The Relationship Among Attributional Style, Mentalization, and Five Anxiety Phenotypes in School-Age Children

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ABSTRACT

Literature has shown the importance of social cognition for emotional wellness. However, to our knowledge, few studies so far investigated the relationship between social cognition and anxiety in childhood. No study systematically examined social cognition in relation to specific domains of anxiety. By a correlational design and multivariate models, we explored in a sample of 337 children the association between five anxiety phenotypes and two social cognition domains (Mentalization/Attributional style). After controlling for depressive symptoms, we found that a good performance in the mentalization task was predicted by high levels of generalized anxiety and low levels of separation anxiety. Moreover, positive attributions for good events were predicted by low levels of social anxiety. The present findings remark the importance of rehabilitating social cognition skills in children with social/separation anxiety and depressive symptoms.

Social cognition could be defined as a multidimensional psychological concept comprising several subdomains and processes that facilitate social interaction, such as knowledge about the self, perception of others, and interpersonal motivations (Amodio & Frith, 2006; Green et al., 2008). Thus, social cognition involves both self-related and interpersonal abilities associated with the observation and reaction to one's own and others' mental states (feelings and cognitions) (Fonagy & Luyten, 2009; Lieberman, 2007; Midgley & Vrouva, 2013; Saxe, 2006). Sociocognitive abilities enable the child to understand the causes of mental states, to infer and construct mental representations of one's own and others' mental states from behavioral and contextual cues, and to behave appropriately (Midgley & Vrouva, 2013).

The present study aims at investigating – in a general population childhood sample – the association between distinct domains of anxiety symptoms and two social cognition domains that are crucial for social interactions: mentalization and attributional style. Mentalization refers to the ability to understand our and other people's mental states (Allen, Fonagy, & Bateman, 2008), whereas attributional style reflects how people typically infer the causes of specific events (Peterson & Steen, 2002). In other words, a person with good mentalizing skills is someone who is able to read his/her interlocutor's mind, inferring emotions and (false) beliefs, and anticipating his/her behavior.

Overall, several studies have shown the importance of social cognition for emotional and psychological wellness. The development and the refinement of sociocognitive abilities are essential for a wealthy development in crucial areas of a child's life, such as social relationships (Caputi, Lecce, Pagnin, & Banerjee, 2012; Fink, Begeer, Hunt, & Rosnay, 2014), school achievement (Lecce, Caputi, Pagnin, & Banerjee, 2017; McKown, Russo-Ponsaran, Allen, Johnson, & Warren-Khot, 2015), and

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emotional functioning (Hoglund, Lalonde, & Leadbeater, 2008; Ornaghi, Grazzani, Cherubin, Conte, & Piralli, 2015; Sette, Baumgartner, Laghi, & Coplan, 2016).

Notably, several studies conducted on mentally ill patients showed specific impairments in social cognition domains, suggesting that these deficits have a negative impact on social and functional outcomes such as quality of life, employment status, or interpersonal relationships (Fulford, Peckham, Johnson, & Johnson, 2014). In fact, different domains of social cognition seem to be compromised in psychiatric disorders. For example, the National Institute of Mental Health identified five social cognitive domains that are compromised in schizophrenia: theory of mind, social perception, social knowledge, attributional bias, and emotion processing (Green et al., 2008).

A number of studies also reported social cognition impairments in children affected by neuropsychiatric and neurodevelopmental disorders (such as autism spectrum conditions) and by depressive symptoms (Baron-Cohen, 2001; Bickett, Milich, & Brown, 1996; Caputi, Pantaleo, & Scaini, 2017; Gibb & Abela, 2008; Mize & Pettit, 2008; Muris, Schmidt, Lambrichs, & Meesters, 2001; Schenkel, Marlow-O'Connor, Moss, Sweeney, & Pavuluri, 2008; Sharp, 2008; Tordjman, 2008; Uekermann et al., 2010). Even if a recent meta-analysis (Plana, Lavoie, Battaglia, & Achim, 2014) well established the presence of sociocognitive deficits in anxious adults, very few studies focused on sociocognitive abilities in anxious children (Sharp & Venta, 2012). In particular, data on adults seem to suggest that patients with social anxiety, generalized anxiety, and panic disorder principally present attribution biases deficit (i.e., systematic errors in evaluating or trying to find reasons for their own and others' behaviors). Therefore, an examination of the different facets of anxiety in relation to social cognition is warranted among children and adolescents. In fact, studying social cognition is particularly relevant for symptoms domains, such as anxiety, that stem from social-interpersonal difficulties, and that are more linked to social impairments. Moreover, collecting social cognition data in different anxiety domains is important in order to understand which impairments are due to a specific disorder and which belong to the general presence of anxiety (Plana et al., 2014). If social cognition abilities appear to have different presentations across the different disorders, the clinician could have a distinctive tool to make differential diagnoses (Plana et al., 2014).

Overall, studies conducted among children within the general population showed poor mentalizing skills (especially lower theory of mind) in peer-rejected and victimized children (Caputi et al., 2012; Gini, 2006). Such children also typically present peculiar attributional styles (Graham & Juvonen, 1998) and social anxiety problems (Inderbitzen, Walters, & Bukowski, 1997). Given these connections between mentalization and social relationships and between peer status and anxiety, investigating anxious children's sociocognitive abilities could help to understand which kind of problem-solving strategies they use (Banerjee, 2008). In fact, mentalizing difficulties deriving from anxiety problems could lead to avoidant behaviors (Davey, 1994), thereby maintaining and intensifying social anxiety symptoms (Banerjee, 2008).

Unfortunately, few contributions investigated the association between anxiety and different aspects of mentalization (such as level of theory-of-mind skills, understanding of *faux pas* scenarios and of self-presentational strategies) in children. In this regard, Banerjee and Henderson found that children presenting social anxiety – accompanied by high levels of shy negative affect – had a poorer understanding of *faux pas* scenarios, which constitute an ecologically valid measure of social understanding in contexts involving multiple mental states (Banerjee & Henderson, 2001). In these scenarios, one character unintentionally insults another one due to lack of knowledge about a key feature of the other character (e.g., a child negatively comments on the drawing of another child who – unbeknownst to the protagonist – is himself the author of the drawing). More evidence confirmed the connection between social anxiety and difficulties in the understanding of self-presentational strategies, which are likely to impede children's attempts to present desired images of the self to others. Banerjee and Watling (Banerjee & Watling, 2004), in a sample of 200 children age 8–9 years, demonstrated that social anxiety positively correlated with the endorsement of fairly crude self-presentational strategies (e.g., ingratiation or self-handicapping tactics).

In the same vein, among children of age 8–9 years, high levels of social anxiety were linked to difficulties in acknowledging social partners' preferences after controlling for depressive symptoms (Grist & Field, 2012). A more recent study found that socially anxious 4-year-olds had lower levels of theory of mind (Colonnesi, Nikolić, de Vente, & Bögels, 2017), showing an early link between these two constructs. The cross-sectional design of the existing studies does not allow clarification of the nature of the link between mentalization and anxiety, in that they could be both the antecedent or the consequence of the other (Broeren, Muris, Diamantopoulou, & Baker, 2013). The only exception is represented by Bosacki's study (2015), a longitudinal investigation conducted on 91 6-year-old children followed for 2 years. In this study, teacher-reported socially anxious behaviors at 8 years of age were predicted by higher scores on second-order false-belief tasks (an age-appropriate mentalization task) obtained at 6 years of age. In commenting on this result, Bosacki argued that social anxiety could represent an interpersonal cost of sophisticated mentalizing abilities and that children with advanced theory-of-mind abilities may be more sensitive to non-verbal and ambiguous messages in social situations, thereby feeling more anxious and worried.

The literature on attributional style and anxiety is also scarcely conclusive with reference to children's samples. Attributional style could be defined as the habitual ways individuals account for events in their lives (Peterson & Steen, 2002). A maladaptive attributional style is characterized by the presence of systematic errors in evaluating or trying to find reasons for one's own and others' behaviors that can compromise the child's wellness and adaptation. Conversely, an adaptive attributional style that does not present these systematic errors may facilitate enjoyment of social successes and adequate coping with social failures (Crick & Ladd, 1993). For children, taking credit for their social success and dealing with failure in a way that will not negatively affect their approach to future performances is important (Wichmann, Coplan, & Daniels, 2004). Several studies on children's causal attributions found a connection between attributional style and social and academic performance (Anderman, Anderman, & Griesinger, 1999; Bickett et al., 1996; Houston, 2016; McQuade, Hoza, Murray-Close, Waschbusch, & Owens, 2011). Research on social withdrawal suggests that children who fault their social failures on internal and stable factors (i.e., a lack of ability) are more likely to withdraw from social interactions and are less liked by peers (Erdley, Loomis, Cain, & Dumas-Hines, 1997). The tendency to misinterpret ambiguous social situations as threatening is considered especially important in the maintenance of social fears (Foa, Franklin, & Kozak, 2001; Mathews & Mackintosh, 2000). Because social interactions are so often ambiguous, they lend themselves to the generation of alternative interpretations (Franklin, Huppert, Langner, Leiberg, & Foa, 2005). The attributional style might be internal vs. external (viewing causes of events as internal or external), stable vs. unstable (viewing causes of events as unchangeable or changeable), and global vs. specific (viewing causes of events as generalizable or isolated instances) (Abramson, Seligman, & Teasdale, 1978). Internality or externality of locus of control refers to the attribution of events to factors that range from internal (i.e., belief there is a relation between one's behavior and outcomes) to external (belief that outcomes are determined by factors external to the self). The stability of events is related to the consistency with which children attribute different causes for events (Wichmann et al., 2004). For example, if acceptance or social success is attributed to unstable events (e.g., others' mood), then children may be less likely to expect future success (Wichmann et al., 2004). Finally, controllability refers to children's perceptions of their ability to have an impact on social outcomes (Wichmann et al., 2004).

Although internal, stable, and global attributions for the causes of negative events proved to have important implications for depressive symptomatology in children and adolescents (Abela & Sarin, 2002; Muris et al., 2001; Nolen-Hoeksema, Morrow, & Fredrickson, 1993; Voelz, Haeffel, Joiner, & Wagner, 2003), very few studies analyzed the relationship between attributional style and anxiety. Overall, results of previous studies indicate that children with anxiety disorders make significantly more negative attributions (internal, global, stable) for bad events than normal controls (for a review see Bell-Dolan & Wessler, 1994). A sense of a lack of control over life events is described as a key risk factor for both anxiety and depression, and is directly related to hopeless attributional style (i.e., attributional style characterized by a sense of

uncontrollability, uncertainty, and unpredictability about future occurrences of the events). Alloy, Kelly, Mineka, and Clements (1990) state that when individuals perceive events as uncontrollable, they are likely to experience a heightened state of arousal or anxiety. By extension, habitually viewing negative events as due to stable and global (and thus uncontrollable) causes may be a key risk factor for the development or exacerbation of anxiety problems in youth. In this direction, a recent study found that hopeless attributional style mediates the link between perceptions of maternal psychological control and later anxiety symptoms (Schleider, Vélez, Krause, & Gillham, 2014). In other words, early adolescents perceiving high rates of maternal psychological control tended to develop a more hopeless attributional style, which in turn predicted increases in anxiety after 1 year. Empirical evidence seems to align with Alloy and colleagues' helplessness-hopelessness theory of anxiety and depression, which theorized two key elements: "a sense of a lack of control over life events" and "a sense of uncertainty and unpredictability about future occurrences of these events" (Alloy et al., 1990). The first factor, in particular, is directly related to hopeless attributional style. Thus, viewing negative events as due to stable and global (and thus uncontrollable) factors could increase in children the risk of developing anxiety problems.

Overall, existing literature on the topic has many gaps and several research lines need to be addressed. A review by Bell-Dolan and Wessler (1994) stressed the importance of understanding whether particular types of anxiety are associated with negative attributional thinking. Specifically, the authors suggested the necessity to investigate whether physiological age-appropriate anxiety is associated with particular attributional style and whether maladaptive causal thinking is characteristic only of more severe patterns of anxiety symptoms. Finally, the analysis of literature revealed mixed results regarding the role of depressive symptoms in influencing the relationship between anxiety and attributional style. Some studies found that maladaptive attributional style was more predictive of anxiety (Houston, 1995), while some others found that it was more predictive of depression or depression in comorbidity with anxiety symptoms than of pure anxiety (Fresco, Heimberg, Abramowitz, & Bertram, 2006). Moreover, very few studies controlled the effect of depressive symptoms in the relationship between attributional style and anxiety. This gap seems to be significant, especially in the light of results from Rodriguez and Pehi's study (Rodriguez & Pehi, 1998). The authors, studying a New Zealand sample of 69 children age 8 to 14, found that anxiety scores were no longer significantly correlated with maladaptive explanatory style after controlling for depression, and that depression, not anxiety, predicted overall explanatory style score. To sum up, more than 20 years occurred from Bell-Dolan and Wessler's publication (1994) and many of the unanswered questions still need to be addressed with children and adolescents samples.

Our contribution aims at exploring some of these less-developed lines. In particular, the novelty of this contribution is twofold. First, from a clinical point of view, we evaluated the relationship between social cognition (mentalization and attributional style) and five distinct anxiety phenotypes (panic/somatic anxiety, separation anxiety, generalized anxiety, social anxiety, and school anxiety). Second, considering the limits of previous contributions, we specifically controlled for the effect of depressive symptoms in influencing the relationship between social cognition and anxiety. In addition, our analyses were performed in a large community sample of 337 children. Pearson correlations were run to determine whether social cognition and anxiety phenotypes were associated. Then, we implemented multivariate models in order to explore the relative contribution of anxiety phenotypes (panic/somatic anxiety, separation anxiety, generalized anxiety, social anxiety, and school anxiety) to predict mentalization and attributional styles, after controlling for depressive symptoms. More specifically, we hypothesized that high levels of anxiety symptoms predicted low mentalization abilities and more dysfunctional attributional styles (e.g., low score for Positive Events Attributional Style and high score for Negative Events Attributional Style). Due to the poor literature on the topic in children and adolescents and the explorative nature of our study, we investigated several domains of anxiety. Since data on adult samples reported cognition deficit principally in social anxiety, generalized anxiety, and panic disorder, we expected that in youngsters the more involved anxiety domains also could be social anxiety, generalized anxiety, and separation anxiety (which is the most important psychopathological predictor of panic disorder in childhood;

Kossowsky et al., 2013). However, due to the scarcely conclusive literature on the topic, it is hard to speculate which sociocognitive deficits (mentalization abilities or dysfunctional attributional styles) are specifically predicted by particular anxiety phenotypes.

Method

Participants

Three hundred fifty-nine students attending primary and middle schools were asked to participate in this research project. Participants were recruited in schools located in three medium to big cities in the north of Italy, in areas with mixed socioeconomic backgrounds. After receiving a complete description of the study, 94% of parents agreed to participate through a signed informed consent, leading to an effective study population comprising 337 participants (169 girls and 168 boys). Participants ranged in age from 8 to 15 years ($M = 11.30$, $SD = 1.77$) and were not clinically referred for any cognitive or learning difficulties.

The study was conducted according to the Declaration of Helsinki. Parents gave their informed consent to use, anonymously, data for research purposes. The school board, school managers, and teachers approved all procedures involving the students. If parents did not provide informed consent, their children/adolescents did not participate in the study. Moreover, if a student did not want to participate, teachers communicated this to the researchers and the child was not enrolled.

Procedure

Participants completed self-report questionnaires, verbal ability and sociocognitive understanding tasks in class during schooltime in one 50-min collective session. Each child received a personal booklet containing all the tests. To guarantee anonymity, every child was assigned an identification number reported on the cover of the booklet. The experimenter, after giving a brief description of every task, read aloud all of the questions and gave instructions about how to complete the tasks. The experimenter made clear that the answers were confidential and anonymous and remained at students' disposal for questions during the whole time of administration.

Measures

Mentalization
Strange stories task. Strange Stories task (Happé, 1994; White, Hill, Happé, & Frith, 2009) was administered using an Italian version documented in the literature (Cavallini, Lecce, Bottiroli, Palladino, & Pagnin, 2013). The Strange Stories task assesses the ability to make inferences about mental states by interpreting nonliteral statements. For the present research, we selected four stories involving double bluff, misunderstanding, white lie, and persuasion (for example, in the story in which a character tells a white lie, the child is asked to give a reason for the character's utterance). After reading the stories, children wrote their answers in a personal booklet without time limit. In line with scoring guidelines (White et al., 2009), we rated responses using a 3-point scale: 0 for incorrect answers, 1 for partially correct answers, and 2 for full and explicit answers. Total scores thus ranged from 0 to 8. Two raters independently coded 25% of the responses, and inter-rater agreement was established using Cohen's kappa ($k = .83$). All remaining responses were coded jointly by the raters. Total scores ranged from 0 to 8. Internal consistency was acceptable in the present research (Cronbach's $\alpha = .69$).

Attributional style
Children's attributional style questionnaire-revised. Children's Attributional Style Questionnaire-Revised (CASQ-R; Thompson, Kaslow, Weiss, & Nolen-Hoeksema, 1998) was used to assess attributional style. An Italian version of the questionnaire was developed *ad hoc* for the present

study. Starting from the original version, the Children's Attributional Style Questionnaire-Revised was translated in Italian according to the blind translate and back-translate procedure recommended by Beaton (Beaton, Bombardier, Guillemin, & Ferraz, 2000). The questionnaire contains 24 forced-choice items that assess the three dimensions of attributional style (internal–external, global–specific, and stable–unstable). The scale yields a Composite Score for Negative Events (sum of the scores on the Internality, Stability and Globality Scales for Negative Events, range 0–12) and a Composite Score for Positive Events (the sum of the score on the Internality, Stability, and Globality Scales for Positive Event, range 0–12), as well as an overall composite score (Positive Events – Negative Events). High scores for Composite Score for Negative Events indicate the tendency to attribute negative events to global, stable, and internal causes. Differently, high scores for Composite Score for Positive Events indicate the tendency to attribute positive events to global, stable, and internal causes. Previous studies showed good psychometric properties (Gladstone & Kaslow, 1995; Thompson et al., 1998). Internal consistency indices in the present research were slightly lower than the values of previous studies (Gladstone & Kaslow, 1995; Thompson et al., 1998). Cronbach's α was 0.47 for overall composite score, 0.40 for Composite Score for Positive Events, and 0.36 for Composite Score for Negative Events.

Anxiety symptoms
Screen for child anxiety-related emotional disorders. Children filled in the Italian version of the 41-item Screen for Child Anxiety Related Emotional Disorders questionnaire (SCARED) (Ogliari et al., 2006; Scaini et al., 2017), which is a screening instrument for childhood anxiety disorders based on the DSM-IV-TR (American Psychiatric Association, 2000) classification. Children were asked to rate the frequency with which they experience each symptom on a 3-point Likert scale (0 = "almost never," 1 = "sometimes," 2 = "often"). According to the original factorial structure of the SCARED questionnaire, the 41 items could be divided into five subscales (Birmaher et al., 1999): (1) Panic/somatic anxiety (13 items), (2) Generalized anxiety (nine items), (3) Separation anxiety (eight items), (4) Social anxiety (seven items), and (5) School anxiety (four items). Good psychometric properties have been reported for this questionnaire (Birmaher et al., 1999, 1997). Internal consistency was good in the present research for all the SCARED subscales, with the exception of the School Anxiety subscale (Cronbach's α = Panic/somatic anxiety: 0.75, Generalized anxiety: 0.72, Separation anxiety: 0.67, Social anxiety: 0.73, and School anxiety: 0.46).

Depressive symptoms
Child depression inventory. Depressive symptoms were assessed through the Child Depression Inventory (CDI; Kovacs, 1985; Italian version by Camuffo, Cerutti, Lucarelli, & Mayer, 1988). The CDI contains 27 items, each consisting of three self-report statements graded in severity from 0 to 2. Total score ranges from 0 to 54 (with higher scores corresponding to higher depressive symptoms). Good psychometric properties have been reported for this questionnaire (Camuffo et al., 1988; Kovacs, 1985). Internal consistency was good in the present research (Cronbach's α = 0.82).

Results

Preliminary analyses

All of the analyses were conducted using IBM SPSS Statistics, version 21.0. Histograms, skewness, and kurtosis analyses showed that all the dependent variables were normally distributed. Mean and standard deviation scores for the variables of interest are shown in Table 1.

Pearson product-moment correlations (Table 2) showed that mentalization negatively correlated with depressive symptoms and separation anxiety symptoms, and positively correlated with generalized anxiety symptoms. The attributional style for positive events negatively correlated with depressive symptoms, panic/somatic anxiety, social anxiety, and school anxiety symptoms; whereas

Table 1. Descriptive statistics for variables of interest.

	Whole Sample					Boys			Girls		
	N	Mean	SD	Skewness	Kurtosis	N	Mean	SD	N	Mean	SD
Mentalization	329	4.22	1.89	−.106	−.529	163	4.07	1.99	166	4.38	1.77
Attributional Style (positive events)	325	7.35	1.93	−.164	−.463	163	7.50	1.87	162	7.21	1.97
Attributional Style (negative events)	325	4.12	1.92	.269	−.514	163	4.18	1.89	162	4.07	1.95
Attributional Style (total score)	325	3.23	2.99	−.283	−.290	163	3.32	2.84	162	3.14	3.14
Depressive Symptoms	337	10.84	6.28	.767	.271	168	10.04	6.25	169	11.63	6.22
Panic/Somatic Anxiety	325	5.86	3.95	.799	.330	163	4.90	3.92	162	6.83	3.75
Generalized Anxiety	325	7.41	3.51	.324	−.306	163	6.90	3.38	162	7.93	3.58
Separation Anxiety	325	5.00	3.13	.668	.012	163	4.20	2.77	162	5.81	3.27
Social Anxiety	325	6.34	3.20	.044	−.461	163	5.44	2.94	162	7.24	3.21
School Anxiety	325	1.83	1.50	.912	1.030	163	1.56	1.50	162	2.10	1.46

Table 2. Correlations among variables of interest.

	AS (positive events)	AS (negative events)	AS (total score)	Depressive Symptoms	Panic/ Somatic Anxiety	Generalized Anxiety	Separation Anxiety	Social Anxiety	School Anxiety
Mentalization	−.014	−.021	.004	−.176**	−.074	.119*	−.202***	.018	−.031
AS (positive events)	-	−.209***	.779***	−.328***	−.163**	−.108	−.101	−.222***	−.124*
AS (negative events)		-	−.776***	.249***	.167**	.166**	.020	.123*	.197***
AS (total score)			-	−.371***	−.212***	−.176**	−.078	−.222***	−.206***
Depressive Symptoms				-	.384***	.302***	.215***	.240***	.414***
Panic/ Somatic Anxiety					-	.539***	.406***	.382***	.279***
Generalized Anxiety						-	.249***	.321***	.276***
Separation Anxiety							-	.296**	.194**
Social Anxiety								-	.163**

AS = Attributional Style.
*** = $p < .01$; ** = $p < .01$; * = $p < .05$.

attributional style for negative events positively correlated with depressive symptoms, panic/somatic anxiety, generalized anxiety, social anxiety, and school anxiety symptoms.

Multivariate analyses

Three linear regression analyses were performed to explore the relative contribution of anxious and depressive symptoms to predict mentalization and attributional styles (Tables 3 and 4). Only significantly correlated variables were entered as predictors, and all the analyses were adjusted for age and gender. In the first regression analysis, mentalization was negatively predicted by separation anxiety and depressive symptoms and positively predicted by generalized anxiety, female gender, and age.

In the second and third regression analyses, attributional style for positive events was negatively predicted by social anxiety and depressive symptoms, whereas the attributional style for negative events was positively predicted only by depressive symptoms.

Table 3. Multivariate analyses on mentalization.

R = .392, R^2 = .153, Adj R^2 = .140, Std Error = 1.762	Unstandardized Coefficients		Standardized Coefficients		
MENTALIZATION	B	Std. Error	Beta	t	Sig.
Age	.223	.070	.209	3.209	.001
Gender	.629	.207	.166	3.041	.003
Depressive Symptoms	-.059	.017	-.194	-3.501	.001
Generalized Anxiety	.079	.032	.146	2.433	.016
Separation Anxiety	-.082	.041	-.134	-2.020	.044

Table 4. Multivariate analyses on attributional style.

R = .301, R^2 = .091, Adj R^2 = .071, Std Error = 1.847	Unstandardized Coefficients		Standardized Coefficients		
ATTRIBUTIONAL STYLE (NEGATIVE EVENTS)	B	Std. Error	Beta	t	Sig.
Age	.017	.061	.016	.278	.782
Gender	-.393	.220	-.103	-1.784	.075
Depressive Symptoms	.052	.019	.170	2.727	.007
Panic/Somatic Anxiety	.023	.034	.047	.676	.499
Generalized Anxiety	.029	.037	.052	.780	.436
Social Anxiety	.035	.036	.059	.985	.326
School Anxiety	.138	.077	.108	1.790	.074

Post-hoc analyses

Subsequently, interaction and simple slope analyses have been implemented in order to evaluate the interactive effects between the significant predictors and gender and age. Hayes's (2013) PROCESS computational tool, on the basis of 5,000 bootstrap samples (Hayes, 2009), has been applied. In every model, the following variables were included: the significant predictor (e.g., depressive symptoms/ anxiety subscale) as independent variable; gender (boy/girl) or age (in continuous) as moderator; mentalization/attributional style as dependent variable.

Analyses revealed only a trend in the interactive effect of depressive symptoms and gender on attributional style for negative events ($\beta = 0.191$, $t = 1.777$, $p = .076$; conditional effect for boys: $\beta = 0.165$, $t = 2.168$, $p = .030$, conditional effect for girls: $\beta = 0.356$, $t = 4.670$, $p = .000$), meaning that girls with higher levels of depressive symptoms tended to present more dysfunctional attributional style for negative events. Post-hoc analyses showed no other significant or marginal interactive effects between the predictors and gender/age.

Discussion

The present study aimed at investigating the association between sociocognitive abilities and anxiety symptoms in childhood, focusing on two specific domains: mentalization and attributional style. Mentalization was measured by means of a task (Strange Stories) in which children read stories about characters who say something not true for a reason (e.g., to persuade, not to offend). Children scoring high on this kind of task are good mindreaders, in that they are able to go beyond the literal meaning of specific utterances and understand, from the context, the actual meaning behind the words. Attributional style represents another facet of sociocognitive abilities, because children can present a functional style (e.g., high score for positive events and low score for negative events) or a dysfunctional style (the reverse pattern). Although the study was exploratory in nature, our data constitute a first attempt to address several unanswered questions present in the literature. As noted previously, two of the major open issues were: (1) understanding whether particular types of anxiety are associated with mentalization and attributional style and (2) controlling the role of depressive

symptomatology in influencing the association between anxiety and social cognition domains. The present results confirmed that social cognition is associated with anxiety symptoms, although the affected domains differ according to the specific anxiety phenotype considered. Moreover, after controlling for depressive symptoms, we found a negative association between mentalization and separation anxiety, a positive association between mentalization and generalized anxiety, and a negative association between attributional style for positive events and social anxiety.

On the one hand, our study documents an association between high levels of separation anxiety and a bad performance in a mentalization task (see also Caputi & Schoenborn, 2018, on the same sample). Such a finding, despite needing further replications with diverse samples, seems plausible if we consider the main features of separation anxiety disorder – an unrealistic and excessive fear of separation from an attachment figure experienced by children and worry that harm may come to their parents or themselves when separated (Silverman & Dick-Niederhauser, 2004). Children with high levels of separation anxiety are hyper-focused on their anxious thoughts concerning the caregiver and less concentrated on others' mental states (Kashdan & Weeks, 2010). In addition, the range of cognitive and somatic symptoms associated with the fear or threat of separation cripples the child's enjoyment of life, social relationships, and abilities to participate and progress in school and recreational activities (Silverman & Dick-Niederhauser, 2004). All of these features are likely to prevent or limit social experiences, hampering the development of social understanding (Suway, Degnan, Sussman, & Fox, 2012).

On the other hand, our data show that children with high levels of generalized anxiety symptoms perform well in a mentalization task. These results were unexpected, and must be interpreted with caution. It is worth noting that, to our knowledge, no study on this specific topic exists in the literature. Thus, it is impossible to compare our results with previous evidence. If good mentalizing skills are predictive of increased generalized anxiety, it could be argued that mindreading is not only beneficial but also entails a cost in terms of internalizing symptoms (Bosacki, 2015; Lecce, Caputi, & Pagnin, 2014). In fact, good mindreading skills, at least in part and in the short term, might enhance sensitivity and cause unfulfilled expectations. Nonetheless, long-term consequences of advanced mindreading abilities possessed in middle childhood still have to be assessed and future longitudinal studies will shed light on these unexplored trajectories. A possible explanation of the unexpected positive relation between generalized anxiety and mentalization could be that, different from children with separation anxiety symptoms who are hyper-focused on their anxious thoughts and less concentrated on others' mental states, children with high levels of generalized anxiety are hyper-focused on the external events (given the nature of this kind of anxiety). Generalized anxiety is indeed characterized by persistent worry regarding multiple life domains/events, which leads to hyper-focusing on external stimuli (including others' emotions and behaviors) (Flannery-Schroeder, 2004). By contrast, children with social anxiety are hypersensitive to internal signals (such as autonomic arousal symptoms) that activate fears of failed performance. It is the fear of failed or diminished performance that maintains anxiety associated with exposure to the phobic situation (Beck, Emery, & Greenberg, 1985). Thus, a chronic alarm condition and hyper-vigilance provided that clinical levels of generalized anxiety were not reached in the present research, can lead to increase the level of attention on external reality and to improve the ability to read others' mental states (Roemer, Orsillo, & Barlow, 2004).

As far as descriptive statistics are concerned, relevant differences in boys and girls were found in the mean scores of Strange Stories, with a better performance obtained by girls. Such differences are not surprising, as girls have been consistently reported to obtain higher scores than boys during both primary and middle school years (Baron-Cohen, O'Riordan, Stone, Jones, & Plaisted, 1999; Devine & Hughes, 2013). Finally, the increase with age of the mean scores in the Strange Stories task found here is also in line with previous literature. After age 8, when all children are able to pass second-order false-belief tasks, other sociocognitive measures (such as, for example, the comprehension of ironic utterances and *faux pas*) show that children can still improve their understanding of mental states and their ability to judge one person's beliefs about the intentions of others

(Filippova & Astington, 2008; Miller, 2009). Therefore, over the elementary and middle school years, children become more sophisticated both in reasoning about beliefs and perspectives and in applying their theory-of-mind skills (Devine & Hughes, 2013; Pearson & Pillow, 2016).

With respect to attributional style, correlational analyses showed significant associations between attributional style for positive events and depressive symptoms, social anxiety, and school anxiety symptoms and between attributional style for negative events and panic/somatic anxiety, generalized anxiety, social anxiety, and school anxiety symptoms. However, when we implemented regression analyses controlling for depressive symptoms, only the association between attributional style for positive events and social anxiety remained significant, whereas no anxiety domains predicted attributional style for negative events. Thus, the present results indicate that children with high levels of social anxiety make significantly fewer positive attributions (internal, global, stable) for good events. As argued above, socially anxious children typically show hypersensitivity to internal signs that activate fear of failure in front of others. Such a fear could make a child avoid meaningful social contacts and lead to introversion, hopelessness, and low self-esteem. Socially distressed individuals indeed have been found to fail in taking credit for social successes, thereby exhibiting the so-called "non-self-serving" bias (Asher, Parkhurst, Hymel, & Williams, 1990; Ciarrochi, Heaven, & Davies, 2007; Crick & Ladd, 1993). The negative link between social anxiety and positive attributional style found in the present study is also partially in line with the results of other studies showing a relation between high levels of social anxiety and low levels of sociocognitive skills (Colonnesi et al., 2017; Grist & Field, 2012). Future studies will clarify if social anxiety hampers the development of social cognition or a deficit in social cognition causes an increase in socially anxious behaviors. Nonetheless, these two constructs are likely to reinforce each other. However, it must be noted that our results are in disaccord with Sandra Bosacki's finding on younger children (Bosacki, 2015). In fact, she found that good mentalization abilities possessed at 6 years of age predicted higher socially anxious behavior rated by teachers 2 years later. Nonetheless, the different age range of the samples and the different methodology used to assess both social cognition (here, we talk about attributional style, whereas Bosacki administered false-belief understanding) and social anxiety (in the present study, it was self-rated, whereas in Bosacki it was rated by teachers) do not allow to establish how the two constructs are in fact related. Moreover, our findings also move away from other previous studies (Kendall, 1994; Spence, Donovan, & Brechman-Toussaint, 1999), which found that the level of negative, rather than positive, cognitions differentiates clinically anxious from non-anxious children.

Moving to the last key finding of the present study, all of the analyses showed that the association between anxiety symptoms and attributional style was not significant (with the exception of social anxiety) when controlling for depressive symptomatology, suggesting caution in interpreting results of previous studies in the cases in which depressive symptoms were not measured. These data also demonstrate the need to assess depression in all future research focused on anxiety and attributional style. Finally, our study suggests that interventions might be helpful in school, home, and clinical treatment. Indeed, both teachers and parents should be aware of the potential of sociocognitive trainings in reducing social and separation anxiety symptoms. Notably, separation and social anxiety are particularly meaningful for children attending primary and middle schools, in that overcoming social challenges in the classroom keeping low levels of anxiety is one of the secrets for a successful school adjustment. In this regard, neither a hyper-focus on the primary caregiver nor a fear of peers favors a good interpersonal functioning and academic success. Interventions aimed at improving mentalizing skills at school could result in a decrease of socially anxious and separation anxiety behaviors. A good knowledge of the dynamics among these constructs concerning children's development is also particularly important for clinical interventions. Therefore, for children showing clinical levels of social and separation anxiety, specific treatment programs should be designed to include a module aimed at improving mentalization and modifying attributional style.

Finally, some limitations of the present work must be acknowledged. First, a technical limitation of the present study is that our phenotypes of interest were assessed only by self-report measures.

Although the literature shows that children and adolescents can report their own internal symptoms in anxiety psychopathologies (Angold, 2002; Wren, Bridge, & Birmaher, 2004), the use of a clinical interview or teacher/parent-reported questionnaires on anxiety could strengthen our results. Moreover, since internal consistency indices of the questionnaire used to evaluate attributional style in the present research were slightly lower than values of previous studies (Gladstone & Kaslow, 1995; Thompson et al., 1998), there could be consequences in terms of assessment validity.

Second, a longitudinal design might allow a better investigation of our phenotypes and of their developmental trajectories over time. Lastly, considering the interconnectedness of mentalization and attributional styles with social interactions, an investigation of children's relationship with their teachers, parents, and classmates, coupled with an assessment of the socioemotional functioning of each child provided by meaningful adults, might depict a clearer picture of the genuine links among these variables (Scaini & Caputi, 2018). Indeed, in the present study, data were only gathered from children and not from others in their close social network (like peers, teachers, and parents). Therefore, we could neither examine the concordance rate between children's evaluations and those of other informants nor the potential effect of sociocognitive abilities on the quality of social relationships.

Conclusion

In conclusion, the present study should be regarded as a starting point in the endeavor to investigate the nature of the relationship connecting anxiety symptoms and sociocognitive constructs in childhood and preadolescence. In addition, this study remains a first step in addressing the importance of assessing and rehabilitating social cognition skills in children with social/separation anxiety and depressive symptoms.

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