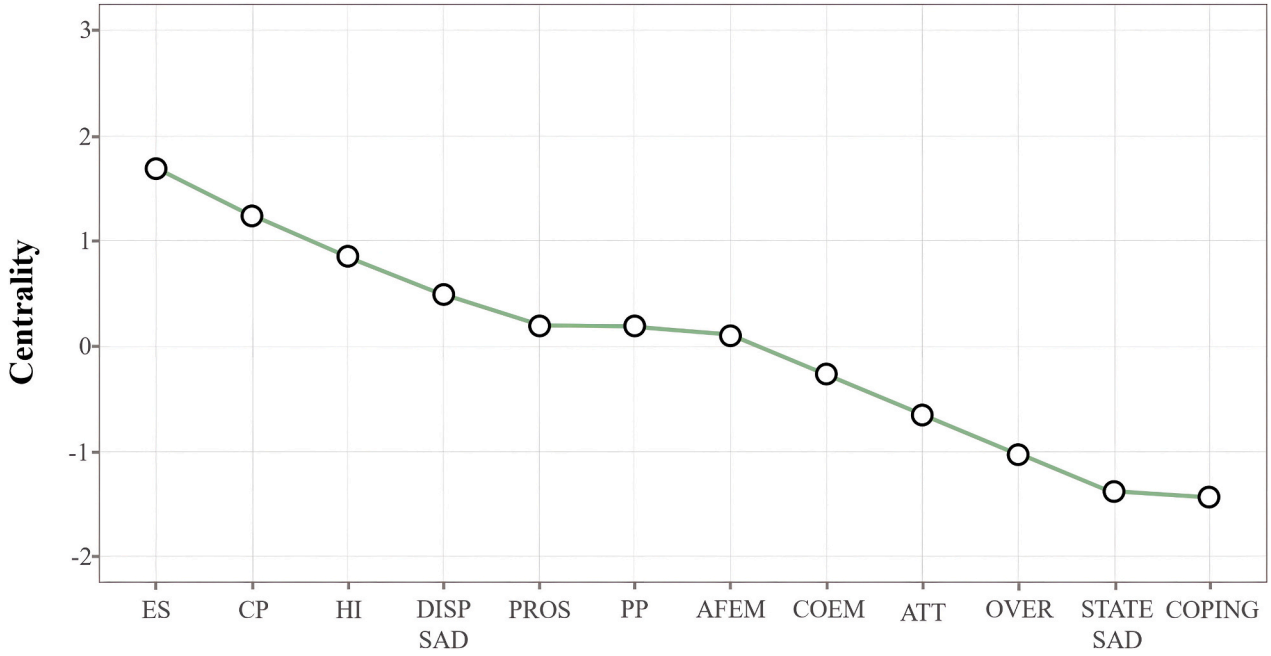

Fig. 4. Strength centrality for each node of the Network structure. *Note*. STATE: State sadness; DISP: Dispositional sadness; COPING: Coping of sadness; OVER: Sadness overcoming; ATT: Attachment; PROS: Prosociality; AFEM: Affective empathy; COEM: Cognitive empathy; ES: Emotional symptoms; CP: Conduct problems: HI: Hyperactivity/inattention; PP: Peer problems.

Discussion

The purpose of the current study was to analyze how dispositional and state sadness were related to sadness regulation coping, sadness overcoming, interpersonal features (attachment, prosociality, empathy), and internalizing/externalizing symptoms. Our findings, based on different analytical approaches, clearly show that state and dispositional sadness are very divergent from one another: state sadness was related to the explored interpersonal features, and dispositional sadness to internalizing/externalizing symptoms, clearly demonstrating the complexity of this emotion in relation to interpersonal features and psychopathological symptoms.

State sadness, dispositional sadness and interpersonal features

Consistent with the first hypothesis, dispositional sadness was unrelated to state sadness, which shows that they represent different aspects of the experience of sadness. This finding suggests that contextualized feelings of sadness are not necessarily linked to children's general tendency to feel sad (Leventhal, 2008), and contributes to the literature by further highlighting the need to consider state and dispositional sadness as different constructs, with different specific functional values. This is crucial for providing case-by-case interventions that alleviate state sadness and lessen dispositional sadness.

Partially consistent with our second hypothesis, the network analysis did not show a significant association between state sadness and affective empathy, but this link was supported by the regression analysis. No significant links were found between either state or dispositional sadness and attachment, cognitive empathy, and prosociality. Regarding state sadness, analogous results have been found by Eisenberg (2000), who showed that children who perceive sadness with intensity are more empathetic than children with lower levels of sadness. Children who deeply perceive sadness may be abler to accurately recognize their state of sadness and, thus, abler to recognize and understand sadness in others, showing consequently high levels of cognitive empathy. The experience of sadness can make it easier for children to feel other people's sadness, and this could explain the higher levels of affective empathy (Saarni, 1999). The sensitivity in perceiving one's own sadness in front of contingent distressing events is a functional and adaptive ability that increases also the sensitivity in perceiving others' sadness (Debono & Muraven, 2020; Miller et al., 2016; Song et al., 2018). It could be speculated that the intensity in perceiving sadness when adverse events occur could imply an increased ability to be attentive to and aware of others' inner states. On the other hand, in our study, dispositional sadness was not significantly related to empathy. It could be speculated that dispositional sadness, being a temperamental trait, i.e. a general propensity to experience negative emotions independently from the occurrence of specific aversive events, may prevent individuals from sensing other people's feelings (Calkins et al., 2019; Rettew & McKee, 2005; Rothbart et al., 2001).

On the contrary, state sadness was not related to prosociality. According to the literature, the study of these relations has not provided consistent results (Guo & Wu, 2021). Following Eisenberg (2000), the sensitivity to one's own and others' sadness does not guarantee prosocial behaviors; only if there is the concomitant capability to overcome sadness, children are able to help others (Eisenberg, 2000; Hein et al., 2018). Therefore, children who are sensitive to sadness can also understand the emotions of others and be sensitive to their emotional states.

Finally, both dispositional and state sadness were unrelated to attachment, consistent with the study of Cheng et al. (2023). Rather, as argued by Belsky (1997), state and dispositional sadness could increase children's susceptibility to parenting behaviors. On the other hand, the direct relations among sadness regulation coping, overcoming sadness, and attachment, are consistent with overall findings in this field. Indeed, secure attachment relationships have been found to foster children's development of their emotional regulation capacity by increasing children's confidence on their own ability to respond to difficult events (Cooke et al., 2019, for a meta-analysis; Saija et al., 2023). As stated by several authors (i.e., Calkins et al., 2019; Sroufe, 1996), sensitive caregivers are both available and effective at decreasing negative emotions, but do not seem to affect the tendency/disposition to feel sad, an aspect specifically related to temperamental features.

State sadness, dispositional sadness and internalizing/externalizing symptoms

Partially consistent with our third hypothesis, state and dispositional sadness showed different associations with internalizing and externalizing symptoms. While state sadness was unrelated to externalizing/internalizing symptoms, dispositional sadness was positively associated with emotional symptoms and peer problems, according to the network analysis, and with all externalizing and internalizing symptoms, according to the multivariate linear regression. Given that dispositional sadness refers to sadness not contingent on specific events, whereas state sadness is contingent on sad events, it can be speculated that children who feel sad and are aware of their sadness when a significant loss occurs are less prone to emotional problems than children who experience sad emotions without a specific trigger. In contrast, children affected by depressive problems are likely to have greater emotional problems (Calkins et al., 2019).

Only dispositional sadness was directly related to peer and conduct problems. Indeed, sadness may involve social withdrawal (Forgas, 2013; Verduyn et al., 2020) and increase the risk of isolation and peer and conduct problems (Abulizi et al., 2017; see Kostyrka-Allchorne et al., 2020 for a review and meta-analysis). However, since dispositional sadness is a continuous trait over time, withdrawal behaviors could become recurrent and affect children's individual and social functioning. Furthermore, sadness regulation coping and overcoming sadness were unrelated to internalizing/externalizing symptoms. This finding is consistent with previous research, where a higher capacity to cope with difficult events has been associated with fewer internalizing/externalizing symptoms (Inguglia et al., 2020; Vreeland et al., 2019; Zeman et al., 2002).

Regarding further relations, state sadness was inversely related to sadness overcoming. The intensity with which children perceive sadness seems related to the ability to cope with it, but, of course, the more sadness children perceive, the harder it is for them to manage and overcome it. Instead, sadness regulation coping was associated with both attachment and sadness overcoming. The differences between dispositional and state sadness have been explored using interpersonal features and internalizing/externalizing symptoms as predictors in a multivariate regression model. While state sadness was positively predicted by affective empathy, dispositional sadness was strongly predicted by all internalizing and externalizing symptoms, confirming the conceptual and practical difference between these sadness aspects.

Limitations and future directions

This study has several limitations. First, in consideration of the sensitivity surrounding the research topic as perceived by school administrators, the scope of the study was delimited to schools amenable to participation. Consequently, a convenience sampling method reliant on the accessibility of schools was employed to facilitate the investigation of this subject matter. Thus, the findings may not apply to different ethnic and socioeconomic contexts. Second, the cross-sectional nature of the study does not allow to make inferences about how sadness variables, interpersonal features and internalizing/externalizing symptoms are causally linked and how their relations may change along development, even though it provides a clearer picture of the relations among the variables under study.

Despite the limitations described, our findings open exciting avenues for future research on sadness in children. The use of different informants (teachers and children) and different methods (qualitative and quantitative) are undoubtedly important strengths of this study. Moreover, our results can inform longitudinal studies. Our study could also be replicated with different samples, in other countries and contexts, thus providing cross-cultural comparisons. In addition, a strength of this study is the distinction between state and dispositional sadness, particularly considering how differently these variables were related to other nodes in the network. This approach to studying sadness can undoubtedly be implemented in future studies.

The exploration of sadness in children is an expanding field. Based on the current findings, it would be desirable that future studies, by distinguishing the different roles of state and dispositional sadness, on the one hand continued to explore the relations between sadness and the development of prosocial behaviors, and on the other hand suggested new pathways for the prevention and treatment of internalizing/externalizing symptoms in childhood.

Arguably, state sadness could be considered more functional than dispositional sadness, because while state sadness implies sensitivity to sad events, dispositional sadness is steadily present, also when inconsistent with real-life events, resulting in a dysfunctional and stable elicitation of sadness, thus failing to serve any adaptive purposes (Frijda, 2008).

Caregivers play a primary role in recognizing and validating children's sadness (Linehan, 1997). Through their responses, they can promote increased awareness of emotional states, foster emotional regulation processes, and educate children to enhance empathy and prosocial aspects. However, as Eisenberg et al. (1998) claimed, often parents cannot accept to see their children sad, and for this reason they either ignore or deny their sadness. Consequently, over time children become reluctant to express this emotion. The suppression or negation of sadness will make it less easily manageable, especially in adolescence (McNeil & Zeman, 2021).

A deeper understanding of sadness in children, provided using increasingly accurate instruments, as well as a more accurate distinction among state sadness, dispositional sadness and depression, could provide parents, educators, teachers and mental health professionals with new tools to help and support children in need. Parents, educators, and clinicians, by distinguishing appropriately between these facets of sadness in children, can help them to recognize and accept it when sad events occur, and make them more sensitive to the normal range of emotions elicited by different events, from sadness to happiness. Caregivers of children temperamentally prone to sadness may encourage them to explore a wider range of emotions. On the other hand, caregivers of children whose sadness is triggered by specific events such as losses or frustrations, may encourage them to reformulate new goals and purposefully act to change unfavorable situations, both in the contingent situation and in similar situations in the future. Indeed, if caregivers cannot tolerate seeing children's sadness or if they minimize it, it implicitly follows that they consider them unable to manage distress. Consequently, this increases the children's distress and contributes to creating a self-image of ineptitude (Calkins et al., 2019; Chaplin et al., 2017). The more parents deny children's sadness, the less children will manage it.

The distinction between state and dispositional sadness in middle childhood may increase our knowledge of the experience of sadness in children. Our study found that dispositional sadness was strongly related to internalizing and externalizing symptoms, and that state sadness was related to sensing other people's feelings. Furthermore, the relation between sadness regulation coping, attachment, and sadness overcoming, may highlight the role of sensitive caregivers in processing negative emotions. These results offer insights for both educational and clinical interventions contributing to improve children's well-being during their development.

Funding

The authors did not receive support from any organization for the submitted work.

Ethical approval

The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Ethics Committee of the

Department of Education Science, Roma Tre University.

Informed Consent

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

Code availability

Not applicable.

CRediT authorship contribution statement

Edoardo Saija: Writing – original draft, Visualization, Resources, Investigation, Formal analysis, Data curation, Conceptualization. **Matti Cervin:** Supervision, Formal analysis. **Roberto Baiocco:** Supervision, Methodology. **Barbara Barcaccia:** Writing – review & editing. **Salvatore Ioverno:** Writing – review & editing, Visualization, Supervision. **Susanna Pallini:** Writing – original draft, Supervision, Resources, Project administration, Methodology, Conceptualization.

Declaration of competing interest

The authors declare that there is no conflict of interest.

Data availability

Data and materials will be made available to the corresponding author upon reasonable request.

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