

Chapter 3

THEORY OF MIND AND EMOTIONAL DIFFICULTIES IN CHILDREN

Thanks to the ability to “read” one’s own and others’ mind, children can develop self-awareness (Howlin, Baron-Cohen & Hadwin, 1999), affect regulation abilities (Fonagy, Gergely, Jurist & Target, 2002) and social skills (Moore & Frye, 1991; Slaughter, Dennis & Pritchard, 2002; Astington, 2003; Cassidy et al., 2003) (see also chapter 1). Thus it can be hypothesized, on the basis of the influence that ToM has on children behavioral and emotional competences, that the mentalization ability have a protective function in children who are at risk of psychological problems (Fonagy & Target, 1996; 1998). Those who are not able (or not much able) to understand mental states (epistemic, emotional and motivational states; Astington, 2001) and to use them to give meaning (or the right meaning) to one’s own and others’ behaviors, can show social impairment, because they interact with other without understanding what the other have in his/her mind (Hughes & Leekam, 2004; Liverta Sempio & Marchetti, 2006).

To explain this idea it can be useful to refer to the severe pathologies within the autism spectrum conditions. Autism was the first psychopathology studied in the field of ToM: in 1985, Baron-Cohen, Leslie and Frith suggested that social and communicative impairment typical of persons with autism could be explained as a lack of mental states understanding ability. In fact many autistic individuals appear not able to understand

what other people have in their mind (plans, thoughts, beliefs, emotions...) and that the others can think differently than themselves; they often find the social environment unpredictable and incomprehensible and it is said that they seem to treat people and objects alike. These impairments can be on the basis of their problems in relating socially to others and cannot be explained referring uniquely to autistic's mental retardation (because there are autistic children and adults with an intellectual quotient in the normal range and there are other individuals, such as those with Down's syndrome, that are socially competent even if they are mentally retarded): the social difficulties in autism underline a difficulty in processing social information based on mental states understanding.

Researches found that autism is characterized by a severe delay in ToM precursors (e.g., sharing intentions, declarative pointing, shared attention, symbolic play) and poor performances in classical and advanced ToM tasks (e.g., Baron-Cohen, 1990; 1995, 1997, 2001; Happè, 1994, 1999; Buitelaar et al., 1999; Howlin, Baron-Cohen, Hadwin, 1999; Surian & Leslie, 1999; Frith, 2003; Fisher, Happè & Dunn, 2005; Hale & Tager-Flusberg, 2005; Perucchini, Muratori & Parrini, 2005; Colle, Baron-Cohen & Hill, 2007; Tager-Flusberg, 2007).

The present chapter has the aim – after reviewing literature about the link between ToM and social competence studied referring most of all to children with externalizing problems – to analyze deeper the relationship that could exist between mentalization and emotional difficulties, typical of internalizing behaviors.

In order to this aim, I present two researches. The first explored the relationship between ToM and psychological risk of conduct problems, somatization, depression and anxiety, finding a link between the poor mindreading ability and the risk to develop

depression and psychosomatic disorders. Starting from this result, the second research investigated in detail the relationship between ToM and somatic complaints in children. This work can contribute to the recent researchers' interest in the study of children individual differences in social understanding (e.g., Repacholi & Slaughter, 2003; Hughes et al., 2005; Ronald et al., 2006).

3.1. Introduction: Theory of Mind point of view on children psychological problems

Developmental psychopathology studies traditionally distinguish between internalizing and externalizing problems (Mesman, Bongers & Koot, 2001). Internalizing problems include anxiety, somatization and depression; externalizing ones regard behavioral disorders such as antisocial behavior, conduct disorders and attention deficit-hyperactivity disorders. As Mesman, Bongers and Koot (2001) underlined, externalizing problems have generally received more research attention than internalizing ones and the same trend can be found also within ToM studies, as I explain in the next section.

To study ToM in persons with psychological problems, characterized by difficulty in the socio-emotional functioning, can throw light upon the link between social and/or emotional abilities and mentalization development. So what about ToM in children with externalizing and internalizing problems? Quite few researches explored this subject; in the next two sections I outline the state of the art of ToM studies regarding children with behavioral and emotional problems.

3.1.1. Theory of Mind and externalizing problems

In these last years, ToM studies have moved their attention from severe psychopathological conditions (i.e. autism spectrum disorders), where mindreading disabilities seem to appear evident (Tager-Flusberg, 2007), to psychological conditions characterized by behavioral problems (reviews: Corcoran, 2000; Liverta Sempio, 2002; Sharp, 2006), searching data about the effect of ToM on social relationships. In other words, these researches have tried to answer to the question: is ToM necessary to social competence? Up till now it has not found a clear answer.

In fact, if on the one hand it appears evident ToM relevance for social and relational life (i.e., a good social adaptation is possible if we can recognize epistemic and emotional mental states, especially those in contrast with reality, such as distinguishing appearance from reality, realizing the existence of different emotions, desires and beliefs, understanding false beliefs), on the other hand this problem is not so easy to face (Liverta Sempio & Marchetti, 2005). It is not still clear the link between mentalization and social functioning (Repacholi & Slaughter, 2003) and it probably depends on definition of ToM adopted (Liverta Sempio & Marchetti, 2005).

Following a restricted definition, ToM (traditionally operationalized as a false belief comprehension) is sometimes a necessary, but not a sufficient condition for the social competence and probably other factors are necessary, such as affective involvement in the social situation, emotion (and not only epistemic) understanding and motivation (Astington, 2003).

While using a wider definition (not restricted to false belief understanding), social behaviour is supposed based on a differentiation of mentalization abilities. Lucariello (2004; Lucariello et al., 2006) distinguished a “social” ToM and an “intrapersonal”

ToM, that develop separately. The social ToM, so called because we use it in social interactions, is the ability to understand others' mental states and it is usually studied using the classical false belief task. Instead the intrapersonal ToM, that is on the basis of introspection, concerns the understanding of one's own mental states and includes the ability to reflect, to maintain opposing objects or events representations and to learn. This view seems to be supported by neuroscientific studies with fMRI (Walter et al., 2004), but it can be suggested that, dividing self knowledge and knowledge of the other, it has the limit to not consider social behavior consisting of the understanding of both others and one's own mental states; moreover it cannot explain how and when these two types of ToM integrate each others (Liverta Sempio, Marchetti, 2006).

Data from empirical researches on children with externalizing problems (such as conduct disorders, antisocial behaviors, bullying, attention deficit-hyperactivity disorders – ADHD) seem to convalidate Astington's (2003) view of ToM as not strictly necessary, even if it is very important, for social competence.

One of the first studies regarding the link between behavioral problems and ToM was conducted by Happè and Frith (1996). They found that children with conduct problems are able to pass classical false-belief tasks, in spite of their lack of communicative and social skills, that would require mental states understanding, they experienced in everyday life.

Similarly, Hughes, White, Sharpen & Dunn (2000) found that "hard to manage" children, that showed antisocial, angry and unsympathetic behaviors, are able to solve false belief and affective perspective taking tasks.

Also children with disruptive behaviors studied by Sutton, Reeves and Keogh (2000) and with ADHD studied by Charman, Carrol and Sturge (2001) and by Perner, Kain and Barchfeld (2002) have not a mentalization deficit.

But a different situation is outlined in other studies: Hughes, Dunn and White (1998), found that “hard to manage” children had difficulty in the affective perspective taking task; Buitelaar and colleagues (1999) and Liverta Sempio, Fabio & Tiezzi (2005) showed that ADHD children did not understand the second-order false beliefs.

In conclusion, researches failed to find a clear ToM deficit; following Happè and Frith (1996) these results can be explained hypothesizing that children with behavioural problems have a “theory of nasty mind”: they are able to read other’s mind, but they impute to the other bad intentions towards them, consequently they act aggressive behaviors. Such explanation (i.e., children with behavioral problems may show intact, but biased mindreading) guides ToM researchers to investigate not only the presence or absence of mindreading ability, but also its content, that is which type of mental states children attribute to their and others’ mind or, in other words, their mentalising style (Slaughter & Repacholi, 2003; Ronald et al., 2005; Sharp, 2006).

Recently Sharp, Croudace and Goodyer (2007) studied misinterpretation or biased mentalising in seven to eleven children, through the use of ambiguous peer-related social scenarios; they found that children with externalizing disorders have an overly positive style (i.e., unrealistic and overly positive self-perception).

A particular/skewed use of the mindreading ability could explain another behavioral problem: bullying. In fact bullies can solve false belief and emotion-false belief tasks (Sutton, Smith & Swettenham, 1999; Sutton, 2001, 2003) and it can be argued that they use their ToM ability for example in proactive aggression, in manipulating others’ mind, in excluding other children from social interactions and cause them distress, or when they organize a gang. So they have a good ToM, but they do not have positive social relationship: Sutton, Smith and Swettenham (1999) defined “macchiavellism” the

bullies' attitude to be aware of others' mental states (first of all emotions) and, at the same time, to be unable or unwilling to share mental states with others.

3.1.2. Theory of Mind and internalizing problems

While externalizing behaviors are ones in which the child is socially troublesome, and are characterized by verbal aggression, oppositional defiance and conduct problems, internalizing behaviors are ones in which the child is inwardly troublesome and are typified by social withdrawal, somatic complaints, loneliness, anxiety and depression. Internalizing problems therefore deal much more with emotional factors, as Kovacs and Devlin (1998, p. 47) wrote, they are “conditions whose central feature is disordered mood or emotion”.

These emotional disorders – depression, anxiety, somatization – lead inevitably to social and interpersonal difficulties and can interfere with cognitive processing.

Specifically, children with depression have low self-esteem and high level of sadness (e.g., Blumberg & Izard, 1985) and suffer poor peer relationships and self-isolation (e.g., Renouf, Kovacs & Mukerji, 1997). They also have some cognitive distortions and misinterpret external stimuli, for example it was seen that they are not able to properly and accurately decode nonverbal information in communication (pitch, tempo, voice inflection) (Emerson, Harrison & Everhart, 1999; Segrin, 2000).

Children with anxiety disorders feel much more fear, worry and apprehension (e.g., Brady & Kendall, 1992) and they are less assertive, shyer and more withdrawn than non anxious children (Ginsburg, La Greca & Silverman, 1998).

Somatization, that is the tendency to experience somatic distress and symptoms, not clearly explicable in terms of a precise medical diagnosis or disorder, and to attribute

them to physical illness (Lipowski, 1988), is characterized by the misattribution of the emotions, considered only as physical sensations and not also as mental states (in fact emotions are physical experiences as well as psychological or cognitive ones; e.g., Damasio, 1999). The somatic symptoms in children often interfere with school, home life and peer relationships (Walker, Garber & Greene, 1994; Garralda, 1999).

Thus the difficulties typical of internalizing problems in the cognitive processing could suggest that also the mindreading ability is impaired. But I do not find researches regarding ToM in children with internalizing problems. This field of study could be fruitful, because a specific mentalising bias can characterize these children and can be linked with their difficulties in cognitive, emotional and social life.

Studies on adults with depression (Inoue et al., 2004; Lee et al., 2005; Harkness et al., 2005; Inoue, Yamada & Kanba, 2006) found that their difficulties in social functioning can be caused by alterations in ToM and, more specifically, that they seem to make not accurate judgments of visual cues about what another person is thinking or feeling.

Moreover, Allen and Fonagy (2006) hypothesized a link between mentalizing and anxiety, in mentalization based treatment.

About children population, Sharp, Croudace and Goodyer (2007), in the research cited above (paragraph 3.1.1.), studied also ToM in children with emotional problems, but they failed to find a specific relationship between mentalising styles and symptoms of emotional disorders. This result was probably due to the type of ToM task used, that was aimed to study specific mentalising styles during peer interaction.

Recently Muris, Mayer, Vermeulen and Hiemstra (2007) studied children's perception and interpretation of anxiety-related physical symptoms in children aged 4-13 years old and found that from 7 years children are more able to link physical symptoms to anxiety and that ToM abilities (assessed using the TOM Test by Muris et al., 1999, a

narrative task; see paragraph 2.1.) appear to have a significant impact in the interpretation of these symptoms and in emotional reasoning.

There are not other studies on this matter; the present work has the aim to begin to fill the gap regarding internalization problems in ToM studies.

3.2. Study 1: Theory of Mind and psychological risk

Till now ToM researches has focalized their attention on children externalizing problems, in order to find if behavioral difficulties are related with and influenced by mentalizing ability. As I reviewed in the previous paragraph, there are not clear results on this subject, probably due for example to the various psychological problems analyzed and especially to the different ToM definitions adopted (i.e., ToM regarding the presence or absence of the ability to understand cognitive mental states or both cognitive and emotional mental states or ToM as a “style”) and measurement used to assess it.

The present study wants to widen ToM perspective in three directions. First, it analyzes not only behavioral problems, but also emotional ones (i.e. internalizing problems: anxiety, depression and somatization), because ToM deals both with social functioning and emotional functioning (see chapter 1). So this research contributes to the debate regarding externalizing problems and mentalization and tests the hypothesis that difficulty in ToM is linked to the emotional difficulties typical of internalizing behaviors.

Second, the study has the aim to analyze ToM not in children with a diagnosed psychopathology (e.g., ADHD, conduct disorder, autism, depression), but in children who can risk to develop a psychopathology, specifically at risk of conduct disorders, anxiety, depression and somatization. This is important because on the one hand it can account for individual differences in mentalization development, on the other hand it can be useful to early mental health problems identification in the school context (Mass Levitt et al., 2007).

Third, it focuses on children attending primary school (while the attention is usually on preschool children externalizing problems; e.g. Hughes et al., 2000; Charman, Carroll, Sturge, 2001; Perner, Kain, Barchfeld, 2002), assessing mentalization ability (that includes also emotion understanding) through not only traditional false belief tasks, but also an advanced and ecological ToM tasks based on vocal cues (i.e. the Voice Test, described in chapter 2).

The major goal of this study is to investigate the relationship between ToM and psychological risk, in particular the risk to develop externalizing (conduct disorders) and internalizing (depression, anxiety and somatization) disorders, in school age children.

3.2.1. Method

Participants

A sample of 112 children (56 males and 56 females), aged between 86 and 122 months (mean age: 103,49 months; standard deviation: 11,03), attending the primary school in two towns near Milan. Children were all Italian native speakers and came from the middle-class background (as assessed on father's profession); they had not

psychological or neurological proclaimed pathologies and learning difficulties. Participant's parents gave their written consent to allow children's participation in the study.

Participants were subdivided in two groups of age:

1. 55 children (26 males and 29 females) aged between 86 and 104 months (M: 93,76 months; s.d.: 5,19);
2. 57 children (30 males and 27 females) aged between 105 and 122 months (M: 112,88 months; s.d.: 5,71).

Measures

The measures consisted of three ToM tasks, a questionnaire regarding the psychosocial risk and a verbal ability test.

Children were tested on the classical first-order ("*The deceptive box*") (Perner, Leekam & Wimmer, 1987) and second-order false belief tasks ("*Look prediction*") (Sullivan, Zaitchik, & Tager-Flusberg, 1994; Italian version: Antonietti et al., 1999), already described in chapter 2.3.1. The complex mental states (epistemic and emotional states) understanding was also assessed using the *Voice Test*, a new advanced ToM instrument, based on 20 vocal cues, for children aged 6,5-11,4 years (see chapter 2 and Appendix).

The psychosocial risk in children was assessed using a self-report measure, administered in a group setting: the *Seattle Personality Inventory – Revised* (S.P.I. – R) (Greenberg, 1994), adapted and validated on an Italian school age sample by Tani and Schneider (1998). Children reported of their own behavioural symptomatology, focuses on feelings and behaviours, on a four-point responses scale (from 1 "almost never" to 4 "almost always").

It contains 32 items subdivided in four subscales focused on four different symptomatology dimensions (plus a control Lie Scale): conduct problems (8 items; e.g., “Do you talk in class a lot when you are not supposed to?”), anxiety (6 items; e.g., “Are you afraid to try new things?”), somatization (5 items; e.g., “Do you get a lot of pains in your body?”) and depressive symptoms (5 items; e.g., “Do you feel like crying a lot of the time?”).

A test of verbal mental age was individually administered: the *Peabody Picture Vocabulary Test – Revised* (PPVT – R) (Dunn & Dunn, 1981; Italian standardization: Stella, Pizzoli & Tressoldi, 2000).

Procedure

Children were tested in their school, in a quiet room. Each child participated in two testing sessions, conducted 10 days apart. In the first session children completed, individually, the PPVT – R and the first order false belief task (1st FB). In the second session the second order false belief task (2nd FB) was administered individually, then the S.P.I. – R and the *Voice Test* were administered in group of ten children.

3.2.2. Results

Table 3.1. shows means and standard deviations for all variables in the total sample and within the two groups of age.

Exploratory analyses suggested all variables to be normally distributed, except the two False Belief tasks: one children (one for each group of age) failed the 1st FB task and 17 children (13 within the younger children group, that is the group 1) did not solved

correctly the 2nd FB task, as expected. The 1st FB task was excluded from analyses; nonparametric test were used with the 2nd FB results.

All children answered correctly to the control questions of the False Belief tasks and recognized correctly the persons' gender in the Voice Test control task.

The S.P.I. – R Lie scale did not correlate with the subscales of the risk of depression, anxiety and somatization (respectively: $r = - 0,18$; $- 0,05$; and $- 0,05$) and correlate negatively with the subscale of the risk of conduct disorders ($r = - 0,493$, $p < 0,001$). So I will consider the likely influence of the social desirability in children with an high score in the subscale of the risk of conduct disorders when I will interpret the data.

Table 3.1. Means and standard deviations

	<i>Total sample</i>		<i>1</i>		<i>2</i>	
	N=112		N=55		N=57	
	M	s.d.	M	s.d.	M	s.d.
<i>Age</i>	103,49	11,03	93,76	5,19	112,88	5,71
<i>PPVT – R</i>	103,63	12,61	102,87	11,68	104,37	13,42
<i>Voice Test (0-20)</i>	13,54	2,49	12,93	2,84	14,14	1,96
<i>Anxiety (0-4)</i>	2,09	0,56	2,10	0,62	2,08	0,51
<i>Depression (0-4)</i>	1,96	0,43	1,95	0,45	1,97	0,43
<i>Conduct Probl. (0-4)</i>	1,65	0,43	1,65	0,45	1,66	0,42
<i>Somatization (0-4)</i>	1,92	0,53	2,05	0,59	1,80	0,44

Influence of gender, age and verbal ability

The independent sample *t* test did not find significant differences between males and females scores in all variables. The Mann-Whitney *U* non parametric test found that females had better performance in the 2nd FB task (only 4 failed; mean rank: 61) than males (13 failed; mean rank: 52): $U(110) = 1316,00, p = 0,018$.

The PPVT – R and the S.P.I. – R subscales did not differ between the two group of age, excepted for the subscale of the risk of somatization, that decreased with age: $F(1, 110) = 6,561, p = 0,012 (\eta^2 = 0,056)$.

The *Voice Test* performance increased with age: $F(1, 110) = 6,964, p = 0,010$. Scores in this test follow the normative data presented in the second chapter.

The bivariate correlations between PPVT – R and other variables did not find any significant correlation of verbal ability with psychosocial risk and ToM.

Correlations

In order to investigate the link between ToM and psychosocial risk, bivariate correlations between the *Voice Test* and the S.P.I. – R were computed (Table 3.2.): the *Voice Test* performance correlated negatively with the risk of depression and somatization subscales.

The nonparametric correlation Spearman's *rho* showed significant correlations between the 2nd FB and the Voice Test ($rho = 0,189, p = 0,045$) and the 2nd FB and the subscale of the risk of depression ($rho = - 0,236, p = 0,012$).

Both correlations between the *Voice Test* and the risk of depression and the *Voice Test* and the risk of somatization (Charts 3.1. and 3.2.) remained significant also controlling for age: respectively $r = - 0,235, p = 0,013$ and $r = - 0,216, p = 0,022$.

The partial correlations (controlling for age) among the four S.P.I.-R subscales remained significant, in particular: anxiety and depression $r = 0,421$ ($p < 0,001$); anxiety and somatization $r = 0,229$ ($p = 0,016$); depression and conduct problems $r = 0,265$ ($p = 0,005$); depression and somatization $r = 0,412$ ($p < 0,001$); conduct problems and somatization $r = 0,226$ ($p = 0,017$).

Table 3.2. Bivariate correlations between ToM and psychosocial risk

	<i>Anxiety</i>	<i>Depression</i>	<i>Conduct Problems</i>	<i>Somatization</i>
<i>Voice Test</i>	n.s.	$r = - 0,216$ $p = 0,022$	n.s.	$r = - 0,282$ $p = 0,003$
<i>Anxiety</i>	1	$r = 0,422$ $p < 0,001$	n.s.	$r = 0,209$ $p = 0,027$
<i>Depression</i>		1	$r = 0,266$ $p = 0,005$	$r = 0,390$ $p < 0,001$
<i>Conduct Problems</i>			1	$r = 0,199$ $p = 0,035$

Chart 3.1. Correlations between the Voice Test and the risk of depression

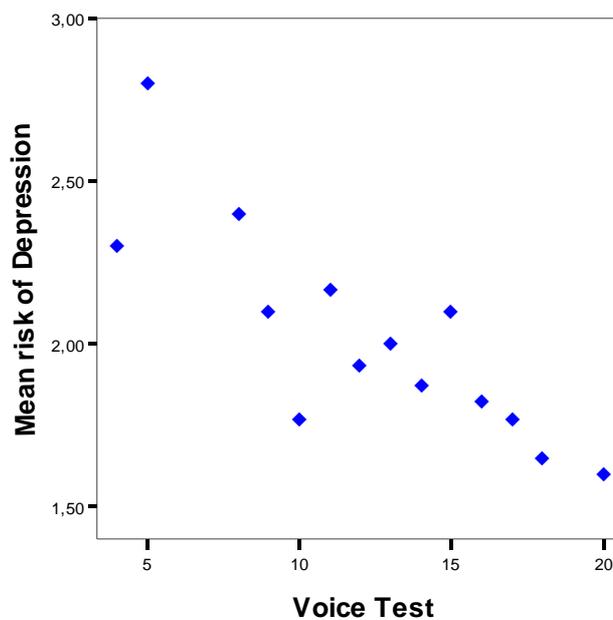
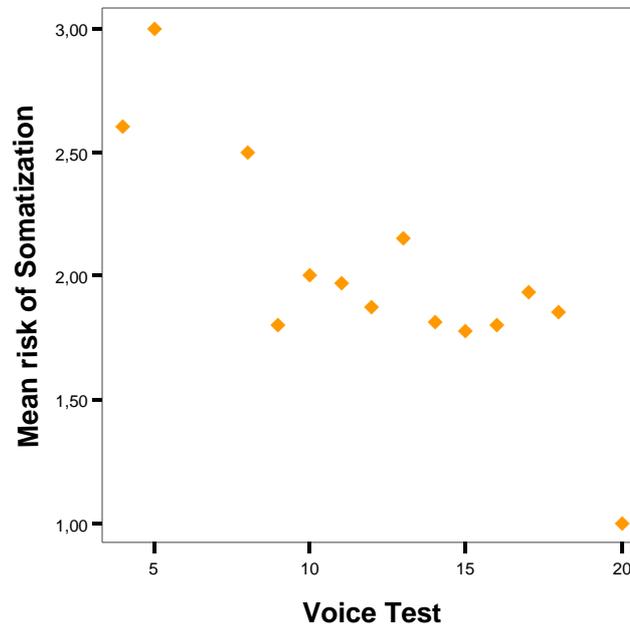


Chart 3.2. Correlations between the Voice Test and the risk of somatization

3.2.3. Discussion

The present study had the aim to explore the relationship between the risk of psychological problems and Theory of Mind in school age children.

ToM was assessed using both traditional and advanced tasks. As expected most of the participants passed the classical *False Belief* tasks, in fact the first order false belief is usually understood around 4 years (Wellman, Cross & Watson, 2001) and the second order false belief is understood at age 7 (Perner & Wimmer, 1985).

It was found that female had better performance in the second order false belief task than male, confirming the trend found by Charman, Ruffman and Clements (2002) in the first order false belief performance. The advanced ToM instrument used in this study was the *Voice Test*, that assesses the comprehension of complex epistemic and

emotional mental states from vocal cues; as showed in the second chapter the performance in this test increase with age and scores follow normative data.

The psychological risk was assessed using the *Seattle Personality Inventory – Revised* (Greenberg, 1994; Tani & Schneider, 1998). In particular it regards two types of psychological risk: the risk to develop externalizing behaviors (i.e. conduct problems) and internalizing behaviors (i.e. depression, anxiety and somatization). Younger children (group 1) that participated to this study showed higher level in the risk of somatization than older children (group 2). On the contrary, the literature on somatization revealed that somatic complaints tend to increase with age, from childhood to adolescence (Garber, Zeman, Walker, 1990; Perquin et al., 2000). The result found in this study can be due to the specific instrument used to assess the risk of somatization. In fact this S.P.I. – R subscale consists of five somatic symptoms (headache, stomach ache, pain, nightmares and retching) usually complaint by younger school age children, while it did not assess other symptoms such as tiredness, weakness, pains in the joints, backache or multiple pains (e.g. simultaneously head ache and stomach ache), that are experienced in older children (preadolescent) (Perquin et al., 2000). It can be suggested that in this study the older children did not found in the questionnaire those somatic symptoms they complaint.

The inter-correlations among the four subscale (conduct disorders, anxiety, depression and somatization) of the S.P.I. – R are similar to those obtained by Tani and Schneider (1998), except for the relation between anxiety and conduct disorders: they found a weak positive correlation ($r = 0,18, p < 0,005$), while in this study they do not correlate significantly. The correlations among these four dimensions, as also noted Tani and Schneider (1998, p. 522), confirm psychiatric literature on comorbidity (American Psychiatric Association, 2000), especially that referring to internalizing problems (e.g.

Garber, Walker & Zeman, 1991; Campo & Fritsch, 1994; Garralda, 1999; Hofflich, Hughes & Kendall, 2006).

The research did not find a relationship between ToM and the subscale of the risk of conduct problems. This result could be altered, considering that children who had higher score in the subscale showed higher social desirability (low score in the lie subscale), nevertheless it seems to confirm Hughes, White, Sharpen and Dunn (2000), Sutton, Reeves and Keogh (2000), Charman, Carroll and Sturge (2001), Perner, Kain and Barchfeld (2002) results. These researchers found that the performance in ToM tasks in children “hard to manage”, with disruptive behavior and ADHD were not different from that of children without externalizing behaviors (see paragraph 3.1.1.).

The present study did not also find a correlation between ToM and risk of anxiety in children. There are not research on this matter; future studies should investigate deeper this relationship using specific instruments to assess anxiety and comparing children with a diagnosis of anxiety disorder and children without these symptoms.

The new relationships found in this research were those between ToM and the risk to develop two internalizing behaviors: depression and somatization. These correlations remained significant also controlling for age.

The results suggest that children that are not able to recognize correctly epistemic and emotional mental states from vocal cues are those who develop more depressive symptoms (e.g., to be unhappy, to cry, to suffer from lack of appetite and insomnia) and more psychosomatic symptoms (e.g., headache and stomach ache).

The link between ToM and depression was found in adults (e.g., Harkness et al., 2005; Inoue, Yamada & Kanba, 2006), using tasks based on visual cues. In the present study this link was extended even to child at risk of this psychopathology. Moreover, because the link was between the *Voice Test*, a ToM task based on vocal cues, and the risk of

depression, the research confirms the misinterpretation of auditory stimuli (i.e. lack of accuracy in decoding nonverbal cues in communication) found by Emerson, Harrison and Everhart (1999) and Segrin (2000) in children with depression.

Finally, the relationship between ToM and somatization were never considered in ToM studies. It is known that persons who experienced somatic symptoms, not explained by a medical diagnosis, have poor emotion awareness and often fail to identify emotions and to differentiate them from physiological states (Waller & Scheidt, 2006).

Some researches explored the link between emotion understanding and somatization in school age children.

Rieffe, Meerum Terwogt and Bosch (2004) failed to find a poor emotion comprehension in children (aged 8-12 years) that experienced a lot of somatic symptoms, but they showed that this group of children attributed negative emotion (and, in particular, more fear than anger) to the characters in stories regarding peer relationship situations.

Jellesma, Rieffe, Meerum Terwogt and Kneepkens (2006) pointed out that the clinical group of children (8-13 years) with functional abdominal complaints and normal children reporting many somatic complaints shared the presence of negative moods, symptoms of depression, poor sense of coherence and two aspects of the emotion awareness: difficulty in emotion differentiation and communication. The two groups differed only in the awareness of the bodily sensations of emotions: children with many somatic complaints are strongly focused on bodily sensations of emotions, attributing the physiological phenomena that accompany emotions to an organic problems.

Recently also Rieffe and colleagues (2007) found that children (10-16 years old) that report many somatic complaints are focused on bodily sensations, moreover they are not able to differentiate and identify correctly the emotions.

In the present study it was found a link between the risk of somatization and the difficulty to recognize not only emotional, but also epistemic mental states from vocal cues. The researches I cited above, regarding somatization and emotion understanding, used narrative tasks; I do not know researches that investigate in children with psychosomatic problems the comprehension of nonverbal cues in communication. Because children often externalize their psychological problems through somatic symptoms (Garralda, 1999) and ToM regards the understanding of psychological states, it can be argued that children who are less able to mindread found also hard to elaborate mentally their problems and cannot read their emotions from bodily sensation (physiological arousal) of emotions. So on the one hand they express inner problems through the body, without mentalize them. On the other hand they do not recognize mental states based on body signals; the vocal cues, that are nonverbal aspects of mental states, can be considered, in a wide sense, as bodily signals (for example, the fear can produce a faltering voice or the muscular tension, due to anger, can cause a shrill voice), like visual cues, that this research did not considered.

The present study contributed to develop a deeper comprehension of children at risk of depression and somatization: it suggests a new variable, the mentalization ability, that could be considered in children's internalizing behaviors, besides affective and personality variables (e.g., Eminson, 2001; Van Leeuwen, Mervielde, Braet, 2004; Waller, Scheidt, 2006; Nelson et al., 2007).

3.3. Study 2: Theory of Mind and somatic complaints

In order to analyze deeper the relationship between ToM and the risk of somatization in school age children, found in the previous research, it was developed another study. The choice to study in detail how ToM and somatization are linked proceeds from two reasons.

First, the presence of physical symptoms or painful complaints of unknown aetiology is a common occurrence in children population (Garber, Walker & Zeman, 1991; Campo & Fritsh, 1994; Perquin et al., 2000): about 30% of American children complain headache, stomach ache, tiredness and other symptoms once a week and only few complaints are due to a medical reason (Campo et al., 1999).

Normal children can express emotional distress in terms of somatic complaints, that are usually transitory and do not affect children's functioning. But what about when children, from a not clinical population, experienced often and for a long time these symptoms? This problem seems increased in these last years (Santalahti et al., 2005) and it requires urgent investigations on its aetiology and on factors that could be associated to somatic complaints.

Somatization aetiology appears very complex, because includes biological, psychological and social factors. Some researchers underlined that psychological causes are not necessary to develop this problem (Walker & Garber, 2003), nevertheless there are some psychological features that can be found in children with somatization (Garralda, 1999): the presence of a time relationship between a likely stress and physical symptoms; the severity of handicap from the symptom that is out of keeping with the

established pathophysiology; concurrent psychiatric disorder¹ (in particular anxiety and depression; e.g., Garber, Walker & Zeman, 1991; Campo & Fritsch, 1994; Hofflich, Hughes & Kendall, 2006); the presence of specific characteristics of the family and illness factors (e.g., parents' physical and/or psychological illness, their worry of illness, the inclination to dissociate bodily and psychological experiences, the lack of communication on emotions, the degree and nature of the parental concerns about the child's symptoms; Walker & Greene, 1989; Walker, Garber & Greene, 1993; Garralda, 1996; Eminson, 2001).

Moreover it was found that the mother-child attachment relationship plays a role in the development of somatic symptoms; in particular those who have an insecure attachment experience higher level of somatization (Hagekull & Boholin, 2004; Waller & Scheidt, 2004).

ToM could be a variable associated with somatic complaints in children, directly (as the previous study seems to suggest) and indirectly, considering the importance of the family contexts variables, such as attachment (i.e. insecure attachment is related to poor performance in ToM tasks) (Fonagy, Redfern & Charman, 1997; Fonagy & Target, 2001; Fonagy, Gergely & Target, 2007) and maternal mind-mindedness (Meins et al., 2001) for ToM development (Liverta Sempio, 2002; Lecciso, 2005; see also chapter 1).

The second reason on the basis of this study is the close relationship that researches found between somatization and emotion. On the one hand both are in deal with the

¹ Most children with somatization disorders do not have psychiatric comorbidity but a third to a half do (Garralda, 1999). Zwaigenbaum and colleagues (1999) found that somatic complaints at age 13-16 predict psychopathology 4 years later; Hotopf and colleagues (1998) showed that abdominal pains, not due to medical causes, during childhood (assessed at 7, 11 and 15 years old) persist also in adulthood and predict psychiatric disturbs at 36 years old. Nevertheless longitudinal researches on this subject are few and the causal relationship between somatization and following psychiatric disorders should be analyze deeper (Fritz, Fritsch & Hagino, 1997).

body. In fact somatization is characterized by persistently complaints of varied physical symptoms that have no identifiable physical origin; emotions can be considered, following Damasio's view (1995, 1999), brain representations of body states: the brain links the body change with the emotion that accompanies it.

On the other hand somatization can be considered as an emotion understanding difficulty. Few researches on children population investigated the link between somatic complaints and emotions. I have already presented in the previous paragraph (3.2.3) the studies developed by Rieffe, Meerum Terwogt and Bosch (2004), Jellesma and colleagues (2006) and Rieffe and colleagues (2007) on this subject, that underlined the difficulty in emotion understanding in children with frequent somatic complaints. Another research, by Meerum Terwogt and colleagues (2006), found that some emotional variables (e.g., negative emotions, problems in handling negative emotions, coping response) and self-esteem predict psychosomatic symptoms in school age children (8-13 years). Recently, Jellesma, Rieffe and Meerum Terwogt (2007) showed that somatic complaint are strongly related to negative moods.

In conclusion, using words typical of ToM studies, these researches on emotions underlined the deficit, in persons' with somatization problems, to consider emotions as mental states (psychological level, that is connected with bodily sensations of emotions), to understand them (e.g., difficulty in emotion identification and understanding, emotion misattribution) and to use mental state terms to express emotions. These difficulties would affect the focalization on somatic cues.

The present study has the aim to investigate, I think for the first time within ToM studies, the relationship between ToM and somatic complaints in a normal school age children population.

Starting from the result found in the first study (par. 3.2.), regarding the link between the poor ability in recognizing complex mental states from vocal cues and the risk of somatization, this research wants to better understand this link, using a specific instrument to assess somatic complaints and analyzing not only the mental states understanding from vocal cues but also from visual cues.

3.3.1. Method

Participants

96 children (47 males and 49 females), aged between 84 and 132 months (mean age: 107,91 months; standard deviation: 14,04) participated in the study. They attended the primary school in a town near Milan and were all Italian native speakers. Prior to conducting the research, permission to participate was obtained from parents. They were from middle-class background (as assessed from fathers' job).

The sample was subdivided in 2 groups:

- 1) 47 children (22 males and 25 females), aged between 84-107 months;
- 2) 49 children (25 males and 24 females), aged between 108-132 months.

Measures

Theory of Mind was assessed with the classical first (“*The deceptive box*”; Perner, Leekam & Wimmer, 1987; Italian adaptation: Liverta Sempio & Marchetti, 2001) and second order (“*Look prediction*”; Sullivan, Zaitchick & Tager-Flusberg, 1994; Italian adaptation: Antonietti et al., 1999) false belief tasks, already used in the first study (and described in chapter 2.3.1).

Children were also administered two advanced ToM tasks based on perceptive cues: the *Voice Test* (see chapter 2 and Appendix), that assesses the ability to recognize complex mental states from voices, and the *Eyes Test* – Child version (Baron Cohen et al., 2001b; Italian translation: Liverta Sempio, Marchetti & Castelli, 2003), that assesses epistemic and emotional states understanding from visual cues (eyes expressions) (it is described in detail in paragraph 2.1.1.).

Somatic complaints were assessed by the *Somatic Complaint List* (SCL) (Rieffe, Meerum Terwogt & Bosch, 2004). The questionnaire consists of a list of 8 items: 6 somatic complaints that are common in younger and older children (e.g., have an headache, a stomach ache, to be tired, weak) and 2 items referred to “feel fine” and “well”. Children were asked to fill out each item on a likert-type scale (from 1 “never” to 3 “often”).

Finally children verbal and non verbal IQs were tested. Verbal IQ was assessed with the *Peabody Picture Vocabulary Test – Revised* (PPVT – R) (Dunn & Dunn, 1981; Italian standardization: Stella, Pizzoli & Tressoldi, 2000), a measure of the receptive vocabulary. The non verbal IQ was assessed with the *Raven Coloured Progressive Matrix* (RCPM) (Raven, 1984).

Procedure

Children were tested in two sessions, in a quiet room within their school, conducted 2 weeks apart.

In the first session their nonverbal and verbal IQs were assessed individually, then they received the first order false belief task. In the second session they completed in group of 10 children the *Voice Test* and the *Somatic Complaints List*, then they tested individually with the *Eyes Test* and the second order false belief task.

3.3.2. Results

Descriptive statistics

The variables were normally distributed, excepting the first order false belief task (only 1 child failed) and the second order false belief task (10 children in the group 1 and 4 in the group 2 did not pass the task).

All children answered correctly to false belief tasks control questions and all children passed the *Voice Test* control task (gender recognition). All children recognized correctly the gender of 23 of 28 persons at least in the *Eyes Test* (53,1% recognize all the persons' gender correctly).

Table 3.4. shows means and standard deviations for normally distributed variables, in the entire sample and in each group of age.

Table 3.3. Means and standard deviations

	Total N=96		Group 1 N=47		Group 2 N=49	
	M	s.d.	M	s.d.	M	s.d.
<i>Age (months)</i>	107,91	14,04	95,66	7,09	119,65	7,36
<i>PPVT – R</i>	104,28	10,11	102,45	8,39	106,04	11,33
<i>Raven (IQ)</i>	107,81	14,50	108,40	11,90	107,24	16,71
<i>Voice Test (0-20)</i>	15,01	2,36	13,87	2,33	16,10	1,83
<i>Eyes Test (0-28)</i>	18,31	3,00	17,26	3,06	19,33	2,60
<i>SCL (8-24)</i>	15,40	1,84	15,47	1,92	15,33	1,77

Gender, age and IQ influences

The independent sample *t* test found the female ($M = 15,65$) had a better performance in the *Voice Test* than males ($M = 14,34$): $t(94) = 2,823, p=0,006$ (Chart 3.3.).

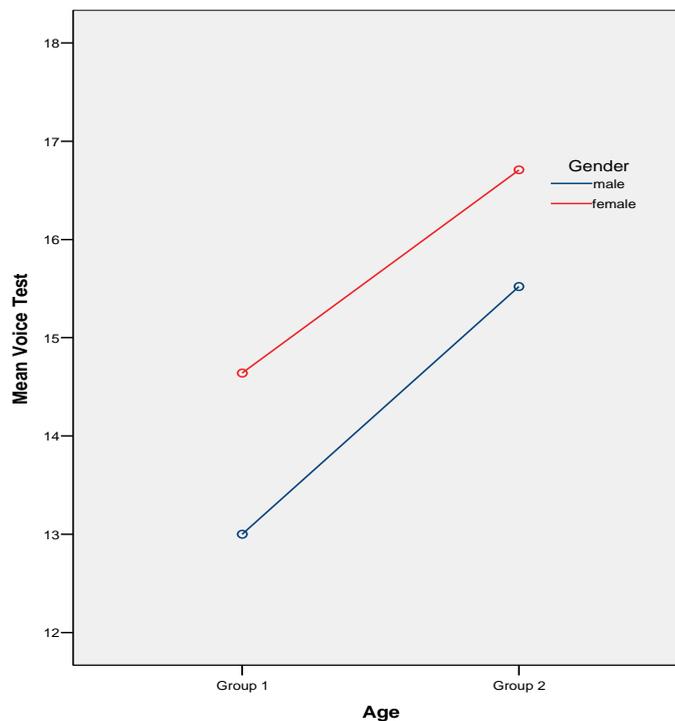
There were not gender differences in the other variables.

As expected, performance in advanced ToM tasks increase with age: $F(1, 94) = 27,362$ ($\eta^2 = 0,225$), $p < 0,001$; and $F(1, 94) = 12,801$ ($\eta^2 = 0,120$), $p = 0,001$, respectively for the *Voice Test* (in line with the normative data presented in the second chapter) and the *Eyes Test*.

No age influence was found in the other variables.

Non verbal IQ (RCPM) correlated with PPVT – R ($r = 0,323, p = 0,001$), but it did not correlate the other variables. Verbal ability correlated positively only with the *Voice Test* score: $r = 0,221, p = 0,031$.

Chart 3.3. Gender and age differences in the Voice Test performance



Bivariate correlations

The *Eyes Test* and the *Voice Test* correlated positively: $r = 0,310$, $p = 0,002$.

The SCL score correlated negatively only with the *Voice Test*: $r = - 0,236$, $p = 0,020$.

Partial correlation, controlling both for age and PPVT – R, was significant: $r = - 0,219$, $p = 0,34$.

3.3.3. Discussion

The present research analyzed the relationship between ToM and somatic complaints in school age children. It confirmed the correlation between higher level of somatic complaints, that characterized psychosomatic problems, and the poor performance in the *Voice Test*, even controlling for age and verbal ability: children who experienced more somatic symptoms have difficulty to correctly recognize complex epistemic and emotional states from voices.

About age, gender and verbal ability influences on the *Voice Test*, I refer to the second chapter, where it was explained that this advanced ToM task increases with age, is dependent from the receptive language ability (but not from intellectual abilities) and females has higher score than males, as other ToM tasks (Wellman, Cross & Watson, 2001; Charman, Ruffman & Clements, 2002; Baron-Cohen, 2003; Wellman & Liu, 2004; Milligan, Astington & Dack, 2007).

The research did not found a significant correlation between the *Eyes Test* and somatic complaints. It seems that the ability to understand mental states from visual cues is independent from somatization.

The voice non verbal cues (e.g., tone, pauses, hesitations, rhythm) are more informative than visual information in social relationships (Wiseman, 1995). Children with frequent

somatic complaints, belonging to a normal population, can grasp mental states from external and observable cues (for example a child can recognize to be sad if he cries after he is smacked by his parent). Following theories of embodied cognition, supported from the discovery of the mirror neuron system (Gallese & Goldman, 1998; Williams et al., 2001; Gallese, 2003; Dapretto et al., 2006), children, with and without frequent somatic complaints, activates in their “body” the same emotion of the other when they observe the other’s emotional expression (Niedenthal, 2007).

The present study found that children with frequent somatic complaints failed more than children with few somatic complaints when they asked to recognize epistemic and emotional states from voices (as found in children with depression that misinterpret affective auditory stimuli; Emerson, Harrison & Everhart, 1999; Segrin, 2000).

The relationship of frequent somatic complaints and the *Voice Test* performance suggests that the impairment regarding the mindreading of their own emotions (that causes somatic complaints; Waller & Scheidt, 2006) is linked to the misinterpretation of others’ mental states (in Lucariello’s, 2004, words it shows the relationship between the intrapersonal and interpersonal ToM). As I summarized in the paragraph 1.4. ToM researchers are focalized most of all on others’ mental states understanding, but there is a lack of studies regarding the ability to impute mental states to oneself and the relationship that can be exist between one’s own and others’ mental states comprehension.

This result also suggest that the problem in children with psychosomatic symptoms is linked to the understanding not only of complex emotional states (e.g., Rieffe et al., 2007), but also of epistemic states and that both types of mental states can be implied in their emotion regulation difficulties.

3.4. Conclusion: Theory of Mind and emotion in children with frequent somatic complaints

Two studies were conducted in order to investigate the relationship between Theory of Mind and emotional difficulties in school age children.

The first research was aimed to study if ToM is linked to the risk to develop conduct disorder (externalizing problem) and depression, anxiety and somatization (internalizing problems). It found that children at risk of depression and somatization had poor performance in the *Voice Test*, an advanced ToM task based on vocal cues. These results are novel within the field of ToM studies for two reasons: they underline that it can be useful to investigate ToM not only in children with proclaimed pathologies but also in normal children at risk of psychological problems; moreover they point out for the first time the relationship between ToM and internalizing problems, that are characterized by emotional functioning difficulties, widening the ToM perspective from children with social impairments to those with emotional problems.

About depression, some ToM researchers showed that adult with this psychopathology are not able to make accurate judgments of others' mental states (e.g., Inoue, Yamada & Kanba, 2006). The first study I presented in this chapter suggests that this difficulty can already exist during school age in children at risk to develop depression.

The link between mentalization and the risk of somatization has never been studied by ToM researchers. This novel relationship and the recent findings regarding emotion understanding difficulties in children with psychosomatic problems (Waller & Scheidt, 2006) suggested that a mentalization impairment could be found in children with frequent somatic complaints.

To investigate this subject a second research was conducted. It investigated specifically if the poor performance in ToM tasks is related to higher level of somatic complaints. It was found that children with frequent somatic complaints had difficulties to understanding complex epistemic and emotional mental states from voices. I think that this link could confirm that the psychosomatic disease testifies the “non-installation” of the mind in the body, that is the non-integration, within the body, of cognitions and emotions (Cerutti & Guidetti, 2007, p. 23).

This result marks out some aspects and suggest future research directions about ToM and emotional difficulties.

First, children with frequent somatic complaints not only cannot recognize emotions but also epistemic mental states, suggesting that probably their emotional problems are in deal with the understanding of a wide range of mental states and not only emotions. Following the recent idea, developed by Sharp, Croudace and Goodyer (2007), to study ToM not as present-absent, but as a mentalistic style, researches will be investigate if children with psychosomatic disease make specific mentalising bias about themselves and others.

Second, the problem in reading mental states in children with frequent somatic complaints seems to be not circumscribed to the self (intrapersonal process: e.g., misinterpretation of one’s own emotions), but also regards others’ mental states. The relation between intra- and interpersonal mental state understanding could be better investigate if ToM researchers move their attention also to the “reading” of one’s own mental states, creating instrument able to study also this ability.

Third, children with frequent somatic complaints can understand others’ mental states from visual cues, but find difficulty to read mental states from nonverbal cues of voices, that are not visible; this result will require a deeper investigation, in order to

verify, also through neuroscientific studies, how and why “look” differs to “listen” in children with and without somatization problems and in adults, too.

Moreover future researches should better explain the nature of relationship between ToM and somatic complaints: difficulty in ToM could be a prerequisite for the development of psychosomatic diseases? Or psychosomatic problems could affect the misinterpretation of mental states? Or, as I suggest, both can be considered part of a single coordinated system, so their relationship can take a variety of forms?

3.4.1. A new line of research: ToM and emotion regulation

The results of these two studies I think suggest also another new topic, that is not still analyzed in ToM studies: the relationship between ToM and emotion regulation.

ToM is studied often in relation to social competence (e.g., Hughes & Leekam, 2004; Sharp, 2006), while its link with emotion regulation ability is less known. Recently Liebermann, Giesbrecht and Muller (2007) examined the contribution of ToM to individual differences in emotion regulation in preschool children. They found that, controlling for verbal ability, the relation between mentalization (false belief understanding) and the emotional control approached to significance: children who have a good ToM are also able to modulate their emotional responses.

As the Authors suggested an objective for future researches would be to clarify the relation between emotion regulation and ToM. This aim can be reach following two ways: the study of correlation between ToM measures and measures that require the child to use internal emotional control processes (Liebermann, Giesbrecht & Muller, 2007) and the study of ToM in children with emotional difficulties, like in the

researches presented in this chapter, where participants are normal children that can have some problems in emotion regulation.

The construct of emotion regulation has received a growing attention in these last years (Spinrad et al., 2006), but there has been little consensus regarding its definition (Thompson, 1994; Cole, Martin & Dennis, 2004); moreover, as Denham (1998; Denham et al., 2003) wrote, emotion regulation is inextricable from the experience, the expression and the understanding of emotions (see also Saarni, 1999; Miller et al., 2006). Because emotions are a dynamic organisation of physiological, cognitive and behavioral responses, occurring inside and outside awareness, the emotion regulation process involves all these three areas (Garber & Dodge, 1991; Walden & Smith, 1997). So the ability to understand one's own emotions, to give meaning to observable indices of emotions (e.g., facial expressions, gestures, tone of voice) as well to the physiological components of the emotional arousal (e.g., heart rate), to select the appropriate behavior, are implied in emotion regulation (Walden & Smith, 1997). A wide definition of emotion regulation, even if it is still a "work in progress", is that of Eisenberg and Spinrad (2004, p. 338): "emotion-related self-regulation as the process of initiating, avoiding, inhibiting, maintaining, or modulating the occurrence, form, intensity, or duration of internal feeling states, emotion-related physiological, attentional processes, motivational states, and/or the behavioral concomitants of emotion in the service of accomplishing affect-related biological or social adaptation or achieving individual goals". Thus emotion regulation refers to changes associated with emotions, that are changes in the emotions themselves (Thompson, 1994) and in other psychological processes (e.g., social functioning, memory), and it is strictly interlaced with cognition and behavior (Cole, Martin & Dennis, 2004).

It is evident the role that the management of emotion has in children social competence (Hubbard & Coie, 1994; Eisenberg, 2002; Denham et al., 2003; Han & Kemple, 2006): those who are able to control impulses, delay gratification, reflect and monitor on one's emotions have more likely the ability to be effective in the realization of social goals (so they are able, for example, to have friends, to be liked by others, to engage positive social interaction). It was found that children with difficulty in social adaptation are at risk for emotion regulation problems (e.g., Eisenberg et al., 1993; 1997, 2001, 2005; Rydell, Berlin & Bohlin, 2003; Spinrad et al., 2006).

Thus it can be suggested that ToM could be related both directly and indirectly (through emotion regulation) to children adaptive social functioning.

Many factors influence the development of emotion regulation, such as the child temperament and cognitive aspects (Diamond & Aspinwall, 2003; Morris et al., 2007). Two decades of empirical works found also that the attachment relationship, and more in general the family context (Morris et al., 2007), is related with the development of emotion regulation (Cassidy, 1994; Braumgart-Rieker et al., 2001; Mikulincer, Shaver & Pereg, 2003). In fact, as noticed van IJzendoorn (2007), one of the most important function of children's attachment is to help to regulate overwhelming emotions, most of all negative emotions, therefore children can develop – within the mother-child relationship – adequate strategies to cope with these emotions: attachment is a scaffold for children's emotion regulation.

It can be noted that also within ToM studies it was found that attachment relationship as an important role: it can affect mentalization development (e.g., Fonagy, Target, 1997).

Regarding specifically psychosomatic problems, researches found that children who suffer of somatic symptoms not explained by a medical diagnosis, have difficulty in

emotion regulation, in particular they have poor emotion awareness and often fail to identify emotions and to differentiate them from physiological states (e.g., Jellesma et al., 2006; Rieffe et al., 2007).

They are not able to consider their own emotions as mental states, because focus their attention on the bodily sensations of the emotional arousal, misinterpreting physical signals and considering them as somatic symptoms, without links with the emotional mental state (e.g., Waller & Scheidt, 2006)².

²In particular, there are different theoretical models that link cognitive deficits in the processing of emotions to somatization (Waller & Scheidt, 2006). One hypothesis was developed in the field of alexithymia research (reviews: Taylor & Bagby, 2004; Toni, 2007). Alexithymia is considered to be a personality trait, it is defined by: difficulty to identify feelings and distinguish between feelings and the bodily sensations of emotional arousal; difficulty to describe feelings to other people; constricted imaginative processes and paucity of fantasies; a stimulus-bound, externally oriented cognitive style (Nemiah & Sifneos, 1970; Nemiah, Freyberger & Sifneos, 1976; Taylor & Taylor, 1997). It is conceptualized as an emotion regulation disorder reflecting deficits in the cognitive and interpersonal regulation of emotion (Taylor, Bagby & Parker, 1997; about the link between somatization and alexithymia see also: Cohen, Auld & Brooker, 1994; Cox et al., 1994; Lundh & Simonsson-Sarnecki, 2001; De Gucht & Heiser, 2003). The alexithymic persons' limited capacities to regulate emotions through cognitive processes (e.g., identify and understanding emotions, recognize their causes) lead them to focus on bodily sensations, that accompany the emotional arousal, so they amplify or misinterpret these physical signals (Taylor, Bagby & Parker, 1997), not linking them to emotions.

Another theoretical model underlines the lack of emotional awareness in somatization disorders (Lane & Schwartz, 1987; Lane et al., 1990). Lane and Schwartz (1987) proposed a cognitive-developmental model of emotional awareness and described five levels of emotional awareness: awareness of bodily sensations, of the action tendencies connected to emotions, of an emotion, of blends of emotion and, the more complex cognitive schemata, the awareness of combinations of blends of emotion. The cognitive schemata for processing emotions are not developed in persons suffering of psychosomatic symptoms, that are not able to elaborate bodily emotional arousal in emotions consciously felt, but are only aware of physiological cues. Finally, somatization can be considered as the result of dissociation between the sub-symbolic and symbolic components of the emotional schemata (Bucci, 1997). Bucci (1997), in her multiple code theory, focalized on emotions representation in non-verbal and verbal channels. Non-verbal ones include both sub-symbolic (sensory, somatic, visceral and motor modalities) and symbolic processes (imagery). The emotion somatic and motor arousals are isolated from the cognitive activation, so persons cannot regulate emotions and experience a prolonged physical activation, that can be associated with the development of psychosomatic problems.

Within ToM perspective, Fonagy and colleagues (2002) hypothesized that affect regulation³, that is present from birth within the mother-child dyadic system (e.g., Lavelli, 2007), becomes more mature and sophisticated thanks to mentalization development (see also paragraph 1.2.2.). Following them, it can be argued that the relationship between emotion regulation ability and ToM is complex, they influence each other. So somatic complaints, that testify a poor emotion regulation ability, could be interlaced with mentalization in a complex way and probably they have a common origin in the child-caregivers relationship (Fonagy et al., 2002; Morris et al., 2007).

It could be interesting to study how ToM, somatic complaints, emotion regulation and social competences are related. Till now researches found that: ToM is important to social development but it is probably not sufficient to have positive social behavior (social adaptation) (Astington, 2003); children with somatic complaints have problems both in emotion regulation and in social life (Garralda, 1999); ToM seem to be related to somatic complaints (these researches); and ToM is probably linked to emotion regulation (both from a psychoanalytic view, Fonagy et al., 2002; and a cognitive view: Liotti, 2001; Colle, 2007).

In conclusion, in this chapter I present a novel and I think fruitful line of research within the field of study of ToM, regarding the link between social understanding and emotional functioning in children with emotional difficulties. Certainly it opens more questions than those it answered, in fact starting from the hypothesis to investigate ToM in internalizing problems, the chapter ends suggesting a complex view of ToM and emotional functioning in the development of children individual differences.

³ Affect regulation is the emotion regulation in the child-caregiver attachment relationship (Fonagy et al., 2002; see also chapter 1).