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Theory of mind and internalizing symptoms during middle childhood and early adolescence: The mediating role of coping strategies

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Abstract: This study examines the relationship between Theory of Mind (ToM) and internalizing symptoms in middle childhood and early adolescence. This developmental period has been largely neglected by ToM researchers, even though internalizing symptoms typically emerge and become stable at this age. In a sample of 318 (157 girls) school-aged children, we found that a high ToM performance is significantly associated with low depressive symptoms and low symptoms of panic disorder and separation anxiety. Further analyses revealed that problem-solving abilities mediate the relationship between ToM and depressive symptoms. Moreover, problem-solving abilities also mediate the relationship between ToM and separation anxiety symptoms, in boys only. The present findings suggest that depressive and separation anxiety symptoms in middle childhood and early adolescence might derive from a complex interaction between ToM abilities and coping strategies.



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Dr. Marcella Caputi is Assistant Professor of Developmental Psychology at Vita-Salute San Raffaele University (Milan, Italy), where she co-directs the Child in Mind Lab. Her key research activities include the development of theory-of-mind (ToM) abilities and their interrelation with various aspects of children's cognitive, emotional and social functioning. By means of longitudinal studies conducted from preschool age through primary-school years, she showed that early ToM abilities are related to later sensitivity to teachers' criticism, academic competence, prosocial behaviour and peer relationships. Through cross-sectional studies, she proved that children possessing higher ToM abilities during middle-school years report lower internalizing symptoms. Moreover, she managed to reduce children's perception of loneliness at school enhancing ToM abilities by means of a training study. This paper – realized in collaboration with Helen Schoenborn (University of Amsterdam) – adds to previous findings on correlates of ToM abilities showing that middle schoolers scoring high on ToM tasks are less anxious/depressed when they employ positive coping strategies.

PUBLIC INTEREST STATEMENT

Over the last 40 years, many research studies documented children's development of theory-of-mind abilities and how such skills help to function well in the society. However, we do not yet know much about the relationship between mindreading abilities and internalizing symptoms during school years, when such symptoms typically emerge and stabilize. We worked with 8-, 10- and 12-year-olds, asking them to complete theory-of-mind tasks, questionnaires on depression and anxiety, and a scale assessing coping strategies used to face an annoying situation at school. By focusing on individual differences among children, we found that poor theory-of-mind abilities are associated with high depressive/anxious symptoms and that problem solving abilities mediate such a relationship. These findings were consistent with our expectations that failing to read one's own and others' minds can co-occur with psychological problems. From a practical point of view, our results suggest that internalizing symptoms might be prevented helping children to develop positive coping strategies based on mindreading abilities.

Subjects: Developmental Psychology; Developmental Psychopathology; Theory of Mind; Anxiety & Mood Disorders; Child & Adolescent Psychiatry

Keywords: theory of mind; depression; anxiety; coping strategies; middle childhood

1. Introduction

Theory of mind (ToM) describes the ability to ascribe others mental states (such as beliefs, desires or opinions) that are dependent on environmental contingencies. ToM further implies the use of mental state understanding to predict and explain social behaviours (Astington, 2001). Over the last 40 years, several studies showed that children's ToM dramatically improves in preschool years (Wellman, Cross & Watson, 2001). Hence, most attention has been given to the investigation of ToM development during preschool years, disregarding school-age years. However, ToM abilities continue to improve throughout childhood and adolescence (Bosacki, 2013; Devine & Hughes, 2013).

In this same period, depression and anxiety disorders are the most common emerging psychopathologies (Bosquet & Egeland, 2006). Specifically, studies on developmental trajectories of such disorders have revealed an increase from childhood to adolescence of general anxiety (Broeren & Muris, 2009), social anxiety (Weems & Costa, 2005) and depression (Graber & Brooks-Gunn, 1996).

To date, no study has systematically investigated the link between ToM and internalizing symptoms—comprised of both depressive and anxiety symptoms—in typically developing children and adolescents (Midgley & Vrouva, 2012). However, such a link makes theoretical sense, as it will be shown below.

The present study will investigate the role of coping strategies in the relationship between ToM and internalizing symptomatology. On the one hand, coping styles mostly derive from the ability—which is part of the broader concept of ToM—to identify, process and regulate emotions (Davis & Humphrey, 2012). On the other hand, coping styles are likely to shape mental health (Seiffge-Krenke, 2011). Therefore, coping strategies might represent the crucial factor linking and explaining the relationship between ToM abilities and internalizing symptoms.

1.1. Theory of mind and internalizing symptoms

Cognitive models of depression and anxiety suggest that these conditions involve altered social information processing and are linked to impairments in social cognition and interpersonal relationships (Banerjee, 2008). Previous findings on the link between ToM and depressive symptoms among clinical and non-clinical adult populations are rather homogeneous. Depressed adults were found to have lower ToM performance during acute depression (Kerr, Dunbar & Bentall, 2003; Ladegaard, Lysaker, Larsen & Videbech, 2014; Lee, Harkness, Sabbagh & Jacobson, 2005; Wang, Wang, Chen, Zhu & Wang, 2008; Zobel et al., 2010) as well as in remission (Inoue, Yamada & Kanba, 2006). Similarly, dysphoric university students performed worse on the Reading the Mind in the Eyes Test (an affective ToM task) compared to non-dysphoric students (Manstead, Doshmukhambetova, Shearn & Clifton, 2013). However, our knowledge on the link between ToM and depressive symptoms studies among clinical and non-clinical children and adolescents is limited to just a couple of studies. One study focused on the role of ToM in paediatric bipolar disorder (PBD): compared to healthy controls, PBD patients (aged 8 to 18 years) performed worse on false-belief tasks (both positively and negatively valenced stories) and on tasks requiring intention understanding from subtle social hints (Schenkel, Marlow-O'Connor, Moss, Sweeney & Pavuluri, 2008). The second study was conducted among typically developing preadolescents (mean age = 11.26 years) and showed that ToM (assessed through the Strange Stories task) and self-reported depressive symptoms

were significantly associated. Moreover, the link between ToM and depressive symptoms was mediated by feelings of loneliness, among girls only (Caputi, Pantaleo & Scaini, 2017).

Similarly, studies on the link between ToM and anxiety disorders are rare and mostly focused on adult samples. Plana, Lavoie, Battaglia and Achim's (2014) meta-analysis found a relationship between anxiety disorders and ToM. However, their meta-analysis only included studies conducted on adults, as research on children and adolescents is sparse. Banerjee and Henderson (2001) focused on children's ToM and anxiety and found that socially anxious children's scores on second-order false belief tasks did not differ from controls' scores. However, their performance in the Faux Pas task, which requires an understanding of the links between emotions, intentions and beliefs in social situations, was very poor. This suggests that children with social anxiety show impairments only in advanced ToM tasks. These tasks are usually based on insight into others' internal mental states. Another study by Hoglund and Leadbeater (2007) examined if social-cognitive processes mediate the relationship between peer victimization and adjustment problems (such as depression, anxiety and social withdrawal) in students (aged 12–14). They found that both physical and relational victimization affect social perspective awareness, which in turn influences depression and anxiety. Hoglund and Leadbeater (2007) argued that victimized students are worried about peers' opinions about them, as they are concerned about peer rejection and further bullying. However, they lack interpersonal skills to resolve the conflict effectively, and this could cause emotional discomfort and lead to anxiety and depression. Nevertheless, Hoglund and Leadbeater's study (2007) provided limited insight into the role that ToM plays in internalizing symptoms, as anxiety and depression were considered together. Previous studies on the link between ToM and internalizing symptoms are sparse. However, taken together, these findings seem to show that high ToM abilities are associated with lower internalizing symptomatology. It is possible that ToM might function as a protective factor for the onset of internalizing symptoms, as a good mental state understanding might prevent negative outcomes in interpersonal relationships derived from impaired social cognition. To better understand ToM's potential as a protective factor, more research is needed in non-clinical samples. Moreover, late childhood and early adolescence are crucial periods for the onset of internalizing symptoms, as during this time period psychiatric illnesses such as depression and anxiety typically emerge (Giedd, Keshavan & Paus, 2008). Thus, more research is needed to investigate the potential of ToM abilities to buffer the development of depression and anxiety in this age group.

1.2. Theory of mind and coping strategies

Coping is the response process to a perceived threat (Carver, Scheier & Weintraub, 1989). Coping strategies are often conceptualized as spontaneous and automatic mechanisms for managing or attempting to manage stress, derived from external or internal demands (Lazarus & Folkman, 1984) (Legerstee, Garnefski, Verhulst & Utens, 2011). One way of grouping coping strategies is to divide them into adaptive and maladaptive coping strategies. Adaptive coping strategies refer to approach-oriented coping, which aims to change a given situation or to seek additional information (Carver et al., 1989). Maladaptive coping strategies refer to rumination (Thompson et al., 2010) or avoidant behaviours, such as ignoring a problem (Carver et al., 1989). Coping strategies are necessary to deal with stressors. In middle childhood/early adolescence, stressors could be represented by school transitions, novel or changing social relationships, physical transformations and so on. The ability to cope increases across development due to more efficient cognitive abilities (Fields & Prinz, 1997), such as inferring internal states, empathy and perspective-taking, metacognition and emotion regulation (Williams & McGillicuddy-De Lisi, 1999). In a study conducted on youths, Thomsen and Greve (2013) found that divergent thinking (linked to perspective change and ToM) predicted the development of accommodative (adaptive) coping, which implies reconsidering goals and adjusting them accordingly to the situation. Moreover, Cadamuro, Versari, Vezzali, Giovannini and Trifiletti (2015) examined the role of ToM in the use of different coping styles among primary school children survived to an earthquake. They found ToM to be positively related to approach (adaptive) coping and inversely related to negative (maladaptive) coping. Finally, Weimer, Dowds, Fabricius, Schwanenflugel and Suh (2017) revealed that constructivist ToM was

predictive of social problem solving in high school students. Overall, the relationship between ToM and coping strategies seems nuanced and complex, and the few published studies suggest that high ToM skills are associated with an adaptive coping style. ToM abilities, such as perspective taking, inferring others' mental states, and metacognition, might be then crucial for developing and using adaptive coping strategies.

1.3. Coping strategies and internalizing symptoms

The relationship between coping strategies and internalizing symptoms has been extensively studied in children and adolescents. It has been repeatedly confirmed that the inability to cope enhances the development, maintenance and severity of internalizing symptoms (Legerstee, Garnefski, Jellesma, Verhulst & Utens, 2010), while adaptive or problem-focused coping reduces these symptoms (Abela, Brozina & Haigh, 2002; Herman-Stabl, Stemmler & Petersen, 1995; Horwitz, Hill & King, 2011; Simpson, Suarez & Connolly, 2012). For example, Abela and colleagues (2002) found that preadolescents using rumination (maladaptive or negative coping) showed more depressive symptoms than those using distraction or problem solving (adaptive coping) after 6 weeks. Research on healthy adolescents show that older adolescents display a greater variety of coping strategies and tend to employ more adaptive coping than younger peers, who are more prone to avoid or ignore problems rather than confronting them (Williams & McGillicuddy-De Lisi, 1999). In addition, problem-solving strategies are most commonly used, especially when coping with daily problems rather than with major life events. In terms of gender, findings are contradictory. As a general trend, boys are more likely to confront a problem, and thus use approach strategies, while girls often perceive the problem as to be out of their control and seek social support and favour emotion-focused over problem-focused coping (Byrne, 2000; De Boo & Spiering, 2010; Lewis, Byrd & Ollendick, 2012). Byrne (2000) found a gender difference in the coping strategies employed by 12-year-olds, and boys also seemed to use them more efficiently to reduce fear and anxiety compared to girls. In line with these results, Lewis and colleagues (2012) found 12-year-old boys to use more active coping, while same-aged girls relied more on social support. De Boo and Spiering (2010) demonstrated that preadolescent girls relied more on avoidant coping and showed higher depressive mood symptoms than boys. The researchers concluded that girls showed a gender-specific vulnerability to depression with a pre-pubertal onset, which can be linked to maladaptive coping abilities.

1.4. The present study

As we have shown, the literature review points to a potentially important role of ToM abilities both for the development of internalizing symptoms and for the use of coping strategies. Given that coping is dynamically involved in our socio-emotional development, the present study investigated the role of coping strategies in the relationship between ToM and symptoms of depression and anxiety. A sample of healthy school-aged students was collected, as this developmental period has often been overlooked in ToM research. Moreover, a non-clinical sample was also recruited to gain a useful insight into the development of internalizing symptoms in the general population. Based on the reviewed literature, we formulated four hypotheses. We expected children with high ToM ability to display a low internalizing symptomatology and adaptive—rather than maladaptive—coping strategies (hypotheses 1 and 2). Next, we hypothesized that adaptive coping strategies correlated with low internalizing symptoms (hypothesis 3). Finally, we hypothesized that coping strategies mediated the relationship between ToM and internalizing symptoms (hypothesis 4). We also considered possible gender differences in the mediation of internalizing symptoms, separately for both anxiety and depression.

2. Method

2.1. Ethics

Although the Italian laws and Vita-Salute San Raffaele University guidelines for this type of study required no institutional review board approval, the study was conducted according to the Declaration of Helsinki.

2.2. Participants

A sample of 368 children was recruited from four elementary schools (two public and two private) and four middle schools (two public and two private) randomly selected in one large and two medium-sized cities of Northern Italy. Following a complete description of the research, we obtained the schools principals' and class teachers' approval for our study. An informed consent was signed by 89% of parents, thus leading to a sample of 326 children with no significant differences in acceptance rates among the schools. Eight children were excluded due to insufficient data available. Our final sample was composed of 318 children (161 girls; 50.6%) attending the third and the fifth year of primary school and the second year of middle school ($M = 11$ years and 3 months; $SD = 1$ year and 9 months). No child was affected by neurological/psychiatric disorders.

2.3. Procedure

The assessment took place collectively during school hours and was divided into three one-hour sessions, which were held one week apart from each other. 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 read out loud every task description and questions and gave instructions about how to complete the tasks. The experimenter made clear that the answers were confidential and anonymous and remained at student's disposal for questions during the time of administration. Results were analysed using IBM SPSS Statistics Version 20.

As a robust correlation between language and ToM has been previously reported (Milligan, Astington & Dack, 2007), verbal abilities were assessed in this study as control variables. Similarly, as an association between parents' educational level and occupation and ToM was shown (Cutting & Dunn, 1999; Pears & Moses, 2003), socioeconomic status was assessed and accounted for in the analyses.

2.4. Measures

2.4.1. Theory of mind

ToM was assessed using the Strange Stories task (Happé, 1994), which is an advanced ToM test that assesses the ability to make inferences about mental states. For this study, four stories targeting the understanding of double-bluff (two stories), persuasion (one story) and misunderstanding (one story) were used. All stories were followed by a comprehension question and a justification (or mental state) question. Standard scoring system was used to evaluate children's performance (e.g., White, Hill, Happé & Frith, 2009). Scores ranged from zero (response lacking logic or misunderstanding of the situation) to two (explicit reference to mental states and understanding of the social implications of the situation) for each story. Total scores ranged from zero to eight. Internal consistency for this measure was acceptable (Cronbach's $\alpha = .69$).

2.4.2. Depressive symptoms

Depressive symptoms were measured using the CDI (Children's Depression Inventory) (Kovacs, 1992; Italian version by Camuffo, Cerutti, Lucarelli & Mayer, 1988), which is a 27-item self-report measure assessing children and adolescents' depressive and dysthymic symptoms. For every item, children are asked to choose the statement—out of three—that best describes their mood in the past two weeks. The three statements reflect the gradual symptoms severity. The total score ranges from 0 to 54. Internal consistency for this measure was good (Cronbach's $\alpha = .82$).

2.4.3. Anxiety symptoms

Anxiety symptoms were measured using the Screen for Child Anxiety Related Emotional Disorders (SCARED) (Birmaher et al., 1997; Italian version by Ogliari et al., 2006). The SCARED was originally developed to assess anxiety disorders in clinical samples (Birmaher et al., 1997), although it is now used as a screening tool in community samples (Muris, Merckelbach, Schmidt & Tierney, 1999).

Symptoms are assessed on a 0–3 point Likert scale ('not/hardly ever true', 'somewhat/sometimes true', 'very/often true'). Subscales are generated by grouping relevant symptoms together and they refer to Panic Disorder or Significant Somatic Symptoms (13 items), Generalized Anxiety Disorder (9 items), Separation Anxiety (8 items), Social Anxiety Disorder (7 items) and Significant School Avoidance (4 items). The total scale score ranges from 0 to 82. Internal consistency for this measure was good (Cronbach's alpha = .86).

2.4.4. Coping strategies

Coping strategies were evaluated using the Self-Report Coping Scale-revised (SRCS-R) (Wright, Banerjee, Hoek, Rieffe & Novin, 2010). The SRCS-R presents children with the following scenario: 'Imagine that another child was being mean to you by calling you bad names or hitting and pushing you. What would you do? There are all kinds of things that children could do if they were being picked on'. Then, children are asked to rate each of the 29 proposed coping responses on a five-point scale ranging from one to five. Responses are grouped together into six coping strategies: Problem Solving (seven items), Trivializing (six items), Internalizing (four items), Seeking Social Support (four items), Distraction (four items) and Externalizing (four items). The total score ranges from 29 to 145. The SRCS-R showed high internal consistency (Cronbach's alpha = .86).

2.4.5. Verbal abilities

Verbal abilities were measured using the corresponding subtest of the Primary Mental Abilities (VA-PMA) (Thurstone & Thurstone, 1962; Italian version by Rubini & Rossi, 1982). This test is composed of both verbal items and picture-matching items. In the verbal task, children are asked to choose a synonym of a target word among four possible options. Whereas in the picture-matching task, children need to choose a picture that matches a word read by the researcher, among four possible choices. Performance was evaluated in terms of number of correct answers given within a limited time. Internal consistency was good for both subscales (Cronbach's alpha = .83 and .93, respectively).

2.4.6. Socioeconomic status

Socioeconomic status was assessed using the Family Affluence Scale (FAS) (Currie et al., 2008), which is a short questionnaire comprising four questions on family's expenditure, affluence and consumption. Questions were read out loud by the experimenter and children answered on their booklet without time limit. Total score ranges from zero to nine.

3. Results

We will first present preliminary analyses, including descriptive statistics, t-tests and correlations. Then, we will present two models of mediation to describe specific relationships among ToM, coping strategies and internalizing symptoms. Mediation analyses were performed using Hayes' (2013) PROCESS computational tool, on the basis of 5,000 bootstrap samples (Hayes, 2009). The PROCESS macro generates estimates of direct and indirect effects (i.e., mediation), based on bootstrap samples of the data. The results of the procedure are reported in terms of bias-corrected confidence intervals (Preacher & Hayes, 2008), based upon the sampling distribution of the indirect effect. Thus, 95% confidence intervals that *do not* include 0 must be regarded as conceptually equivalent to rejecting the null hypothesis with α set at .05 (Hayes, 2009).

3.1. Preliminary analyses

Table 1 shows mean scores, standard deviations, possible and actual score ranges. All variables approximate the normal distribution.

Independent samples t-tests revealed gender differences only for separation anxiety, where girls reported higher symptoms than boys, $t(316) = -4.819$, $p = .004$, $d = -0.54$, 95% CI [-2.28, -0.96], ($M = 5.85$, $SD = 3.25$) ($M = 4.23$, $SD = 2.74$).

Table 2 shows correlation analyses. ToM was negatively associated with depressive symptoms, separation anxiety, panic disorder, externalizing and trivializing coping strategies, and positively

Table 1. Means, Standard Deviations, and Range of Possible and Actual Scores of all the variables considered. SCARED = Screen for Child Anxiety Related Emotional Disorders; SRCS-R = Self-Report Coping Scale-revised

Measure	M (SD)	Possible Range	Actual Range
Verbal Ability (Primary Mental Abilities)	33.97 (18.62)	0–60	2–60
Family Affluence Scale	6.64 (1.75)	0–9	1–9
Strange Stories	4.16 (1.92)	0–8	0–8
Children's Depression Inventory	10.84 (6.12)	0–54	0–31
SCARED—Separation Anxiety	5.05 (3.10)	0–16	0–16
SCARED—General Anxiety	7.42 (3.94)	0–18	0–17
SCARED—Panic Disorder	5.91 (4.00)	0–26	0–22
SCARED—School Phobia	1.82 (1.49)	0–8	0–8
SCARED—Social Phobia	6.30 (3.22)	0–14	0–14
SRCS-R—Problem Solving	23.44 (4.36)	7–35	11–35
SRCS-R—Trivializing	13.22 (3.98)	6–30	6–30
SRCS-R—Externalizing	8.23 (3.53)	4–20	4–20
SRCS-R—Internalizing	11.26 (3.24)	4–20	4–20
SRCS-R—Distraction	11.93 (3.43)	4–20	4–20
SRCS-R—Seeking Social Support	12.91 (3.72)	4–20	4–20

associated with problem-solving strategies. Depressive symptoms were positively correlated with all anxiety subscales, $r \geq .21$, $p < .01$, and with most of the coping strategies (positive with internalizing and externalizing, negative with problem solving and seeking social support), $r \geq .12$, $p < .05$. Depressive symptoms did not correlate with trivializing and distraction coping strategies. Separation anxiety was negatively related to problem solving, $r = -.15$, $p < .01$, and positively related to internalizing and seeking for social support strategies, $r \geq .21$, $p < .01$. General anxiety, panic disorder and school phobia were all positively related to both internalizing and externalizing coping strategies, $r \geq .15$, $p < .01$. Social phobia was positively related to internalizing coping strategies, $r = .25$, $p < .01$.

In order to test the fourth hypothesis, mediation analyses considered ToM, problem-solving strategies, depressive symptoms and separation anxiety symptoms, only. These were chosen as core variables, since their association remained significant even after controlling for verbal abilities and socio-economic status, partial $r \geq .14$, $p = .01$.

3.2. Mediation analyses

3.2.1. ToM—problem solving—depressive symptoms

In order to test the relationship among ToM, problem solving and depressive symptoms, we assumed a simple mediation, described by Hayes (2013) as model 4 of mediation. In this model, the independent variable X influences the dependent variable Y with an indirect effect via the mediator M. The indirect effect of X on Y mediated by M is calculated by the sum of the effect of X on M and the effect of M on Y controlling for X.

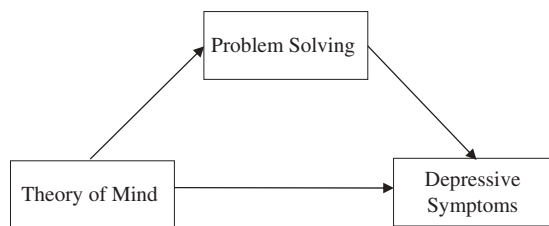
In our model (see Figure 1), ToM was the independent variable (X), depressive symptoms were the dependent variable (Y) and problem solving represented the mediator (M). We used the PROCESS macro model 4 (Hayes, 2013) to calculate the mediation effect, with 5,000 bootstrap

Table 2. Correlations among all the variables considered. SCARED = Screen for Child Anxiety Related Emotional Disorders; SRCS-R = Self-Report Coping Scale-revised

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Verbal Ability (Primary Mental Abilities)	.13	.37**	-.28**	-.07	-.07	-.22**	-.12	-.07	.17**	-.14*	-.06	-.12	.10	.07
2. Family Affluence Scale	-	.13*	-.07	-.09	.01	-.04	-.07	-.06	.08	.15**	-.01	.11*	.14*	-.03
3. Strange Stories		-	-.24**	-.19**	.09	-.11*	-.04	-.01	.27**	-.12*	-.00	-.13**	.07	.05
4. Children's Depression Inventory			-	.21**	.28**	.38**	.42**	.22**	-.29**	.35**	.39**	.12	-.04	-.12*
5. SCARED—Separation Anxiety				-	.25**	.40**	.18**	.32**	-.15**	.02	.26**	-.05	-.07	.21**
6. SCARED—General Anxiety					-	.53**	.28**	.31**	.09	.15**	.45**	-.05	.06	-.04
7. SCARED—Panic Disorder						-	.29**	.38**	-.04	.23**	.37**	.06	.03	.04
8. SCARED—School Phobia							-	.17**	-.05	.25**	.21**	.06	.03	-.11
9. SCARED—Social Phobia								-	.01	.01	.25**	-.04	-.05	.04
10. SRCS-R—Problem Solving									-	.02	.19**	-.23**	.13*	.11*
11. SRCS-R—Externalizing										-	.18**	.16**	.15**	-.04
12. SRCS-R—Internalizing											-	-.15**	.14*	.08
13. SRCS-R—Trivializing												-	.17**	-.15**
14. SRCS-R—Distraction													-	.07
15. SRCS-R—Seeking Social Support														-

* $p < .05$, ** $p < .01$, *** $p < .001$

Figure 1. Schematic illustration of the mediation model under testing: Theory of Mind can either directly or indirectly influence Depressive Symptoms via Problem Solving



estimates for the construction of 95% bias-corrected confidence intervals. Based on preliminary analyses, we added verbal abilities as a covariate in the model.

Total effects were significant (effect = $-.4957$, SE = $.1842$, 95%, CI [$-.8580$, $-.1333$]), as were the significant direct effects of ToM on problem solving (effect = $.5362$, SE = $.1328$, 95%, CI [$.2750$, $.7974$]), direct effects of problem solving on depressive symptoms (effect = $-.3154$, SE = $.0763$, 95%, CI [$-.4645$, $-.1644$]) and indirect effects of ToM on depressive symptoms (effect = $-.1686$, SE = $.0602$, 95%, CI [$-.3110$, $-.0719$]).

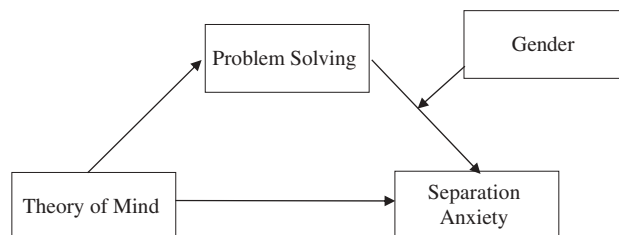
3.2.2. ToM—problem solving—separation anxiety

As preliminary analyses revealed significant gender differences in separation anxiety (with girls scoring higher than boys), we assumed that gender might have a moderating effect in the relationship among ToM, problem solving and separation anxiety. Therefore, we conducted separate partial correlations for girls and boys controlling for socio-economic status and verbal abilities. The associations tested were between (a) ToM and problem solving, (b) problem solving and separation anxiety and (c) ToM and separation anxiety. We found a remarkable difference between boys and girls only in the correlation between problem solving and separation anxiety. Fischer's r to z transformation revealed that this association was significantly stronger for boys than girls, $z = 2.268$, $p = .02$.¹ This led us to consider gender as a moderator for the relationship between problem solving and separation anxiety.

We used model 14 of the PROCESS macro (Hayes, 2013) to calculate the moderated mediation effect of ToM on separation anxiety with 5,000 bootstrap estimates for the construction of 95% bias-corrected confidence intervals. In a mediation model, X predicts Y because X affects M and M affects Y. In a moderated mediation model, the indirect effect of classical mediation is conditional depending on the different levels of a moderator (V). If the moderator is gender (with levels being male and female), finding a moderated mediation would mean that M mediates X→Y in males but not in females (or vice versa). In our model (see Figure 2), ToM was the independent variable (X), separation anxiety represented the dependent variable (Y), problem solving was the mediator (M) and gender was the moderator (V).

Direct effects of ToM on problem solving (effect = $.5362$, SE = $.1328$, 95%, CI [$.2750$, $.7974$]), of problem solving on separation anxiety (effect = $-.3013$, SE = $.1225$, 95%, CI [$-.5424$, $-.0602$]) and of ToM on separation anxiety (effect = $-.2899$, SE = $.0887$, 95%, CI [$-.4643$, $-.1154$]) were all

Figure 2. Schematic illustration of the moderated mediation model under testing: Theory of Mind can either directly or indirectly influence Separation Anxiety via Problem Solving and Gender can moderate the effect of Problem Solving on Separation Anxiety



significant. Indirect effects of ToM on separation anxiety mediated by problem solving were significant only for boys (girls: effect = $-.0051$, SE = $.0268$, CI [$-.0677$, $.0435$]; boys: effect = $-.0833$, SE = $.0384$, CI [$-.1782$, $-.0227$]). Therefore, gender moderates the indirect effect of ToM on separation anxiety.

4. Discussion

In the present study, the association between ToM and symptoms of depression and anxiety was investigated in typically developing children and early adolescents. We found that participants achieving high scores on a ToM task had lower symptoms of depression, panic disorder and separation anxiety. Moreover, problem-solving strategies were found to mediate the relationship between ToM and depression and between ToM and separation anxiety, albeit the latest was found in boys only. These findings are noteworthy, since up-to-date research on the association between ToM and internalizing symptoms has been mostly conducted on clinical and non-clinical adults (Midgley & Vrouva, 2012).

Before commenting on the core results of the current research, some preliminary findings deserve attention. First, we found a significant negative association between ToM and depressive symptoms. This finding is consistent with previous results (Caputi et al., 2017; Manstead et al., 2013). Nonetheless, further studies are needed in order to confirm this negative association in typically developing youths and to clarify its nature. The use of different tasks is also recommended to give further validity to these findings.

Second, we found a significant negative association between ToM and two SCARED sub-scales: panic disorder and separation anxiety. While the association between ToM and panic disorder failed to reach the significant threshold after controlling for verbal abilities and socio-economic status, the association between ToM and separation anxiety remained significant, warranting further investigation. This is in line with the growing evidence that insecurely attached children show impaired social understanding compared to their secure counterparts (Repacholi & Trapolini, 2004). Sensitive caregiving, characterized by attention toward the child's internal states and responsiveness, facilitates secure attachment (Ainsworth, Blehar, Waters & Wall, 2015). Mind-minded mothers, who are typically secure mothers (Meins, 1997), are tuned to their infants' mental states and use a wide range of mental-state talk (Meins, Fernyhough, Fradley & Tuckey, 2001). This leads children to focus on their own and other people's internal states during interactions, which is likely to improve ToM skills (Meins et al., 2002). Therefore, the negative association between ToM and separation anxiety found in the present research, albeit plausible, needs further replications in different population samples in order to be fully understood.

Another preliminary finding worth noting is the significant association between ToM and problem-solving strategies. Following Roth and Cohen's (1986) concept of coping, we investigated children's use of various coping strategies, such as problem solving, externalizing, internalizing, trivializing distraction and seeking social support. During the transition from primary to secondary school, coping abilities are crucial, since children have to face a number of novel stressors ranging from hormonal changes to qualitatively new social relationships. Under these circumstances, poor coping abilities might cause or add up to existing psychological distress. In fact, it is not surprising that internalizing symptoms often emerge and become stable during adolescence (Calvete, Villardón & Estévez, 2008). As we found ToM to be significantly associated with problem-solving strategies, efficient coping mechanisms might be boosted by ToM capacities. As mentioned above, no study to date explicitly tested the association between ToM and the use of different coping strategies in everyday life. Cadamuro and colleagues (Cadamuro et al., 2015) found ToM to be positively related to approach (active) coping, albeit among children who experienced a particular life event (e.g., an earthquake). Weimer et al. (2017) found constructivist ToM to be associated with social problem solving in a sample of high school students, without examining other coping strategies. Therefore, future studies will have to confirm and further specify the relationship between ToM and coping strategies.

One of the main findings of this study is that problem-solving strategies mediate the relationship between ToM and depressive symptoms. A higher ToM performance is likely to be associated with positive coping abilities (i.e., problem solving), which are in turn predictive of lower depressive symptoms. However, more research is needed to consolidate this finding. An association between ToM and positive coping was previously found (Cadamuro et al., 2015; Weimer et al., 2017), although the present research goes further, linking these two constructs to depressive symptoms in school-aged typically developing children. The importance of this result can be better understood taking into consideration two previous findings. First of all, children are likely to gradually improve their ToM ability from middle childhood to adolescence, due to their experience of more complex social relationships and their cognitive development (Devine & Hughes, 2015). Secondly, children's problem-solving strategies are also likely to increase between 12 and 19 years of age, reflecting age-related changes in metacognitive abilities (e.g., being aware of the efficacy of a strategy) and proficiency in the use of effective strategies (Williams & McGillicuddy-De Lisi, 1999). If this pattern of associations is longitudinally robust, our results may help educators and clinicians to prevent depressive symptoms in middle childhood by prompting ToM and problem-solving strategies.

The second core finding of the present study is that problem-solving strategies were found to mediate the relationship between ToM and separation anxiety only among boys. In contrast, among girls, the association between ToM and separation anxiety seems to be direct. This means that the use of problem-solving strategies is likely to reduce the effect of ToM skills on separation anxiety, and this reduction occurs for boys but not for girls. This result highlights the importance of investigating gender differences in psychological well-being, deriving from the use of coping strategies. In addition, there are other possible mediators that are worth investigating such as motivation, perception of the quality of life, attachment with parents and teachers or relationship with peers. If future studies confirm gender differences in the association among ToM, separation anxiety and problem solving, gender-specific interventions should be developed in order to effectively reduce separation anxiety.

4.1. Limitations, future directions and conclusion

The present study constitutes a novel contribution to the literature, since the association between ToM and both depressive and anxiety symptoms in youths had not been examined before. We have just begun to explore the link between social cognition and internalizing problems and more research is needed to fully understand such dynamics.

That said, some limitations of the present work must be acknowledged and should be considered when interpreting these results. First of all, our study had a correlational design, allowing only speculation about causality. We suggested a bidirectional relationship whereby children with a low ToM and negative coping strategies as well as other dysfunctional behaviours can be at risk for depression and separation anxiety, which in turn can lead to further ToM deficits. Therefore, internalizing symptoms could be both an outcome as well as an antecedent of a low ToM level. Second, each core construct (i.e., ToM, coping strategies and internalizing symptoms) was assessed with one task only. The use of multiple tasks could contribute to validate different measures and provide a more nuanced view of the main constructs and their relationship to one another. Third, our participants endorsed their own internalizing symptoms and coping strategies. Having parents and teachers as raters would have been useful in order to verify the concordance of their rating to increase the consistency of these constructs.

The present study brought us one step further in the understanding of the relationship between ToM and internalizing symptoms. However, the links among ToM, coping strategies and internalizing symptoms could be further explored examining the role of relations and interactions with significant adults and peers (Carpendale & Lewis, 2004). It is widely ascertained that maternal mind-mindedness is a significant predictor of children's secure attachment, which is in turn positively related to ToM development (Meins et al., 2001, 2002) and negatively related to the

development of separation anxiety (Colonnesi et al., 2011). The presence of maternal depression is another factor that should be taken into consideration. Depressed mothers are likely to pass on risk genes for depression to their children and to expose them to a wide range of social and environmental factors that may heighten their vulnerability to depression (Goodman & Gotlib, 1999; Harkness, Washburn, Theriault, Lee & Sabbagh, 2011). Finally, further investigations should include the assessment of major life events and daily stressors, which have been found to affect coping processes in adults (Rice, Herman, & Petersen, 1993; Sandler, Wolchik, MacKinnon, Ayers & Roosa, 1997).

In conclusion, the present research shows that internalizing symptoms in middle childhood and early adolescence derive from a complex interaction between ToM and coping strategies. These findings are crucial, since a deeper understanding of the development of internalizing symptoms is necessary to plan effective interventions.

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Note

1. Specifically, this correlation was not significant for girls, $r = -.04$, $p = .58$, while it was highly significant for boys, $r = -.29$ $p < .001$.

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