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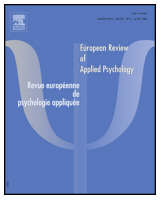

Original article

Emotion comprehension and attachment: A conversational intervention with school-aged children

Compréhension de l'émotion et attachement : une intervention dialoguée avec des enfants en été scolaire

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ABSTRACT

Introduction. – As part of the flourishing line of enquiry into children's emotion understanding, we report the results of a conversation-based intervention study aimed at improving participants' emotion comprehension, and exploring the intervention effect as a function of attachment security.
Method. – The study was conducted at school with the participation of 98 second-grade children (mean age: 7 years, 7 months; SD: 3.4 months). Participants were assigned to experimental and control groups that were balanced with respect to attachment security and insecurity as evaluated using the Separation Anxiety Test (SAT). The experimental group was exposed to a conversational intervention, in which short story readings with emotional content were used to stimulate discussion on the nature, causes and regulation of emotion. The children in the control group listened to the same stories, but did not take part in the conversational activity. Children from both groups were individually pre- and post-tested on measures of emotional lexicon (ELT) and emotion comprehension (TEC).
Results. – The training was found to have a significant effect on the emotion comprehension of the children allocated to the experimental group. In addition, non-secure children displayed higher gains in emotion comprehension than secure participants. The implications of the findings for educational and school contexts are discussed.

Mots clés :
Compréhension de l'émotion
Attachement
Conversation
Étude d'intervention
École primaire

RÉSUMÉ

Introduction. – Dans le domaine fertile des recherches sur la compréhension de l'émotion par les enfants, nous exposons les résultats d'une étude, basée sur le dialogue, visant l'amélioration de la compréhension de l'émotion de la part des enfants et explorant l'effet de l'intervention en fonction de la sécurité de l'attachement.
Méthodologie. – L'étude a été conduite à l'école, avec la participation de 98 étudiants de deuxième année (âge moyen : 7 ans, 6 mois ; écart-type : 3,5 mois). Les étudiants ont été répartis dans des groupes expérimental et de contrôle, équilibrés par rapport à la sécurité ou l'insécurité de l'attachement et évalués par le Separation Anxiety Test (SAT). Le groupe expérimental a été exposé à une intervention conversationnelle, basée sur des courts contes à contenu émotionnel, visant la stimulation de la discussion sur la nature, les causes et la régulation de l'émotion. Les enfants dans le groupe de contrôle ont écouté les même comptes, mais ils n'ont pas pris part à l'activité conversationnelle. Les enfants des deux groupes ont été individuellement testés a priori et a posteriori sur des mesures de lexique émotionnel (ELT) et de compréhension de l'émotion (TEC).

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Résultats. – Les analyses ont montré un effet significatif de l'entraînement à la compréhension de l'émotion parmi les enfants du groupe expérimental. Également, les enfants insécurisés ont fait preuve de gains plus importants dans la compréhension de l'émotion par rapport aux enfants sécurisés. Les implications de ces résultats sont ensuite discutées.

The present study falls within the broad area of enquiry into the development of children's social cognition (Dunn, 2006), a set of skills that embraces both theory of mind and emotion comprehension (EC). The last-mentioned ability is a key aspect of socioemotional competence – a construct that has been developed and consolidated thanks to the work of Saarni (1999) and Denham (1998, 2000) – and which along with emotion comprehension includes emotion expression and emotional regulation.

Emotion comprehension is itself made up of a range of abilities that are crucial for successful everyday social interaction and school achievement (Mavroveli & Sànchez-Ruiz, 2011). Following Pons, Harris, and de Rosnay (2004), EC may be said to comprise three main dimensions: understanding the nature of emotions, their causes and the fact that they may be regulated. In the current study, we explored the efficacy of a conversational intervention conducted at school and designed to enhance all three components of primary school children's emotion comprehension, while also examining its effects in relation to different attachment profiles, or more specifically in relation to secure versus insecure and disorganized attachment (Ainsworth, 1979).

1. Training children's emotion comprehension

Recent years have seen an increase in intervention studies on the development of socioemotional competence with both typical and atypical populations (e.g., Izard, Trentacosta, King, & Mostow, 2004; Domitrovich, Cortes, & Greenberg, 2007; Bierman et al., 2008). Many of these studies have been conducted with at-risk populations (e.g., due to social disadvantage and poverty) with the aim of assessing the efficacy of broad-sweeping programs targeting social and emotional abilities and problem-solving (for a recent review: Cefai & Cavioni, 2014). Among these studies, the most important programs are the PATHS, a universal school-based preventive intervention model whose effectiveness has been showed with both school-aged (Greenberg, Kusche, Cook, & Quamma, 1995) and preschool children (Domitrovich et al., 2007), and the REDI (Bierman et al., 2008), a program promoting school readiness competencies in the domain of social-emotional development. Other studies, which are among those informing the current research, have reported interventions that specifically focused on the role of conversational mechanism to improve emotion comprehension, a key correlate of psychological wellbeing, cognitive development and academic success (Denham et al., 2003; Denham, Ji, & Hamre, 2010; Jones, Brown, & Lawrence Aber, 2011). Pioneering work in this particular line of enquiry was carried out by Peng, Johnson, Pollock, Glasspool, and Harris (1992). These authors evaluated an intervention with 4- to 7-year-olds that was designed to improve the children's comprehension of mixed or conflicting emotions, that is to say the awareness that in certain situations it is possible to experience emotions of opposite valence in relation to the same stimulus. The training involved reading story episodes eliciting mixed emotions and prompting the children to identify the causes.

Nonetheless, a genuine interest in assessing whether it is possible to help children develop their general emotion comprehension has only emerged over the past 15 years. Pons, Harris, & Doudin (2002) conducted an intensive 3-month program with 9-year-old children divided into experimental and control groups. The 13 areas covered by the intervention included recall of past and present emotions, identification of loved and not loved persons, the distinction between actual and apparent emotions, the origins of pride and guilt, and so on. Children were helped to develop their EC in each of these areas by means of specifically designed activities based on reading, conversation and discussion. The results reflected significant gains in participants' emotion comprehension independently of gender. In a different study, Guajardo and Watson (2002) manipulated 3- to 4-year-old children's exposure to social discourse during storybook reading. The individual training sessions involved discussion of mental-state concepts (e.g., intentions and emotions) in the context of story reading, with the storyteller highlighting the characters' inner states and actions, and asking the children to explain them. The findings provided support for the hypothesis that social discourse on inner states influences children's emotion comprehension and theory of mind. Grazzani Gavazzi and Ornaghi (2011) also reported positive outcomes – in terms of significant improvements in social cognition – for a training intervention conducted in kindergartens with both male and female preschoolers. The training consisted of reading stories enriched with psychological lexicon and then getting the children to "play language games", that is, to converse using a series of emotional terms with a view to enhancing their emotion comprehension as well as other aspects of their social cognition. In a study by Tenenbaum, Alfieri, Brooks, & Dunne (2008), children between the ages of 5 and 8 years either explained (self-explanation condition) or listened to an experimenter explaining (experimenter-explanation condition) the causes of story characters' hidden and ambivalent emotional reactions in several different situations. Compared to a control group who listened to the story scenarios and answered questions unrelated to emotions, school-age children in both experimental conditions displayed gains in EC; the authors discussed the outcomes of their study, emphasizing the fact that children's emotion comprehension was enhanced by participation in explanatory conversations. Similar results were recently obtained with toddlers (Grazzani, Ornaghi, Agliati, & Brazzelli, in press) attending nursery schools, who participated in an intervention based on conversing about emotions in small groups of children.

Most of the studies just reviewed adopted a conversational method of training. In the course of infancy and childhood, conversational activities, such as explaining mental states and discussing them with other people, crucially contribute to children's understanding of the mind (Turnbull & Carpendale, 1999; de Rosnay & Hughes, 2006), helping them to transform their implicit knowledge into explicit awareness, as borne out by the ample body of longitudinal studies reported in the literature (Hughes, White, & Ensor, 2014). During the training phase, a conversational approach gives children the opportunity to discuss, reflect on and reason about the themes introduced by the adult, helping them to develop new perspectives and access the viewpoints of others (Ornaghi, Brockmeier, & Grazzani, 2014). Nonetheless, the conversational studies reviewed above focused on a narrow set of emotion comprehension skills, e.g. the comprehension of ambivalent or mixed emotions (Peng et al., 1992; Tenenbaum et al., 2008), or tested the efficacy of intervention on a variety of skills but only with preschool participants (Grazzani Gavazzi & Ornaghi, 2011; Ornaghi, Grazzani, Cherubin, Conte, & Piralli, 2015).

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In contrast, the present conversational intervention conducted with primary school children was aimed at improving multiple skills related to the three dimensions of EC described in the developmental model proposed by Pons et al. (2004). This model comprises nine components grouped into three main dimensions, namely comprehension of the nature of emotions (recognition of basic emotions and appreciation of mixed emotions), the causes of emotion (the role of external causes, desires, beliefs, memory and moral values) and the fact that emotions may be regulated (the awareness that there may be a difference between the emotion experienced and that displayed and that it is possible to regulate the intensity of current emotional experience).

The nine components are not all of equal complexity, therefore the development of EC spans three different levels. The simplest level, conventionally referred to as *external* and normally mastered at around 3–4 years, includes recognition of basic emotions as well as understanding the role of external causes and desire in emotions. The intermediate level, labeled *mentalistic*, is generally reached from the age of 6 years onwards and comprehends appreciation of the role of beliefs and memories in emotional experience, as well as awareness of the distinction between manifest and private emotion. The final level in the development of emotion comprehension, termed *reflective*, is attained from about 8/9 years and implies awareness of the role of moral values in emotional experience, the meaning of mixed emotions and the fact that emotions may be regulated (Grazzani Gavazzi, Ornaghi, & Antoniotti, 2011). The authors who developed this model also created an instrument for the evaluation of emotion comprehension, the TEC (Pons & Harris, 2000), designed for use with children between the ages of 3 and 11 years. The TEC tests for the progressive acquisition of increasingly complex components of EC throughout childhood and allows the child's current level of development to be assessed.

2. Emotion comprehension and attachment

As mentioned above, the current study was also designed to analyze the outcomes of the training intervention as a function of the participants' attachment profile. The construct of attachment, which concerns the child's need to be guaranteed closeness and protection within the relationship with its caregiver, was examined here in terms of attachment security (Ainsworth, Bell, & Stayton, 1971). A number of studies reported in literature have investigated the relationship between emotion and attachment, considering both emotion regulation (Riva Crugnola et al., 2011) and emotion comprehension. In particular, research with preschool children has shown that secure attachment is a predictor of children's emotion understanding (Laible & Thompson, 1998; Steele, Steele, Croft, & Fonagy, 1999) and that parents' mentalistic discourse plays a crucial role in the development of EC (Ontai & Thompson, 2002). These studies indicate that more securely, or less insecurely, attached children are better able to attribute belief-based emotions; moreover, securely attached infants display a more advanced understanding of mixed emotions at 6 years of age.

In a study with older children, aged between 8 and 12 years, Borelli et al. (2010) found significant correlations between attachment and emotional competence. Antoniotti, Grazzani, & Ornaghi (2012) examined the relationship between attachment and emotion comprehension in 10-year-olds, reporting positive correlations between the two constructs. Specifically, compared to their insecurely attached peers, children with secure attachment obtained higher scores for emotion understanding, particularly for the components of the reflective level, which – as we have seen – concern the role of moral values in emotional experience, mixed emotions, and the regulation of emotion intensity. Finally, in a study conducted with adopted children, Barone and Lionetti (2012) also found attachment to be a correlate of emotion competence, particularly emotional knowledge.

3. The current study

In this paper, we present an intervention study conducted with primary school children in line with the conversational approach. We chose to work with 7- to 8-year-olds because this is a critical age for the development of EC, at which children make the transition from the more basic forms (external level) to increasingly complex modes (mentalistic and reflective levels) of emotion understanding (Pons et al., 2004). Furthermore, the school at which the research was conducted was selected on account of the teachers' interest in learning more about the development of socio-emotional competence in children and educational approaches for enhancing it. Thus, at the end of the research, teachers were debriefed about the objectives, method and findings of the completed study, and were provided with ad hoc training enabling them to implement and benefit from the intervention program on an ongoing basis.

The present study offers two original features with respect to the studies reviewed above. First, in our intervention, we focused on all three dimensions and all nine components of emotion comprehension, as opposed to on a narrow set of skills. Second, we explored the effect of intervention on children with different attachment profiles, specifically with secure versus insecure and disorganized attachment.

4. Aims and hypotheses

We had two main research aims:

- to verify whether the conversational procedure adopted with the participants in the experimental group led to a significantly greater increase in their emotion comprehension abilities, and in particular whether it enhanced these children's mental and reflective levels of EC, as compared to their counterparts in the control group;
- to test whether the training effect on children's emotion comprehension varied as a function of attachment security, in order to evaluate the effectiveness and potential applications of this type of intervention with children displaying insecure and disorganized attachment.

Based on our review of the existing literature, we hypothesized that the experimental group would show greater gains in EC than the control participants; we also expected that experimental group would outperform the control group at both the mental and reflective levels of EC. We did not make any predictions about how any training effects might vary in relation to attachment security given that there is little existing literature on the topic.

5. Method

5.1. Participants

One hundred and fifty children, from six classes at the same primary school in the Greater Milan area, were first administered an attachment instrument. Based on their responses, they were classified as secure (pattern B: 64%) or insecure or disorganized (patterns A, C, and D: 36%). We randomly selected 49 secure and 49 non-secure children, to create an experimental and a control group with a similar distribution of securely and insecurely/disorganized

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attached subjects. Both the secure and non-secure children were equally distributed between the two research groups.

The 98 children thus selected (51 girls; mean age at pre-test: 7 years, 7 months; SD = 3.4 months) who took part in the intervention study spoke Italian as their first language, were of middle class economic background and were attending the second grade at a primary school in the hinterland of Milan. Analyses of variance were conducted to ensure that there were no significant differences between the two research groups at pre-test in relation to age, $F(1,97) = 0.31$, NS, or in terms of their scores on the pretest measures, namely the test of emotional lexicon, $F(1,97) = 0.06$, NS, and the test of emotion comprehension, $F(1,97) = 0.009$, NS, both of which are described in the section below.

5.2. Research phases, measures and coding

The study, conducted in school after the researchers had spent a period of time getting to know the children, was made up of three phases: pre-test, intervention and post-test. The intervention was initiated 2 weeks after the pre-tests had been administered and lasted about 2 months; the post-testing took place 2 weeks after the end of the training. All participants, previously assessed for their attachment profile, completed two tests evaluating their knowledge of the emotional lexicon and their emotion comprehension, respectively.

5.2.1. Separation Anxiety Test (SAT, Klagsbrun & Bowlby, 1976)

The Separation Anxiety Test (SAT, in the adapted and standardized Italian version by Attili, 2001) evaluates children's attachment representations. It is a semi-projective test in which children are shown six pictures depicting various types of separation between a child (a boy or girl) and its parent(s). These pictures present a child in the following situations:

- staying at home while its parents go out;
- being separated from its mother on the first day of school;
- staying with an aunt while its parents go away for the week-end;
- at the park, being told to go and play by itself while its parents talk amongst themselves;
- being given a present because its parents are going away for 2 weeks;
- saying goodnight to its mother who then leaves the room.

For each scenario, the respondent is asked four questions: how the child in the picture might feel, why it might feel that way, what it might do on being separated from its parents, and how it might behave when reunited with its parents. The complex coding system recommended in the manual (Attili, 2001) enables different patterns of attachment to be identified. Children with a global score of 4 or over are classified as secure (pattern B); those with scores between 1 and 3 as insecure anxious-ambivalent (pattern C); those with scores between 0 and −2 as insecure avoidant (pattern A); finally, children with an overall score of < −3 are classified as displaying disorganized attachment (pattern D). The protocols were coded by two researchers who were expert in the use of the SAT (Cohen's K = 0.79). They reached full inter-rater agreement by discussing doubtful cases.

5.2.2. Emotional Lexicon Test (ELT, Grazzani, Ornaghi, & Piralli, 2011)

This test was included in the research design in order to ensure that there were no significant initial differences between the experimental and control groups in terms of their linguistic knowledge of the emotion lexicon. The measure consists of a series of brief scenarios, in each of which an event leads a story character to have an emotional experience. After the story has been read to the child, he or she is invited to choose which of two emotional terms more appropriately defines the protagonist's emotional state, and to give a reason for their choice. Given the age of the participants in the present study, only the second part of the test was administered, comprising seven scenarios designed to evaluate the ability to name complex emotions (e.g., shame, jealousy, nostalgia, etc.). The total score awarded to each child thus ranged from 0 to 7. The reliability coefficient were $\alpha = 0.70$, 95% CI [0.62–0.78] at pre-test and $\alpha = 0.71$, 95% CI [0.64–0.79] at post-test.

5.2.3. Test of Emotion Comprehension (TEC, Pons & Harris, 2000)

We used the standardized Italian version developed by Albanese and Molina (2008). This test evaluates comprehension of the nature, causes, and regulation of emotion in 3- to 11-year-old children. It is made up of 23 illustrated cards because some of the nine components under study are assessed using more than one card. The adult reads a short story and shows the child four illustrated faces representing different emotional states: anger, fear, sadness, happiness, or a "neutral" expression, asking them to select the one that corresponds to the story. For each response assessing one of the nine components in one of the three dimensions of EC, a score of 1 is assigned for a correct answer and a score of 0 for a wrong answer. However, in our data analysis, we only included the scores for the six items assessing the more advanced components of EC (the mental and reflective levels outlined in the introduction). Thus, children could obtain total scores of 0 to 6, as well as partial scores ranging from 0 to 3 for each of the two levels. The reliability coefficients were $\alpha = 0.71$ at pre-test, and $\alpha = 0.73$ at post-test.

6. Conversational intervention for enhancing emotion comprehension

The training, which lasted 2 months, was conducted by an expert from the research team, who was different to the researcher who carried out the pre- and post-testing. The teachers took part in two debriefing sessions, conducted for training purposes, after the post-test phase had been concluded.

The intervention, designed on the basis of the developmental model of emotion comprehension, focused on fear, sadness, happiness, anger and guilt. In all, each participant attended 15 sessions held with groups of five or six children at a time at twice-weekly intervals. For each of the five target emotions, three 45-minute training sessions were devoted to exploring it nature, causes and regulation, respectively. Each session began with the reading of a short everyday scenario, created ad hoc for the research (e.g., receiving gifts, losing a sports competition, quarrelling, breaking a friend's toy, etc.), in which the main character experienced a particular emotion. The short stories, then used to initiate the conversation, were constructed on the basis of emotional scripts, as in the following examples: "George cannot wait for it to be his birthday. Tomorrow, he is going to be 8 and his parents have promised him a wonderful bicycle like Peter's. . .", "Marina and her Mum are getting ready for Marina's birthday party. Marina would really love to get a new dance costume. Unfortunately here, parents are going to give her a book to help her study Math. . .".

After the story reading, stimulus questions were used to initiate group conversation. For example, after telling the story of a child who felt extremely disappointed because it did not receive the gift it had been looking forward to, the researcher might say: "Children, have you ever been disappointed when you opened a present?" Or: "How do you manage not to show the person who gave you the gift that you are disappointed, if you don't want to hurt their feelings. . .?" The adult's role was to support and stimulate the conversational exchange, in such a way as to enable all the children in the group to actively participate and to be exposed to their peers' perspectives on the theme under discussion. The

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conversational activity, appropriately guided by the adult, was designed to improve the three dimensions of EC (Pons et al., 2004): children's comprehension of the nature of emotions, their possible causes, and strategies for their regulation, through reflection on personal experience and on the viewpoints of the other children, as well as on the relationship between inner experience (e.g., feeling angry) and manifest behavior (e.g., yelling or hitting someone). By way of illustration, an extract from a conversation on the causes of emotion is included in the Appendix.

Our use of the conversational approach during the sessions had the aim of facilitating the transformation of the participants' knowledge from implicit to explicit (de Rosnay & Hughes, 2006; Ornaghi, Brockmeier, & Grazzani Gavazzi, 2011; Siegal, 1999), by activating mechanisms of metacognitive reflection on the self and others. The control group children, on the other hand, after listening to the same stories, were invited to engage in free play and therefore did not benefit from the stimuli offered by conversation.

7. Results

In keeping with our two research aims, the results section is divided into two paragraphs covering the impact of the conversational intervention on emotion comprehension, in terms of both total EC scores and partial scores for the mentalistic and reflective levels, and the impact of the intervention as a function of attachment profile, respectively.

7.1. The effects of the training on children's emotion comprehension

A multivariate analysis of variance (MANOVA) for repeated measures was run, with the factors Time (pre vs post), Group (training vs control) and Gender as independent variables. In the research design, Time was the within-subject variable, while Group and Gender were between-subject factors. The dependent variables were the scores obtained on the emotional-state lexicon and emotion comprehension measures. Effect sizes were calculated using partial eta-squared (η_p^2).

Table 1 reports the means and standard deviations for age (expressed in months), emotional lexicon, and emotion comprehension.

A significant effect of Time, Wilks' $\lambda = 0.40$, $F(2,94) = 28.09$, $p < 0.0001$, $\eta_p^2 = 52$, and a significant Time × Group interaction, Wilks' $\lambda = 0.80$, $F(2,94) = 5.18$, $p = 0.001$, $\eta_p^2 = 21$, emerged from this preliminary analysis. Given that gender was not found to have any significant interactive effect at this stage, Wilks' $\lambda = 0.98$, $F(2,94) = 0.89$, $p = 0.411$, $\eta_p^2 = 02$, it was omitted from all subsequent analyses. The univariate tests revealed that the Time × Group interaction was significant for emotion comprehension, $F(1,97) = 9.01$, $p = 0.001$, $\eta_p^2 = 20$. This interaction was broken down into the simple main effects. For the Time factor, the differences between pre- and post-test scores were analyzed for each of the two groups. There were significant differences between pre- and post-test scores for both the training, Wilks' $\lambda = 0.35$, $F(2,45) = 23.07$, $p < 0.001$, $\eta_p^2 = 0.60$, and the control group, Wilks' $\lambda = 0.53$, $F(2,45) = 7.20$, $p < 0.01$, $\eta_p^2 = 0.30$ (Table 1). With regard to the Group factor, calculation of the main effect did not yield any significant differences between the two groups at the pre-test stage; in contrast, at post-test there were significant differences between them in relation to the measures of emotional lexicon, $F(1,97) = 11.35$, $p = 0.001$, $\eta_p^2 = 15$, and emotion comprehension, $F(1,97) = 21.20$, $p < 0.001$, $\eta_p^2 = 21$, with the children in the experimental group obtaining higher scores on both tests (Table 1).

Additional analyses were conducted to assess the impact of the intervention on the mental and reflective levels of EC. A significant effect of Time emerged for both the mental, Wilks' $\lambda = .74$, $F(1,97) = 32.15$, $p < 0.0001$, $\eta_p^2 = 0.21$, and the reflective levels, Wilks' $\lambda = 0.76$, $F(1,97) = 25.38$, $p < 0.001$, $\eta_p^2 = 0.19$. There was also a significant Time × Group condition interaction for the reflective level, Wilks' $\lambda = 0.75$, $F(1,97) = 8.01$, $p = 0.003$, $\eta_p^2 = 0.20$, and for the mental level, Wilks' $\lambda = 0.90$, $F(1,97) = 3.68$, $p = 0.05$, $\eta_p^2 = 0.08$. In both cases, the higher gains were displayed by the experimental group (Table 1).

7.2. The training effect as a function of attachment security

In line with our second research aim, in order to explore the training effect in relation to attachment security, a repeated measure multivariate analysis of variance was conducted with Time (pre vs post), Group (training vs control) and Attachment security (secure vs non-secure) as the independent variables. Specifically, Time was the within-subject variable, while Group condition and Attachment security were the between-subject variables. Again, scores for emotional-state lexicon and emotion understanding were the dependent variables. Given that we had not made any specific predictions concerning how Attachment would interact with the other variables under study, we applied the Bonferroni correction in order to reduce the probability of type I error. Thus, the corresponding p-value for statistical significance was set at 0.0125. Attachment was not found to interact with Time and Group for either the ESL or total EC scores. In line with the study aims, further analyses were carried out to separately explore the effect of the training on the mental and reflective levels of EC. A significant Time × Group condition × Attachment interaction emerged for the mental level only, Wilks' $\lambda = 0.95$, $F(1,97) = 6.98$, $p = 0.01$, $\eta_p^2 = 0.09$. Specifically, as shown in Fig. 1, in the training group, the non-secure children improved significantly more than the children displaying secure attachment.

On calculating the simple main effects, it emerged that the non-securely attached children in the experimental group obtained significantly lower scores at pre-test than the securely attached participants, $F(1,48) = 6.01$, $p = 0.01$, $\eta_p^2 = 0.18$, while at post-test, there was no longer a significant difference between the two groups (Table 2). Analysis of the simple main effects for the time

Table 1
Means and standard deviations at pre- and post-test in the training and control groups.

	Pre-test		Post-test	
	Training group	Control group	Training group	Control group
Age in months	86.99 (3.20)	87.90 (3.02)	92.20 (3.85)	91.50 (3.00)
Emotional lexicon	5.90 (1.01)^{c}	5.94 (1.03)	6.74 (0.51)^{a,d}	6.45 (0.60)^{b}
EC (total)***	4.10 (1.30)^{c}	4.00 (1.39)^{c}	5.90 (1.20)	4.47 (1.33)^{d}
EC (mental level)*	2.22 (00.88)^{c}	2.30 (0.96)	2.89 (0.75)^{d}	2.44 (0.83)
EC (reflective level)**	1.85 (0.81)^{c}	1.71 (0.95)	2.50 (0.75)^{a,d}	1.90 (0.88)^{b}

The standard deviations are in brackets. *time × group interaction was significant at $p \leq 0.05$; **: time × group interaction was significant at $p \leq 0.01$; *** time × group interaction was significant at $p \leq 0.001$ On application of a post-hoc Bonferroni correction for the simple main effects, the values marked with the superscripts *a* through *d* were found to be statistically significant. Group factor: the letters *a* and *b* denote the comparisons between training and control groups for each of the pretest and posttest measures. Time factor: the letters *c* and *d* indicate comparisons between pretest and posttest scores within the training and control groups, respectively.

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Table 2
Means and standard deviations in the training and control groups in relation to attachment security (secure vs insecure and disorganized profiles), before and after the intervention.

	Training group		Control group	
	Pre	Post	Pre	Post
Emotional lexicon	6.01 (1.00)	6.70 (0.53)	5.82 (1.24)	6.21 (0.70)
	5.68 (1.12)	**6.67 (0.50)**	**5.69 (1.15)**	**6.46 (0.57)**
EC total	4.36 (1.06)	5.28 (0.85)	4.33 (0.91)	4.76 (1.04)
	3.78 (1.20)	**5.40 (1.05)**	**3.79 (1.15)**	**4.28 (1.23)**
EC mental level[a]	2.62 (0.69)	2.81 (0.39)	2.31 (0.75)	2.48 (0.85)
	1.85 (0.92)	**2.95 (0.50)**	**1.98 (0.87)**	**2.05 (0.86)**
EC reflective level	1.82 (0.82)	2.46 (0.64)	1.76 (0.83)	1.95 (0.86)
	1.78 (0.86)	**2.51 (0.78)**	**1.59 (0.76)**	**1.79 (0.80)**

The standard deviations are in brackets. The values reported in bold are those of the insecure/disorganized group of children, while those in normal typeface are those of the securely attached participants.

[a] The time × group × attachment security interaction was significant at $p \leq 0.01$.

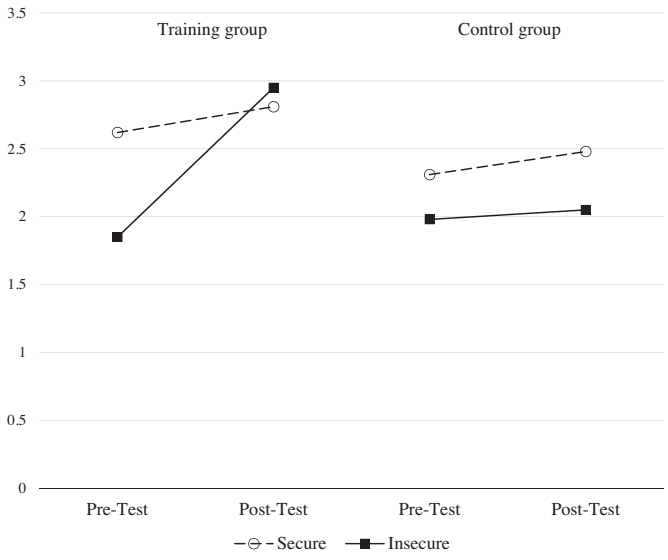

Fig. 1. Improvement in the mental level of emotion comprehension, as a function of experimental condition and attachment security.

factor showed a significant difference from pre- to post-test in both secure, $F(1,24) = 5.00$, $p = 0.01$, $\eta_p^2 = 0.17$, and non-secure children from the experimental group, $F(1,23) = 19.03$, $p < 0.001$, $\eta_p^2 = 0.45$. In contrast, in the control group, there were no significant differences as a function of attachment profile at either pre- ($p > 0.20$) or post-test ($p > 0.11$).

8. Discussion

This study, conducted to assess the impact of conversational intervention at school on the EC of 7- to 8-year-old children, offered two innovative features with respect to earlier research in the field. First, it focused on all three dimensions and nine components of emotion comprehension, as opposed to on a narrow set of skills. Second, it explored the effect of intervention in relation to participants' secure, insecure and disorganized attachment patterns.

With regard to the first aim, we found that the intervention was efficacious in fostering children's understanding of the nature, causes and regulation of emotion, as the interaction between Time and Group condition had a significant effect. In fact, the experimental group participants displayed significantly greater pre- to post-test gains than the control group, with a moderate effect size value (0.21). Our findings are therefore in line with those of other researchers reporting improvements in the EC of school-age children as an outcome of conversational intervention (e.g., Pons et al., 2002; Tenenbaum et al., 2008). More precisely, as predicted, the training primarily facilitated gains particularly in the reflective components of EC, for which we found a moderate effect size value (0.20). In discussing this finding, it is of interest to focus on the precise nature of the training provided. The conversational approach that characterized the discussions among the children in the experimental group after each story reading, appears to have fostered processes of reflection on the relationship between internal, subjective emotional experience and manifest behavior in both self and others. It also allowed the children to compare their own perspectives with those of their peers in relation to emotions and individual difference, and this in turn may have promoted the cognitive decentering required to attain the final level of development of emotion comprehension, as described in the model put forward by Pons et al. (2004).

Furthermore, the children in the training group also displayed gains in their emotional lexicon. Although this measure was included in the research design primarily to ensure that the two groups had similar levels of linguistic competence at pre-test, it is interesting to note that the experimental group – even though the effect size was small – also improved in terms of lexical knowledge. This is presumably due to the fact that the conversation promoted both the cognitive and the linguistic components of emotion comprehension (Vygotskij, 1934), as borne out by studies reporting the two aspects to be strongly correlated (Antonietti, Liverta, Marchetti & Astington, 2006; de Rosnay & Hughes, 2006; Grazzani & Ornaghi, 2012; Milligan, Astington, & Dack, 2007; Ornaghi & Grazzani, 2013). However, it should be noted that the improvement recorded in the training participants' cognitive EC abilities does not allow us to conclude that they benefited from corresponding gains in emotion expression and regulation, which are distinct aspects of the broader construct of emotional competence.

Turning to our second research aim, as far as we know, no prior training studies evaluated whether the benefits of intervention varied as a function of attachment pattern. The current highly preliminary and exploratory results suggest that the type of training implemented in this study may help children with a pattern of non-secure attachment to make up an initial gap in emotional competence with respect to their more securely attached peers. The non-secure children obtained lower scores on the TEC at the outset of the research, but after the intervention, they displayed significantly greater gains than their secure counterparts, with a moderate effect size. This improvement was particularly evident for the mental components of emotion comprehension, for which the insecure children in both groups obtained lower pre-test scores than secure participants, in line with the literature (Fonagy, Redfern, & Charman, 1997; de Rosnay & Harris, 2002) reporting secure attachment to be a precursor of reflective capacities (Fonagy & Bateman, 1996).

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In sum, reinforcing children's mental capacities through a specific intervention led to a significant improvement in their emotion comprehension: the conversational activity during which the children were required to think about the cognitive and emotional states of others (e.g., in relation to the causes and regulation of emotion) also promoted greater self-awareness in insecurely attached children thanks to their involvement in discussions with their peers and an adult. Nevertheless, it must be acknowledged that our own data and outcomes alone do not allow us to infer whether conversational intervention may also help children with insecure attachment to overcome deficits in effective emotion regulation in everyday life, and in other emotional competence skills (Saarni, 1999).

9. Limitations and educational implications

The findings of this study are, in our view, promising and encouraging, given the overall robustness of the effect sizes obtained. However, some limitations must acknowledged.

First of all, further back-up evidence is required given the small sample size available for the comparative analysis of children with secure and insecure attachment. In other words, these findings must be viewed as preliminary results that need to be replicated in order to acquire more scientific weight. Specifically, a new study with a larger sample would allow the effect to be analyzed in greater depth, that is, in relation to the specific attachment patterns displayed by non-secure children (patterns C, A, and D).

Another limitation has to do with the fact that the school was selected based on teacher interest. This may bias the results, although the fact that the teachers gave their permission for our team of experts to conduct the training can only have had a very slight influence on the work actually implemented with the children. The teachers in both conditions were informed of the characteristics of the intervention only after the post-test phase had been concluded, when they were offered ad hoc training to enable them to implement similar approaches in the future.

Finally, given that the control group also displayed gains in EC, it may be asked whether simply reading the scenario in which a main character experienced a particular emotion in itself stimulated children' reflective activity about emotions. Consequently, future research should be designed so to have more than two groups and more than two conditions (for instance, by adding a control group that receives neither the story-reading nor the story-reading followed by conversation) in order to better elucidate the respective roles of reading emotion stories and conversing about them.

Despite these limitations, we believe that the findings of the current study have interesting educational implications. The intervention that we carried out in school may be implemented by outside experts, or even better, by trained teachers as part of an educational program. These adult figures can contribute to improving children's emotional competence by engaging them in conversation about the nature, causes and regulation of emotions and other inner states. In this way, they can foster the development of perspective-taking abilities, mindreading and empathy, which are correlated with positive social behavior and problem-solving abilities, and negatively associated with antisocial conduct (Denham et al., 2010). Teacher-taught socio-emotional programs, designed to improve emotional competence, are being increasingly widely used in North America (Greenberg, Weissberg, O'Brien, Zins, et al., 2003) and have recently also begun to be introduced into educational practice in European countries (Pons et al., 2002; Lafortune, Doudin, Pons, & Hancoock, 2004), as a means of fostering positive social, health and academic outcomes in students.

Disclosure of interest

The authors declare that they have no competing interest.

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Appendix A.

Extract from a conversation on understanding the causes of sadness

In the short story we just read, how did the protagonist feel?

P.: Sad.

Exactly, that's right. And why is it that he feels sad?

A.: Because his Mum had promised to take him to the cinema after school but she did not take him because she had to work.

Today let's talk about the things that make us sad. . . think about it.

V.: During the holidays, I was sad because Andy and I quarrelled.

A.: I'm sad too when I fight with my brother. But he always tries to annoy me.

L.: My Mum does not let me play with the Wii.

P.: You can feel sad when you are made to do something you do not feel like doing.

Well done! It's true that we can feel sad when we are made to do something we do not want to do, as well as when we are not allowed to do something that we would really like to do.

M.: I am sad when my friends do not let me play with them.

L.: Yes, me too.

A.: Me too!

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