# Does Training Toddlers in Emotion Knowledge Lead to Changes in Their Prosocial and Aggressive Behavior Towards Peers at Nursery?

*Veronica Ornaghi**

*Elisa Brazzelli**

*Maria Lucarelli***

*Alessia Agliati***

*Ilaria Grazzani**

*Department of Human Sciences "R. Massa", University of Milano-Bicocca, Milan, Italy

**Department of Psychology, University of Milano-Bicocca, Milan, Italy

**Corresponding author**:
Dr. Veronica Ornaghi, University of Milano-Bicocca, Department of Human Sciences "R. Massa", Building U6, Room 4169, Piazza Ateneo Nuovo 1, 20126 Milano, Italy (veronica.ornaghi1@unimib.it)

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**Abstract**

*Research findings*. Within the flourishing area of research demonstrating the efficacy of emotion-based interventions carried out by trained teachers in educational contexts in increasing children's emotional skills, this study makes an original contribution to the existing literature by focusing on the effects of this kind of intervention on toddlers' prosocial and aggressive behavior. Ninety-five 26- to 36-month-olds participated in a two-month intervention in which trained teachers read emotion-based stories to small groups of children and then either involved them in conversations about emotions (experimental condition) or did not (control condition). Even after controlling for age and general language ability, the children in the experimental condition were found to outperform the control group on measures of emotion knowledge and emotional-state talk. Furthermore, the intervention fostered gains in prosocial behavior, whereas it did not have a significant effect on the frequency of aggressive actions, which was lower at post-test in both groups. The positive effect of the training program on participants' prosocial behavior was no longer significant when controlling for gains in emotion knowledge and emotional-state talk. *Practice or policy*. The results encourage the implementation of early educational programs focused on emotion knowledge in order to foster children's prosocial behavior towards peers.

*Keywords:* emotion knowledge, emotional-state talk, prosocial and aggressive behavior, toddlers, educational program

# Does Training Toddlers in Emotion Knowledge Lead to Changes in Their Prosocial and Aggressive Behavior Towards Peers at Nursery?

As part of a broader research program investigating ways of sustaining and enhancing the development of social and emotional skills in children of different ages, we conducted an intervention study in early childhood education contexts. In the current paper, we report and analyze some of the hitherto unpublished findings of this study. While part of this research was documented in a recent work (XXXX, 2016), additional data coding and analysis have pointed up further aspects, which we present and discuss here. More precisely, we investigate and discuss in greater depth the consequences of increased emotion knowledge for both positive and aggressive behavior in toddlers' interactions with their peers during free play sessions at the infant-toddler center. The study of prosocial behavior in early childhood is a key research theme within developmental psychology. Interest in the topic remains strong, given the increasing body of empirical evidence suggesting that prosocial behaviors carry benefits at both the individual and interpersonal levels. Many scholars have shown that the early manifestation of positive social behaviors, such as helping, sharing and comforting, is correlated with personal wellbeing, the development of empathy, the regulation of anti-social impulses, and school achievement, thereby positively shaping a child's global adjustment to his or her social environment (Denham, 2006, 2007; Eisenberg, Fabes, & Spinrad, 2006). Developing a prosocial orientation thus acts as a protection factor that increases children's likelihood of enjoying positive social relationships, being accepted by their peers and establishing good quality friendships (Denham et al., 2003).

## Prosocial and Aggressive Behavior in Toddlerhood

Prosocial behavior is generally defined as voluntary actions intended to benefit another person, such as helping, sharing, and comforting (Eisenberg et al., 2006). This concept therefore encompasses a broad range of behaviors that may be observed from early

childhood but continue to develop as children grow older (Hoffman, 2000; Svetlova, Nichols, & Brownell, 2010; Warneken & Tomasello, 2009). By the end of their first year, children have begun to attend to and display concern about the emotions expressed by others, and soon afterwards, also begin to experiment with actions aimed at relieving other people's distress. These early attempts at prosocial behavior become increasingly sophisticated throughout the second year of life, reflecting toddlers' ongoing cognitive and emotional development (Davidov, Zahn-Waxler, Roth-Hanania, & Knafo, 2013; Hoffman, 2000). Between 14 and 18 months, children acquire the ability to engage in *instrumental helping.* In fact, they begin to help others attain their goals by removing obstacles from their path or handing them objects beyond their reach, as well as by providing helpful information, for example by pointing out the location of an object that has been moved unbeknownst to an interlocutor (Warneken & Tomasello, 2009). Later on, from the age of about 18 months, toddlers also begin to respond empathically when others express distress (*comforting or empathic helping*), displaying prosocial behaviors aimed at alleviating another person's negative state of mind, by actively comforting him or her (e.g. Nichols, Svetlova, & Brownell, 2009). By the time they are two years of age, toddlers have learned to share their resources with others (*sharing*) more frequently and spontaneously, a development that is based on their newly acquired grasp of the concept of personal property (Brownell, 2013). During toddlerhood, the propensity to engage in prosocial behavior increases significantly: in line with their developing ability to infer the needs, desires, and emotional states of others, children come across as increasingly more driven to actively assist their interlocutors. Svetlova et al., 2010).

Dunfield and colleagues have recently put forward a three-factor model of prosocial behavior (e.g., Dunfield, Kuhlmeier, O'Connell, & Kelley, 2011). It distinguishes between three types of positive social action prompted by children's recognition of the needs of

others, namely *helping*, *sharing*, and *comforting*, that reflect responses to instrumental need, unmet material desire, and emotional distress respectively.

Alongside positive and altruistic social conduct, children also engage in aggressive behaviors towards others. The definition of aggressive action assumes an intent to at least threaten and cause harm to people, animals or objects (Bandura, 1979). Aggressive behaviors can vary in terms of the degree of arousal associated and may be either *reactive* (undertaken in response to an interaction perceived as hostile) or *proactive* (produced independently of the behavior of others) (Dodge & Coie, 1987).

Physical aggressive behavior - such as hitting, kicking and biting - emerges around the first year of life. The onset of physical aggression can be linked to the emergence of anger that takes place in this period of life. The few studies that have investigated the development of aggression rates in early childhood suggest an increase in frequency between 2 and 3 years (Alink et al., 2006; Mesman et al., 2008), partly explained by the developing feelings of autonomy in children of this age (Campbell, 2002). From the age of 3 years, the frequency of aggressive actions decreases, (Alink et al., 2006), evolving from direct physical forms of aggression to verbal and indirect forms, which appear later in childhood and in adolescence (Eisenberg, 1995). From the preschool stage onwards, gains in language and cognitive abilities generally pave the way for the deployment of alternative strategies, such as negotiation, with only a small proportion of children continuing to display high levels of physical aggression (Tremblay, 2000). In early childhood, most children start to internalize rules and values, learn to control their behavior and to regulate their anger, develop a theory of mind and become more empathic (e.g. Hoffman, 2000; Wellman, 1992). As a result, they learn to respond in a socially acceptable way instead of acting aggressively. In her review, Reebye (2005) reports that failure to acquire the skills needed to manage emotional responses and emotional arousal may lead to difficulties in such areas as social interaction (Calkins,

Gill, Johnson, & Smith, 1999; Cicchetti, Ackerman & Izard, 1995). Moreover, children who display aggressive behaviors toward their peers may do so because they have developed inappropriate strategies for regulating anger (Eisenberg, Fabes, Nyman, Bernzweig, & Pinuelas, 1994).

## Children's Emotion Knowledge and Its Relationship With Prosocial and Aggressive Behavior

Numerous scholars have pointed up the key role played by emotion knowledge in influencing the production of prosocial behavior, observing that the ability to understand the emotional states of self and others promotes the development of helping, sharing and consoling behaviors (e.g. Denham et al., 2003; Eggum et al., 2011; Ornaghi, Grazzani, Cherubin, Conte, & Piralli, 2015).

In the psychological literature, emotion knowledge (EK) has long been viewed as a core dimension of emotion competence, which is defined as the capacity to understand one's own and others' emotions, and to regulate and make appropriate use of emotions in one's cognitive processes and social exchanges (Denham, 1998). Emotion knowledge is itself a multicomponent construct, which encompasses both children's knowledge of the nature and causes of emotion and their awareness that it is possible to control how emotions are expressed and experienced. Denham (1986; 1998) proposed breaking down the abilities making up the emotion knowledge construct into the following components: the ability to use appropriate emotional lexicon to identify and name the basic emotions in judging facial expressions (*expressive emotion knowledge*); the ability to understand emotional language and therefore to recognize emotions by their verbal labels (*receptive emotion knowledge*); the ability to understand both stereotypical (*stereotypical situation knowledge)* and non-stereotypical emotions (*non-stereotypical situation knowledge*) arising from given situational

antecedents; the ability to identify the causes of basic emotions in oneself and others (*causal emotion knowledge*).

Many authors have argued that the development of EK hinges on mastery of the ability to recognize and label expressions of the basic emotions (joy, sadness, anger and fear), to comprehend the situational antecedents of emotions (the external causes that elicit them) and to foresee their possible consequences (Bassett, Denham, Mincic, & Graling, 2012; Denham et al., 2003; Pons, Harris, & de Rosnay, 2004). In particular, studies have shown that recognizing emotions (receptive EK), that is to say, the ability to identify the different facial expressions of emotion and interpret the associated emotional signals, emerges early in development and does not necessary require verbal abilities (e.g., Dunn, Brown, & Beardsall, 1991). In contrast, the other components of EK are more strongly influenced by lexical competence and the acquisition of emotion terms, which enhance the ability to categorize emotions and therefore to comprehend their nature and causes. Expressive EK emerges at around 18 months, developing rapidly throughout the preschool period, during which children learn to label the different emotions thanks to their more advanced overall linguistic competence. Situational EK, concerning children's understanding of the situations that elicit the emotional responses of happiness, sadness, anger or fear, also emerges in the preschool period, continuing to develop throughout the school years (Denham et al., 2003).

Children draw on their emerging ability to recognize and comprehend the emotions, feelings, desires and thoughts of others, in order to interpret their interlocutors' instrumental and emotional needs and enact appropriate and positive social responses (Thompson & Newton, 2013). In a pioneering study, Denham (1986) observed a significant correlation between the EK of 3-year-old children and their prosocial behaviors in a semi-structured situation. Positive correlations between children's emotional competence and their prosocial behaviors have also been observed in many later studies with both preschoolers and school-

age children (Denham, 2007; Farrant, Devine, Maybery, & Fletcher, 2012). This relationship is already present in early childhood, as borne out by the predictive studies of Ensor and colleagues (Ensor & Hughes, 2005; Ensor, Spencer, & Hughes, 2011), which identified a strong association between emotion understanding at 3 years and manifest prosocial behavior at 4 years of age. Similarly, Garner & Waajid (2012) have pointed up the predictive role of emotional competence in preschoolers' development of social skills. A meta-analysis by Trentacosta and Fine (2010) provided further evidence for a close relationship between knowledge of the basic emotions and social competence in preschooler. Specifically, children who are better at identifying and regulating their own emotions display greater competence in their interpersonal interactions, are more readily accepted by their peers and more skilled in resolving interpersonal conflict.

Furthermore, it has emerged from both correlational and longitudinal studies on the link between EK and social competence that the former influences the development of the latter by promoting prosocial behavior on the one hand and inhibiting aggressive behavior on the other. Many researchers have found that gains in emotional competence provide preschool and school age children with new tools for social interaction that may be used as an alternative to aggressive conduct (Belacchi & Farina, 2010; Bohnert, Crnic, & Lim, 2003). In contrast, aggressive behavior is associated with less advanced EK: children who display high levels of aggression express anger more frequently and more intensely, and are less skilled in identifying the causes of emotions and in regulating their emotional states in general (Calkins et al., 1999).

## Why Implement Educational Programs in Emotion Knowledge During Early Childhood? Empirical Evidence From Conversation-based Training Studies

A growing number of training studies have investigated how to promote gains in socio-emotional competence via the implementation of school programs. One line of studies

have tested the efficacy of educational programs designed to foster socio-emotional skills (emotion knowledge and social competence) in preschool and school-aged children from disadvantaged backgrounds (i.e. Domitrovich, Cortes, & Greenberg, 2007; Izard, Trentacosta, King, & Mostow, 2004).

In parallel, another line of research have focused on the mechanisms, such as conversation, for enhancing cognitive and socio-emotional skills in typically developing children from a very young age. Initial studies conducted in the home showed that parents' emotional dialogue with their children promotes the development of social and emotional skills (Brownell, Svetlova, Anderson, Nichols & Drummond, 2013; Denham, Bassett & Wyatt, 2007; Dunn et al., 1991; Garner, Dunsmore, & Southam-Gerrow, 2008; Ontai & Thompson, 2002; Van Bergen, Salmon, Dadds, & Allen, 2009). In recent years, researchers have broadened their focus and begun to investigate how the same mechanisms may work in educational contexts, and whether teachers can act as key socio-emotional socializers in a similar way to parents (Denham, Bassett, & Zinsser, 2012).

In light of empirical evidence obtained in this field, a number of authors have set out to test the effects of intervention programs designed to promote children's socio-emotional competence in childhood education contexts, in terms of both enhancing prosocial competence and reducing levels of aggressive behavior (e.g., Cigala, Mori, & Fangareggi, 2015). This area of research has included conversational training studies conducted with preschoolers (Ornaghi et al., 2015) and school age children (Ornaghi, Brockmeier, & Grazzani, 2014; Tenenbaum, Alfieri, Brooks, & Dunne, 2008). These studies showed that participating in conversational activities about the expression, causes and regulation of emotion has significant effects on children's emotional competence and on their propensity to engage in prosocial behavior. However, within intervention research on the promotion of positive social conduct, the conversational approach has rarely been implemented with 2 to 3-year-old children, with the

exception of two very recent studies by our own research team; these works showed that conversing on mental states, especially emotions, with small groups of toddlers at early childhood education centers has a positive impact on their social and emotional understanding (XXXXX, 2016; XXX, in press).

Furthermore, to the best of our knowledge, there is no published data about how children this young might spontaneously draw on such enhanced emotional skills to inform their behavior in the course of their social interactions with other toddlers.

**The Current Study**

The aim of the present research was to explore the effects of an EK intervention program, conducted by trained teachers and based on the conversational method, on the prosocial and aggressive behavior of 2-3 year old children, independently of age and language ability. The innovative aspect of this study, one of the few to implement a conversation-based intervention in the early childhood education context, was that it investigated the effects of a program designed to improve toddlers' EK on the various types of behavior enacted by the participating children while freely interacting with their peers.

Thus, the research objectives were on the one hand to evaluate how the conversational training impacted on the development of EK (in terms of gains in the ability to label emotions, recognize emotions from facial expressions, grasp stereotypical emotions and their situational antecedents, and identify the causes of basic emotions in the self and others) and emotional state-talk, and on the other hand to analyze the effects of the intervention on social behaviors, both positive and negative. We expected that the children in the experimental group would outperform the control group on measures of EK; in addition, we hypothesized that experimental participants would engage more frequently in prosocial action and display fewer aggressive behaviors than their peers in the control group. We also expected that the training effect on children's social behavior was associated to changes in their level of EK.

## Method

This study consisted of three phases: pre-test, intervention phase, and post-test, for both the experimental and control groups. The intervention began two weeks after the end of the pre-test and lasted two months. The post-test phase started two weeks after the end of the intervention.

### Participants

Ninety-five toddlers (41 girls), ranging in age from 26 to 36 months ($M_{age}$ at pre-test: 30.05; *SD* = 3.60), took part in the study. They were recruited at eight nurseries located in an urban area of Northern Italy. The infant-toddler centers involved in the study were similar in terms of organization and educational philosophy, given that they were all part of the same network of facilities. Participants were all typically developing children, native Italian speakers, and from middle-class socioeconomic backgrounds. The majority of their parents held a high school diploma or university degree (92% of mothers and 87% of fathers) and were in white-collar employment (75% of mothers and 56% of fathers). Other parents were manual workers (6.8% of mothers and 18% of fathers), executives or self-employed professionals (10.2% of mothers and 20% of fathers), while the remainder were unemployed (8% of mothers and 6% of fathers). Single-child families represented 62.2% of the sample, while the remaining 37.8 % had two or more children.

The children at four of the participating centers were randomly assigned to the experimental condition (*n* = 42; 16 girls) and those at the other four centers to the control condition (*n* = 53; 25 girls). Twelve teachers volunteered to conduct the intervention. They were all female and their mean age was 27.6 years (*SD* = 4.86; range: 21-45). They too were assigned to either the experimental or the control condition (5 and 7 teachers, respectively) and received ad hoc training from the research team in advance of the intervention (more detail is provided below).

## Pre- and Post-test Measures

All the children were pre-and post-tested with measures assessing their general language ability, EK, and prosocial and aggressive behavior.

### Language ability

*The PVB* (Caselli, Pasqualetti, & Stefanini, 2007). This standardized test uses maternal ratings to evaluate the language abilities of children aged between 18 and 36 months. It consists of four sections evaluating the child's *vocabulary*, *sentence complexity*, *clarity of pronunciation*, and *non-verbal communication abilities* such as pointing, making gestures, and pretending. The rating questionnaire took around 20 minutes to compile and standard scoring procedures from the PVB Manual were applied. The score ranges were 0-100 for the vocabulary section, 0-12 for the sentence complexity section, 0-2 for the pronunciation section, and 0-2 for the non-verbal communication abilities section. Given that the score ranges varied greatly across the four sections of the instrument, in order to calculate a global language ability score, the partial scores were converted into standardized or z-scores (Miller & Whicker, 1999). The final overall score was obtained by summing the four z-scores and dividing by four.

### Emotion knowledge

*Affective Knowledge Task* (AKT, Denham, 1986). Toddlers were administered the Italian validated version (Camodeca & Coppola, 2010) of the task. The materials are two puppets with blank faces and four felt discs, each depicting a facial expression corresponding to a distinct basic emotion. Four subtasks from the battery were used: the expressive task, receptive task, affective perspective-taking task, and causes task. Respectively, these examined the ability to label emotions (four items), recognize them (four items), deploy EK in stereotypical situations (eight items), and identify/comprehend the causes of emotions (four items). Participants received a score of 2 for a correct response, 1 for an incorrect response of the appropriate affective valence, and 0 for a completely inappropriate response.

Each child was assigned a total score ranging from 0 to 40, and four sub-scores relative to the four sections of the test (expressive task: max. 8; receptive task: max. 8; affective perspective-taking task: max. 16; and causes task: max. 8). The reliability coefficients were α =.83 at pre-test and α =.79 at post-test. Reliability coefficients for the four sections of the AKT were: α =.79 at pre-test and α =.62 at post-test for the expressive task; α =.89 at pre-test and α =.81 at post-test for the receptive task; α =.82 at pre-test and α =.71 at post-test for the affective perspective-taking task; and α =.79 at pre-test and α =.79 at post-test for the emotion causes task.

*Emotional-state talk (EST).* Each participant was video-recorded for a total of 24 minutes during free play observed at nursery on three different days. The trained observers used a randomly ordered list of children and focused on one child at a time. Two expert judges who were blind to the aims of the research transcribed the children's talk and coded their spontaneous use of EST according to a pre-defined classification grid (e.g., Bretherton & Beegly, 1982). The grid included terms referring to both positive (i.e., happy, love, feeling good, cheerful, glad, satisfied, proud, etc.) and negative emotional states (i.e., scared, angry, sad, annoyed, worried, etc.). Only genuine references to emotional states were counted, according to Bartsch and Wellman's theory (Bartsch & Wellman, 1995). Therefore, all the linguistic expressions that left doubts about the child's comprehension of the mental state they refer to were excluded (i.e., mere repetitions of verbal expressions that the child has just heard being pronounced by other people). The coders obtained 80% agreement at pre-test ($\kappa$ = .74) and 86% at post-test ($\kappa$ = .78).

**Prosocial and aggressive behavior**

The same video-recordings used to evaluate children's emotional-state talk were also availed of to observe the toddlers' prosocial and aggressive behaviors. Coding was carried out by two independent judges blind to the aims of the study and unaware of which children

belonged to the experimental and control groups. For each child, behaviors were coded following an ad hoc observation grid adapted from that used by Denham (1986). Drawing on classifications common to a number of studies reported in the literature (Brownell, Svetlova & Nichols, 2009; Svetlova et al., 2010), we grouped behaviors into categories situated along a continuum that went from actively prosocial behavior (e.g., sharing, helping, etc.) to aggressive behavior (both reactive and proactive). The specific categories used were: *sharing* (when a child shares an object or information with another), *helping* (when a child assists a peer to complete an action or attain a goal, or gives up something to benefit someone else), *comforting* (when a child offers verbal or physical consolation in response to the distress of a peer), *neutral attention* (when a child turns around and looks attentively for at least three consecutive seconds at another child who is displaying signs of distress or discomfort), *reactive aggression* (when a child displays defensive verbal and non-verbal behaviors in response to provocation or attack from others) and *proactive aggression* (when a child uses verbal and non-verbal behavior to provoke, challenge, or attack others).

Each participant was assigned an overall score for prosocial behavior (corresponding to the total number of comforting, sharing, helping and neutral behaviors displayed) and an overall score for aggressive behavior (corresponding to the total number of behaviors classified as reactive or proactive aggression). Again the judges independently coded the children's social behavior, obtaining 83% agreement at pre-test ($\kappa = .79$) and 82% agreement at post-test ($\kappa = .74$) before resolving discrepancies via discussion.

**The Emotion Knowledge Intervention Program**

In between the pre-test and post-test phases, a two-month intervention took place at all participating nurseries. The teachers, who had previously been specifically trained by the research staff, daily involved small groups of children in semi-structured training sessions. The teachers were provided with specific guidelines concerning the Emotion Knowledge

Intervention Program. The activities were conducted in a quiet ad hoc setting, in which the children were seated in a circle with the teacher in front of them to encourage communication and exchange. Composition of the groups (4-5 toddlers at time) was based on teacher nomination, and all groups were mixed gender.

A total of 42 intervention sessions were carried out by the teachers. Each session, lasting about fifteen minutes, consisted of two key steps (the first one lasted about 5 minutes, the second one lasted about 10 minutes). At the first step, identical in both conditions, children were read a brief story from an illustrated book that had been specifically created with the research aims in mind and was age-appropriate. The book, enriched with emotional lexicon, contained short stories about animal characters who experience exciting and emotional events that make them alternately joyful, scared, sad, and angry. The stories presented the children with familiar situations activating common emotional scripts, such as feeling sad because one has lost a favorite possession, angry over the snatching of a toy, happy on account of a wish come true, or afraid of a loud noise.

The second part of the activity, in contrast, varied across the two conditions. The children assigned to the experimental condition, following the well-consolidated paradigm based on story-reading and subsequent conversational activity (e.g., Ornaghi et al., 2015; Tenenbaum et al., 2008), were encouraged by the teacher to talk about emotions. Specifically, following the program instructions, after using the story that had just been read to introduce the theme, the teachers asked the children questions about the target emotion, addressing each question to an individual child, with the aim of stimulating reflection and conversation about a different aspect of that particular emotion at each session: recognizing the emotion, expressing it, understanding its causes, or regulating it. Examples of stimulus questions include: “How did the little rabbit feel in this story?”, “Did you see how angry the little bear was?”, “What is an angry face like? Can you make one? Look what an angry face Lucy is

making!", "Do you ever get mad when someone takes your favorite toy?", "Luke, what do you do when you get mad? And you, Lucy?", "How can you tell that a person is scared?". By means of these stimulus questions, the children were guided to think and converse about their own and others' emotional experience, with the aim of enhancing their knowledge about emotions, fostering their affective perspective-taking abilities, and so on.

Children in the control condition, after the book-reading, were allowed to engage in free play instead of participating in subsequent conversational activity on EK. Their teachers were blind to the research aims and were told that they would have the opportunity to receive the training the following year.

## Results

The result section is divided into five subsections outlining descriptive statistics and correlations among the study variables, the impact of the intervention on participants' EK and EST, the effect of the emotion-based training program on participants' prosocial and aggressive behavior, the effect of the intervention on social behavior when controlling for the contribution of gains in EK, and, finally, a measure of the fidelity with which the intervention was delivered by the teachers in both conditions. All statistical analyses were conducted using SPSS (version 21).

### Descriptive Statistics

Table 1 shows means and standard deviation for all variables as a function of group condition at both pre-test and post-test stages. Table 2 reports correlations among variables by group condition at both time points.

### Training Effects on Toddlers' Emotion Knowledge and Emotional-state Talk

In order to verify the impact of the intervention on participants' EK and EST, a multivariate repeated measures analysis of co-variance (MANCOVA) was run, with the following independent variables (IVs): Time (pre and post) as a within-subject factor and

Group Condition (experimental vs control group) as a between-subject factor. The dependent variables (DVs) measured at two time points were EST and EK (total score on the AKT). Age in months and pre- to post-test gains in language ability were included as covariates.

A significant Time × Group Condition interaction, Wilks' $\lambda = .66$, $F(2,91) = 6.48$, $p = .005$, $\eta_p^2 = .33$, emerged. The univariate tests showed that this interaction was significant for both EST, $F(1,93) = 7.47$, $p = .009$, $\eta_p^2 = .13$, and the total score on the AKT, $F(1,93) = 23.13$, $p < .0001$, $\eta_p^2 = .32$. As shown in Table 1, the children in the experimental group displayed higher gains from pre- to post-test stages than children in the control group. We then broke down the interaction into the simple main effects, applying the Bonferroni correction for multiple contrasts. For the Group Condition factor, at pre-test no significant differences emerged between the two groups. At post-test, the children in the experimental condition outperformed those in the control condition on the measures of EST, $F(1,93) = 10.92$, $p = .002$, $\eta_p^2 = .18$, and EK, $F(1,93) = 23.06$, $p < .00001$, $\eta_p^2 = .20$. For the Time factor, the experimental group showed significant differences between pre- and post-test scores for EST, $F(2,39) = 13.62$, $p = .001$, $\eta_p^2 = .34$, and EK, $F(2,39) = 292.97$, $p < .000001$, $\eta_p^2 = .91$. In the control group, significant differences between pre- and post-test scores were found with regard to EK, $F(2,50) = 40.82$, $p < .00001$, $\eta_p^2 = .29$ (Table 1).

Moreover, in order to gain a more detailed insight into the efficacy of the intervention in improving the different EK abilities evaluated by the AKT, a series of analyses of variance for repeated measures were performed. As shown in Table 3, the children in the experimental group displayed significantly higher pre- to post-test gains than the control group on all sections of the AKT: labelling emotions, Wilks' $\lambda = .93$, $F(1,93) = 7.40$, $p = .008$, $\eta_p^2 = .08$, recognizing emotions, Wilks' $\lambda = .92$, $F(1,93) = 8.13$, $p = .005$, $\eta_p^2 = .08$, deploying EK in stereotypical situations, Wilks' $\lambda = .82$, $F(1,93) = 19.70$, $p < .0001$, $\eta_p^2 = .17$, and comprehending the causes of emotions, Wilks' $\lambda = .85$, $F(1,93) = 16.54$, $p < .001$, $\eta_p^2 = .15$.

Simple main effects were calculated. For the Group Condition factor, at pre-test no significant differences emerged between the two groups on any of the four sections of the instrument. At post-test, the children in the training group outperformed the control group on all sections ($p < .001$). For the Time factor, children assigned to both conversational ($p < .0001$) and control ($p = .01$) conditions displayed a significant improvement from pre- to post-test on all sections of the Affective Knowledge Test (Table 3).

**Training Effects on Toddlers' Prosocial and Aggressive Behavior**

To test the effect of the conversational intervention on participants' social behavior, a multivariate repeated measures analysis of co-variance (MANCOVA) was run with Time and Group Condition as IVs and prosocial and aggressive behavior as the DVs. Again, age in months and gains in language ability were included as covariates.

A significant effect of Time, Wilks' $\lambda = .79$, $F(2,91) = 6.43$, $p = .003$, $\eta_p^2 = .21$ and a significant Time × Group interaction, Wilks' $\lambda = .82$, $F(2,91) = 4.50$, $p = .03$, $\eta_p^2 = .18$, emerged. Univariate tests showed that the interaction was significant for the prosocial behavior only, $F(1,93) = 5.19$, $p = .02$, $\eta_p^2 = .11$. The training had a positive role in improving the frequency of overall prosocial actions towards others (higher in the experimental group) but not in reducing their aggressive behaviors. Analyses of the simple main effects (see Table 1) show that for the Group Condition factor, at pre-test no significant differences emerged between the two groups. At post-test, the children in the experimental condition outperformed those in the control condition on the frequency of prosocial behavior, $F(1,93) = 3.99$, $p = .04$, $\eta_p^2 = .08$. For the Time factor, the experimental group showed a tendency toward statistical significance between pre- and post-test scores for prosocial actions, $F(5,35) = 3.52$, $p = .07$, $\eta_p^2 = .12$. In the control group, significant differences between pre- and post-test scores were found with regard to aggressive behavior, $F(5,46) = 9.89$, $p = .005$, $\eta_p^2 = .20$.

In order to investigate the effect of the intervention on each category of social behavior under study, a series of repeated measure ANOVAs was run. Results as a function of Time and Group Condition are illustrated in Figure 1. A significant effect of Time emerged for sharing behaviors, $F(1,93) = 3.99$, $p < .05$, $\eta_p^2 = .08$, reactive aggressiveness, $F(1,93) = 7.29$, $p = .009$, $\eta_p^2 = .13$, and proactive aggressiveness, $F(1,93) = 4.03$, $p = .03$, $\eta_p^2 = .09$. Specifically, participants showed a significant pre-to post-test increase in sharing behaviors and a significant pre- to post-test decrease in both reactive and proactive aggressive actions. Furthermore, with regard to the Time × Group Condition interaction, a tendency towards statistical significance emerged for sharing behaviors, $F(1,93) = 3.50$, $p = .06$, $\eta_p^2 = .06$. The improvement in frequency of sharing actions was particularly marked in the experimental group (means: from .48 at pre-test to 1.44 at post-test) as compared to the control group (means: from .25 at pre-test to .33 at post-test). The calculation of the simple main effects showed a statistically significant difference between the sharing behavior of two groups at the post-test stage, $F(1,93) = 5.06$, $p = .03$ (see Figure 1). Thus, the intervention program had a significant effect on prosocial but not on aggressive actions toward others. As shown in Figure 2, from pre- to post-test both groups displayed an increase in prosocial behaviors and a reduction in aggressive conducts. With regard to prosocial action, this increase was significant in the children who had received the experimental training and displayed more advanced EK at post-test than the children in the control condition, $F(1,93) = 5,20$; $p = .03$. Concerning aggressive behaviors, both groups obtained negative delta values, but there was no statistically significant difference between the experimental and control conditions.

**The Training Effect on Prosocial Behavior After Controlling for Changes in Emotion Knowledge**

To test the role of children's improvements in EK and emotional state talk in explaining the positive effect of the training program on participants' prosocial behavior, we carried out a

repeated measures analysis of co-variance (ANCOVA). Time and Group Condition were the IVs and prosocial behavior at two time points was the DV. Pre- to post-test gains in EK and EST were included as covariates (Rogosa & Willett, 1983; Gottman, 2013). Since the training did not show any significant effect on aggressive behavior, it was not included in the analysis. Results showed that the Time × Group interaction for prosocial behavior did not remain significant when controlling for children's improvements in EK and EST, $F(1,91) = 2.90$; $p = .10$, $\eta_p^2 = .04$. We conclude that the positive impact of the intervention on children's frequency of prosocial actions depends on their gains in EK and EST.

**Fidelity Analysis**

In order to evaluate the fidelity with which the trained teaching staff actually implemented the program, we randomly videotaped 45% of the intervention sessions in both research conditions. Two researchers with specific expertise in video-observation independently evaluated all the recorded footage, using a shared rating procedure. For both groups, the raters assessed teachers' levels of compliance with the guidelines for laying out the setting and delivering a verbatim reading of the story text; in addition, for the experimental group, the judges rated the extent to which teachers had correctly implemented the instructions for conducting the conversation on emotions. For each of these areas, the judges awarded a fidelity score on a five-point scale ranging from "not at all faithful" to "completely faithful". The teachers in the experimental condition were found to display a high level of fidelity across all the areas under evaluation: creating the setting (90%), faithfulness to story text (88%), and implementation of the guidelines for the conversational activity (89%). Similarly, the teachers in the control condition displayed strong fidelity, in 90% of cases with regard to preparing the setting and in 87% of cases in relation to respecting the guidelines for the story reading. Overall, the judges attained 84% agreement ($\kappa = .75$).

## Discussion

The core aim of the present study was to verify whether a conversation-based training program carried out by nursery teachers was effective in enhancing toddlers' EK and whether and how it impacted on prosocial and aggressive behavior.

We obtained four main findings. First, the training had a positive effect on children's EK and spontaneous production of EST during free play with peers; second, the children in the experimental condition showed significantly higher gains in their overall production of prosocial actions than the children assigned to the control condition, particularly with regard to sharing behaviors; third no training effects emerged in relation to participants' aggressive behaviors toward others, which decreased from pre- to post-test in both the experimental and control groups; fourth the positive impact of the intervention program on prosocial behavior was independent by age and language but was influenced by participants' gains in EK and EST.

We now discuss the research outcomes, focusing first on the most significant results, and then on the socio-educational implications of the findings, the study's limitations and possible directions for future research.

**Gains in Toddlers' Emotional-state Talk and Emotion Knowledge**

The two-month conversational intervention promoted the development of a series of emotional abilities in the toddlers assigned to the experimental group.

First, at post-test they displayed higher spontaneous use of emotional lexicon when interacting with peers at the infant-toddler center. This result is in line with the literature that emphasizes the key role of conversation in enabling children to acquire mental-state lexicon and to use it in the course of their daily interaction with others (Ornaghi et al., 2011; Peskin & Astington, 2004). Indeed, increases in children's use of this lexicon are to be attributed to their active participation in discursive contexts more so than to passive listening to adult talk or stories told by adults (de Rosnay & Hughes, 2006). From the video-recordings of the

children's free play sessions, it emerged that the children who received the training were more inclined, and linguistically better able, to explicitly describe the emotional contents of their own and others' experience. Thus, for example, in a prototypical conflict situation among children, in which one child snatched another child's toy, the victim would express his or her anger not only by gesticulating or crying, but also by verbalizing the emotion he or she was experiencing at that moment: "Hey, give me back my car. I'm mad!" Or a child who was frightened at the sight of a mask might say: "It's horrible, it's scary! Let's run away."

The transition from implicit to explicit knowledge of emotions, promoted by conversational practices, is unquestionably of great use to children in the course of their early social relations, because it enables them to recognize their own and others' emotions, to label them and understand their causes and consequences, as well as to refine their affective perspective-taking abilities (Brown & Dunn, 1991). This is borne out by the finding that, after the intervention, the participants in the conversation condition displayed significantly greater gains in EK, as assessed by measures of emotion recognition, identifying the causes of emotions and affective perspective-taking. Such outcomes are in line with previous intervention studies, which showed conversation on emotions to be a powerful educational tool and a mechanism of emotional socialization that enhances the development of children's EK at different ages, not only in the home but also in educational contexts (Ornaghi, Brockmeier, & Grazzani, 2014; Ornaghi et al., 2015; Tenenbaum et al., 2008).

In the present study, the story-based conversational intervention on emotions carried out with small groups of toddlers gave them the opportunity to set about articulating their own emotional experience and compare it with that of others, using the emotions of the story characters as a starting point. For example, during a conversational exchange with an educator, Mary (2 years and 89 months) stated, "I'm scared of the wolf"; shortly afterwards, Louis (2 years and 9 months) said that he felt afraid when his dog barked loudly, and finally,

when invited by the educator to name different causes of fear, Frances (2 years and 10 months) broke in to say: “I’m not scared of my dog!”

**The Impact of the Training on Toddlers’ Prosocial and Aggressive Behavior**

The intervention program led to higher levels of positive social behavior on the part of the children in the experimental group, who at the post-test stage displayed prosocial actions more frequently than their counterparts in the control condition. Thus, in keeping with the outcomes of studies on conversation in the family setting (e.g., Brownell et al., 2013), talking about emotions with young children in an early childhood education setting facilitates their prosocial behavior. Given the well-established relationship between emotional competence and prosocial behavior (Eggum et al., 2011; Ensor & Hughes, 2005; Ensor et al., 2011), it might be argued that the experience of the toddlers in the training group over the two-month period allowed them to internalize new knowledge about emotions, reinforcing their awareness and comprehension of others’ feelings and needs, thus increasing their propensity to engage in prosocial behaviors, such as comforting, helping, and sharing (Ornaghi et al., 2015). It is interesting to note that, despite the fact that children between 2 and 3 years of age typically display prosocial behaviors infrequently (Brownell & Kopp, 2007) and that the training was not specifically focused on this aspect, the children in the experimental group increased their overall production of positive social actions toward peers, in line with other recent findings with toddlers (Giménez-Dasí, Fernández-Sánchez, & Quintanilla, 2015). The following are representative examples of prosocial behaviors extracted from the post-test video-observations. George is playing on his own with some toy cars when Andrew comes over to him. George holds out a car that he is playing with and invites Andrew to play with him (*sharing*). Matthew is crying, Mark comes over and rubs him on the cheek (*comforting*). Clare is trying to position her stool near the other children’s stools but unsuccessfully. Anna gets up and goes over to help her (*helping*). Anne is playing with dolls when she suddenly

hears another little girl crying. She stops playing, turns around and looks closely at her classmate (*neutral attention*).

Concerning the different types of prosocial behavior, although the experimental group displayed gains in all categories, we found a significant pre-to post-test improvement for sharing behaviors only. This might be due to the relatively small sample size or to the fact that children at this age generally engage in low levels of prosocial behavior. In any case, it is interesting that the children improved significantly in the area of sharing behavior, which the literature reports to be more difficult and later-developing than other kinds of prosocial conduct (Dunfiled et al., 2011; Warneken & Tomasello, 2009), because it requires the ability to recognize an inequality between oneself and another and to simultaneously take into account one's own feelings and the feelings of others (e.g., Brownell et al., 2009). Thus, we may speculate that the intervention, by promoting children's conversation about their own and others' emotional states, promoted the development of perspective-taking abilities, which is a crucial prerequisite for sharing behaviors. This suggests the critical importance of offering education programs aimed at enhancing children's EK from an early age (Domitrovich et al., 2007).

An original feature of the present study was its exploration of the impact of emotion-knowledge training on both positive and aggressive social behavior. With regard to the latter, in line with Giménez-Dasí et al. (2015), after the intervention both training and control participants displayed a reduced frequency of aggressive conduct, with no significant effects of the emotion-knowledge intervention on the frequency of aggressive conducts. This outcome could be explained by the fact that aggressive behavior decreases sharply over the course of early development (Trembley, 2000), in parallel with the acquisition of language abilities and self-regulation.

**The Role of Language Ability and Age**

Given the linguistic nature of the intervention, we also controlled for the effect of language. The results showed that participants' pre- to post-test changes in general language ability did not account for the differences observed between the two groups. In other words, although the conversational activities carried out with the toddlers in the experimental group led to an almost significant improvement in their basic language abilities at the syntactic, semantic and pragmatic levels, this outcome did not explain the positive effect of the training on the other competences under study. This is in line with previous studies demonstrating the strong relationship between EK and prosocial behavior independently of general verbal ability (Ensor & Hughes, 2005; Ensor et al., 2011). The teacher-guided *conversation on emotions and other inner states* facilitated the transformation of the children's implicit knowledge into explicit awareness of their own and others' inner worlds (Nelson, 2007), allowing them to engage in processes of metacognitive reflection about internal states. In this sense, our results bear out the findings of a substantial body of research demonstrating the key role of conversation on inner states in enhancing children's cognitive development (de Rosnay & Hughes, 2006).

Likewise, age differences among participants, who in the current study were aged between 26 and 36 months, did not have a significant impact on the effectiveness of the intervention. In other words, the training led to similar gains in both younger and older children. Nonetheless, it would be interesting to repeat the intervention in the future with a larger sample and broader age range in order to verify whether some abilities improve more than others at given ages.

**Limitations, Educational Implications and Future Research Directions**

The present study is not without its limitations. First, we were unable to collect follow-up data given that not all of the participating nurseries were willing to further extend the period of the study. However, it would be of value to ascertain how long the effects of the

training last. We therefore recommend that future studies include a follow-up assessment evaluating the longer-term effects of this kind of training.

A second limitation is that we did not include any adult-report measure of children's social competence. It would have been of great interest to collect parental ratings of children's social behavior in order to build up a more complete picture of the socioemotional changes undergone by the children as a result of the intervention. Such a measure could help to verify whether children's improvements in the use of emotional lexicon and levels of prosocial behavior would also be observed in the family context.

A further limitation is that the sample size was not suitable for running analyses to test the potential mediating role of EK in explaining participants' improvements in prosocial behavior. Thus, we could only control for the effect of changes in EK on children's prosocial improvements. Future research with a larger sample would be necessary in order to test the mediating effect of EK on children's social behavior.

Despite these limitations, the study offers some novel features that are worth of note. The fact that we implemented a conversational intervention with toddlers and the fact that the conversational activity was conducted by teachers with small groups of children at a time (as opposed to the classical adult-child dyad) are two original aspects of our work. These novelties contributed to advancing understanding of the role of emotional socialization in promoting the early socioemotional development of children in educational contexts. Based on the present findings, we contend that the innovative format implemented in our studies represents a viable option that should be seriously taken into account by educational programmers.

A further strength of the present research is that a multiple source methodology was adopted to collect data via different types of measure: parent-reports, direct assessment, and observation of children.

In this study, in which we found improvements in toddlers' prosocial actions after a conversation-based intervention focused on emotions, we did not specifically engage children in discussion about positive social behaviors. Nonetheless, the training was found to have a positive effect not only on toddlers' emotional competence, but also on their prosocial behavior. One potential future line of research could be to carry out training studies using intervention programs similar to that implemented here but specifically focused on encouraging children at nursery to converse about the various kinds of positive social behavior.

Finally, we can suppose that the positive effect of the intervention on toddlers' socio-emotional competence has been made stronger by teachers' generalization of emotion concepts during their daily activities with the children at nursery. Thus, future research should focus not only on the children's socio-emotional changes but also on the impact of the intervention on teachers' beliefs, emotional style and professional competence, as suggested by a very recent work with K-5 teachers (Domitrovich et al., 2016).

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Table 1

*Pre- and Post-test Means and Standard Deviations for All Variables by Group Condition*

| | *Pre-test* | | *Post-test* | |
|---|---|---|---|---|
| | Experimental | Control | Experimental | Control |
| Age in months | 30.30 | 30.11 | 34.30 | 34.28 |
| | (4.18) | (2.88) | (4.15) | (2.67) |
| Language ability | -.09 | .06 | .04 | .01 |
| (z scores) | (.66) | (.58) | (.61) | (.66) |
| EST | .29 [c] | .08 | 1.15 [a,d] | .20 [b] |
| | (.61) | (.27) | (1.35) | (.50) |
| EK | 11.70[c] | 12.68 | 28.23 [a,d] | 19.89 [b] |
| | (10.29) | (9.88) | (7.73) | (8.68) |
| Prosocial actions | 1.11 | 1.50 | 2.22 [a] | 1.55 [b] |
| | (1.42) | (1.69) | (2.53) | (1.54) |
| Aggressive actions | 1.15 | 1.65[c] | .70 | .62[d] |
| | (1.29) | (1.59) | (1.12) | (.77) |

*Note*. Numbers in parentheses are standard deviations. EST = emotional-state talk, EK = emotion knowledge. The apices *a* and *b* denote the statistically significant differences between experimental and control groups for each of the pre-test and post-test measures; the apices *c* and *d* indicate significant differences between pre-test and post-test scores within the training and control groups, respectively.

Table 2

*Correlations Among Variables in Both Groups*

| Measure | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Age (pre) | - | .28 | .28 | .33* | .27 | -.03 | .23 | .34* | .22 | .22 | .01 |
| 2.Language ability (pre) | .43* | - | .32* | .38* | .15 | .14 | .79*** | .31 | .21 | .04 | -.13 |
| 3.EK (pre) | .27 | .34* | - | .04 | .33* | .09 | .23 | .69*** | .02 | .24 | .04 |
| 4.EST (pre) | .34* | .62** | .27 | - | .02 | .08 | .36 | .03 | .18 | -.20 | -.25 |
| 5.Prosocial behaviour (pre) | .05 | .06 | .33* | .03 | - | -.05 | -.18 | .10 | -.12 | .20 | -.15 |
| 6.Aggressive behaviour (pre) | -.19 | .11 | .07 | .01 | .03 | - | .11 | .01 | .02 | -.24 | .02 |
| 7.Language ability (post) | .37* | .72*** | .18 | .42* | .44* | -.08 | - | .46** | .29 | .10 | .12 |
| 8.EK (post) | .58** | .55** | .55** | .48* | .30 | -.27 | .46** | - | .50* | .08 | .19 |
| 9. EST (post) | .34* | .52** | .46* | .47* | .02 | -.06 | .42* | .59** | - | -.28 | .09 |
| 10.Prosocial behaviour (post) | .12 | -21 | .16 | .03 | .35* | -.18 | .24 | .30 | .17 | - | -.17 |
| 11.Aggressive behaviour (post) | .30 | .12 | -.07 | .31 | .03 | -.09 | .11 | .20 | .26 | .05 | - |

*Note*: Variable intercorrelations for the experimental and the control group are presented below and above the diagonal, respectively. EK = emotion knowledge; EST = emotional-state talk. * $p < .05$, ** $p < .01$ *** $p < .001$.

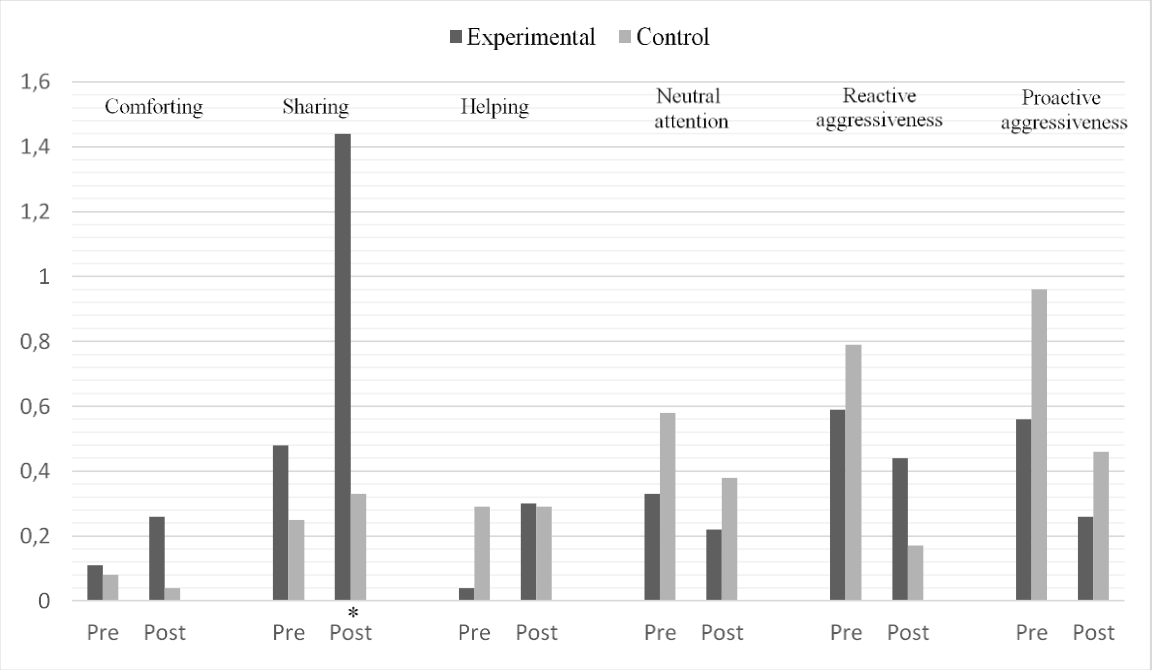
Table 3

*Pre- and Post-test Means and Standard Deviations for Emotion Knowledge Abilities in Both Groups*

| | *Pre-test* | | *Post-test* | |
|---|---|---|---|---|
| | Experimental | Control | Experimental | Control |
| Emotion labelling | 2.36 (2.51)[c] | 1.96 (2.23)[c] | 5.74 (2.14)[a,d] | 4.21 (2.13)[b,d] |
| Emotion recognition | 4.24 (2.54)[c] | 4.17 (3.04)[c] | 7.48 (1.04)[a,d] | 5.94 (2.44)[b,d] |
| Affective perspective taking | 4.19 (4.79)[c] | 5.45 (4.26)[c] | 10.48 (3.28)[a,d] | 7.79 (3.62)[b,d] |
| Emotion causes | 1.50 (2.45)[c] | 1.09 (1.72)[c] | 4.57 (3.06)[a,d] | 1.94 (2.32)[b,d] |

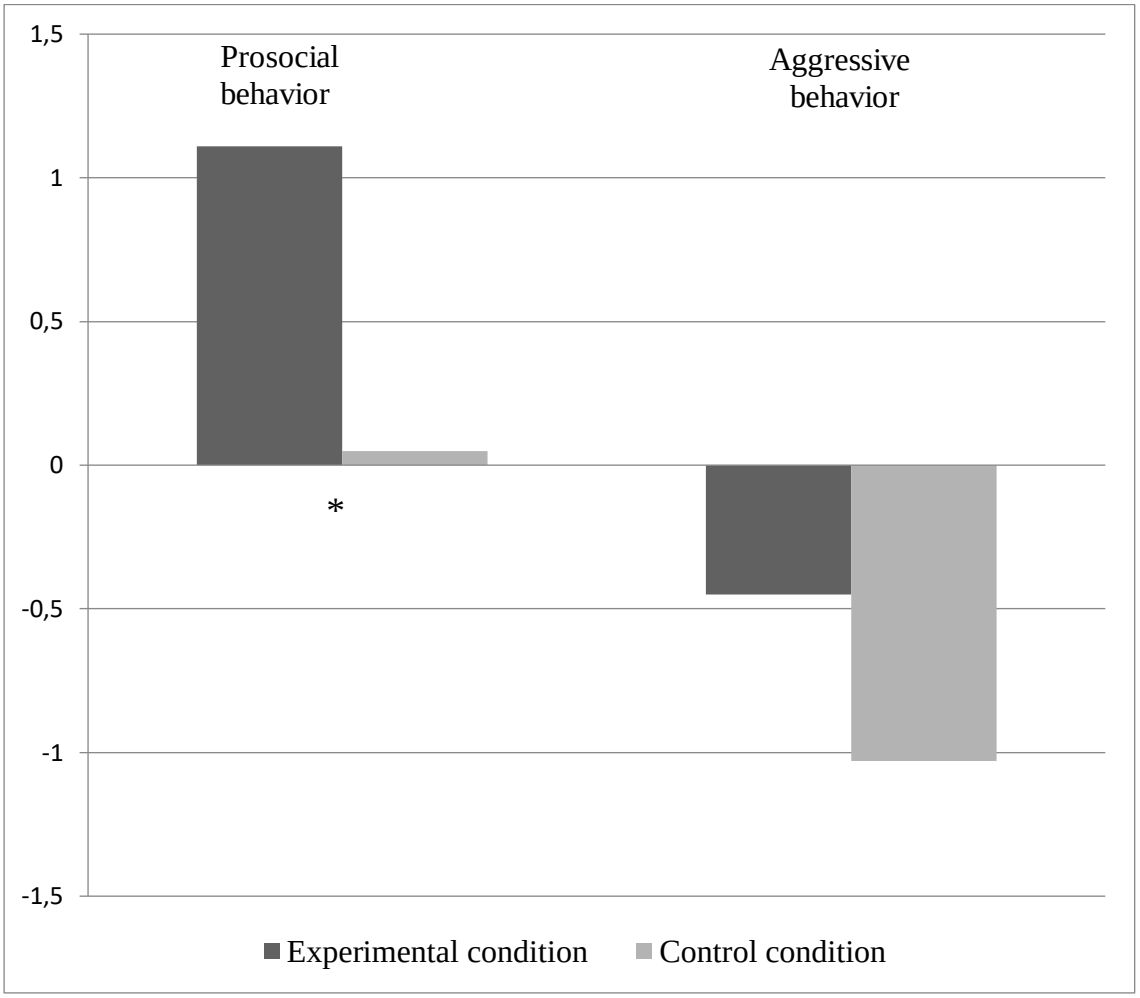
*Note*. Numbers in parentheses are standard deviations.
The apices *a* and *b* denote the statistically significant differences between experimental and control groups for each of the pre-test and post-test measures; the apices *c* and *d* indicate significant differences between pre-test and post-test scores within the training and control groups, respectively.

**Figure 1.** Pre- and Post-test Frequency of Prosocial and Aggressive Behavioral Categories in Both Groups




*Note:* * $p < .05$.

**Figure 2.** Delta Scores (Post-test – Pre-test) of Prosocial and Aggressive Behavior in Both Conditions




Note: * $p < .01$.