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The Relations of Preschool Children's Emotion Knowledge and Socially Appropriate Behaviors to Peer Likability

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Abstract

The purpose of the present study was to examine the relations of children's emotion knowledge (and its components) and socially appropriate behavior to peer likability in a sample of Italian preschool children at two time-points. At both Time 1 (T1; $n = 46$ boys, 42 girls) and a year later at Time 2 (T2; $n = 26$ boys, 22 girls), children's emotion knowledge (i.e., emotion recognition, situation knowledge) was assessed, teachers evaluated children's socially appropriate behavior, and peer likability was measured using a sociometric procedure. A two-wave Autoregressive Cross-lagged (ARC) model indicated that children's T1 emotion recognition was associated with higher T2 socially appropriate behavior, and children's T1 socially appropriate behavior was related to higher T2 peer likability, even after controlling for stability in the constructs. Socially appropriate behavior mediated the relation between preschool children's emotion recognition and peer likability. No bidirectional associations were found. The results support the notion that teacher training should focus on promoting children's emotion knowledge to create a classroom atmosphere characterized by positive social behaviors and harmonious peer relationships across the preschool years.

Keywords

preschool age; emotion knowledge; socially appropriate behavior; peer likability

Successful peer relationships are crucial to children's positive development in early childhood, and failure in this domain may pose a risk for later maladjustment (Bandon, Calkins, Grimm, Keane, & O' Brien, 2010; Denham, Bassett, Thayer et al., 2012; Gower, Lingras, Mathieson, Kawabata, & Crick, 2014; McCabe & Altamura, 2011). Peer likability has been positively related to children's academic adjustment, positive attitudes about school, and school engagement (Buhs & Ladd, 2001; Buhs, Ladd, & Herald, 2006; Ladd, Herald-Brown, & Reiser, 2008; Morris, Denham, Bassett, & Curby, 2013; Palermo, Hanish, Martin, Fabes, & Reiser, 2007). Furthermore, early success in peer relationships has been positively related to socially appropriate behaviors (Bandon et al., 2010; Spinrad et al., 2004) and emotion understanding (Denham, 2006; Denham et al., 2001). For example, Bandon and colleagues (2010) found that children's social skills during kindergarten predicted their popularity in second grade. In the spirit of understanding the processes that contribute to successful relationships with peers, the goal of the current study was to

examine the longitudinal relations of emotion knowledge and children's socially appropriate behaviors to their peer relationships in a sample of Italian preschool children.

Children's Emotion Knowledge and Socially Appropriate Behavior

Children's emotion knowledge encompasses identifying and labeling emotional facial expressions and recognizing the situations that elicit particular emotions (Denham, 1998; Denham, Bassett, Way et al., 2012; Morgan, Izard, & King, 2010). In terms of normative development, around 1.5 - 2 years of age, children begin to use emotion labels, albeit infrequently, in their language (Widen & Russel, 2008). Children younger than 2 years generally distinguish between feeling good versus feeling bad. Between 2 and 3 years, the ability to recognize and label basic emotions (i.e., happy, angry, afraid, sad) appears to emerge, and children are quite skilled at recognizing basic facial expressions (emotion recognition) by 5 years of age (Widen & Russell, 2003). By the end of preschool, children develop the ability to understand the contexts surrounding particular emotions (situation knowledge), such as being happy to receive an ice cream or sad for having lost a toy (Fine, Izard, & Trentacosta, 2006; Heinze, Miller, Seifer, Dickstein, & Locke, 2015; Morgan et al., 2010).

Despite the fact that emotion recognition and situation knowledge appear to develop at different ages, researchers generally have considered a global measure of children's emotion knowledge (e.g., Arsenio, Cooperman, & Lover, 2000; Mostow, Izard, Fine, & Trentacosta, 2002) or have focused on only emotion recognition (Izard et al., 2001; Miller et al., 2005) or only situation knowledge (e.g., Fine et al., 2006; Garner & Waajid, 2008). However, Bassett, Denham, Mincic, and Graling (2012) found that the construct of emotion knowledge is multi-dimensional and distinguished between emotion recognition (both expression and receptive knowledge) and situation-based emotion knowledge. The authors argued for differentiating between these components in further research.

As suggested by social information processing theory (see Crick & Dodge, 1994; Lemerise & Arsenio, 2000), children's emotion knowledge is essential for effective peer interactions. Specifically, emotion knowledge is thought play a critical role in social interactions, from interpreting others' cues, evaluating potential responses, making decisions about possible responses, to enacting behavior accordingly. Thus, there is good reason to believe that children's emotion understanding predicts the quality of children's social interactions.

Consistent with social information processing theory, researchers have found positive relations between children's emotion knowledge and socially appropriate behaviors, reflecting children's capacity to cooperate, help others, and initiate and maintain social relationships (e.g., Denham, 1998; Denham et al., 2013; Denham et al., 2003; Izard et al., 2001; Mostow et al., 2002; Trentacosta & Fine, 2010). However, each emotion knowledge component may be differently related to social behaviors. The ability to recognize emotions may be particularly important information for children to interpret peers' cues and to evaluate the situation and potential responses (more than understanding the causes and consequences of emotions; see Widen & Russell, 2010). For example, Alonso-Alberca, Vergara, Fernandez-Berrocal, Johnson, and Izard (2012) found, in a sample of Spanish

children from 36 to 72 months, that children's receptive emotion knowledge (the ability to point to the correct emotion) was negatively related to aggressive problems, whereas no significant associations were found between situation knowledge and children's social behaviors. Garner and Waajid (2008) found that preschoolers' situation knowledge contributed to children's school competence (e.g., concept knowledge, language competence) in a cross-sectional design. Furthermore, Heinze et al. (2015) found that preschoolers' emotion recognition knowledge was negatively correlated with self-reported loneliness, and both expressive emotion knowledge and emotion situation knowledge were negatively related to parent reported internalizing symptoms.

Although social information processing approach considers the interpretation of information to be a first step in children's social interactions, it is important to consider potential transactional relations. That is, although emotion knowledge may provide a foundation for children's positive social behaviors, the reverse may also be true. Social relationships with others may offer opportunities to learn about others' emotions (e.g., Halberstadt, Denham, & Dunsmore, 2001).

To our knowledge, current research has investigated only one component of emotion knowledge (or a global measure of emotion knowledge) in relation to socially appropriate behaviors and peer likability (Denham et al., 2003; Mostow et al., 2002). Thus, there is limited research on how the different components of children's emotion knowledge might relate to children's socially appropriate behavior and success in peer relationships during the preschool years. In the current study, we investigated the potential unique relations of emotion recognition and situation knowledge to preschoolers' socially appropriate behavior and peer liking. Potential transactional relations among the constructs also were investigated.

Children's Socially Appropriate Behaviors and Peer Likability

It has been demonstrated that children who exhibit socially appropriate behaviors tend to be liked by their classroom peers (Bandon et al., 2010; Spinrad et al., 2004) and develop close peer relationships (Lindsley, 2002; Sebanc, 2003). For example, Ladd and colleagues found that children who play cooperatively were more likely to be accepted by peers across the preschool years (Ladd, Birch, & Buhs, 1999; Ladd & Burgess, 2001). Palermo et al. (2007), using a cross-sectional design, further demonstrated that prosocial behavior (a component of socially appropriate behavior) was negatively related to peer exclusion. In short, children who display socially appropriate behaviors are in a better position to thrive in a social world (Baumgartner & Strayer, 2008; Denham et al., 2003). Indeed, using an earlier assessment of the children in the current study, Sette, Spinrad, and Baumgartner (2013) showed that socially appropriate behavior was associated with relatively high peer likability.

However, researchers need to better understand the direction of effects between socially appropriate behavior and peer likability in preschool children. In the current study, a longitudinal design was used to examine the relations of these variables over time while controlling for the stability in the constructs. Based on transactional theory, we focused on how children's socially appropriate behavior and peer likability predict each other over time (see Sameroff, 2010; Sameroff & Chandler, 1975). We expected children's socially

appropriate behaviors to predict peer likability, even after controlling for stability in the constructs. Alternatively, children who are accepted by peers may have more opportunities to practice socially appropriate behaviors over time. That is, peer likability may promote social inclusion within classrooms, and thereby be a resource that fosters interpersonal success (Ladd, 2003). In support of this notion, Eggum-Wilkens, Valiente, Swanson, and Lemery-Chalfant (2014), studying children from kindergarten through the early school years, found that popularity in first grade positively predicted cooperative participation within classrooms (an indicator of socially appropriate behaviors) and school liking. Thus, another goal of this study was to examine the potential transactional relations between peer likability and children's socially appropriate behavior in a sample of preschool children.

The Mediating Role of Socially Appropriate Behavior

Children's abilities to read others' emotions are thought to play an important role on their social behavior. In turn, children's socially appropriate behaviors (e.g., helping, cooperating) may predict peer likability. Few investigators have considered these mediational processes over time. As an exception, Mostow and colleagues (2002), in a sample of first and second graders, tested the role of social skills (i.e., cooperation, making friends, inviting peer to join in, and self-control) in the relations of children's global emotion knowledge to peer likability from fall to spring of the same academic year. The authors found that children's general emotion knowledge was positively linked to later social skills and indirectly associated with later peer likability. Bidirectional relations between Time 1 (T1) social skills and Time 2 (T2) emotion knowledge were not found. These results suggest that children who are better able to understand emotions within classrooms may display high levels of social skills and subsequently form positive interpersonal relationships (e.g., Ensor & Hughes, 2005).

However, to our knowledge, researchers have not focused their attention on separate components of emotion knowledge (i.e., emotion recognition, situation knowledge) in relation to socially appropriate behavior and peer likability during the preschool years. In the present study, we examined the mediational role of children's socially appropriate behavior from each component of emotion knowledge to peer likability in a sample of Italian children assessed at two time-points (1 year apart). In the Italian educational context (and in similar educational settings), it may be especially useful to understand children's peer likability because Italian preschoolers, compared to American children, generally follow a continuity of care program so that children interact with the same teachers and peers for up to 3 years (Sette, Baumgartner, & Schneider, 2014). Understanding the processes that lead to children's success in peer relationships can help teachers to promote children's socially appropriate behaviors and harmonious peer relationships. Therefore, teachers may contribute to the creation of a positive and warm classroom atmosphere (Gower et al., 2014).

The Present Study

The present study had three main goals. First, we were interested in examining if each of the two components of emotion knowledge (i.e., emotion recognition, situation knowledge) would differentially predict preschoolers' socially appropriate behavior across one year. We expected T1 emotion recognition and situation knowledge to be positively related to T2

children's socially appropriate behavior. Because the identification of facial expressions appears to precede situation knowledge and may be particularly relevant in the preschool classroom (where children may express frequent, variable, and intense emotions relative to older school-aged children), we predicted that emotion recognition (as opposed to situation knowledge) might be more strongly related to socially appropriate behavior in this age group than would situation knowledge. Second, we tested whether children's socially appropriate behavior mediated the relation between emotion knowledge components and peer likability. We expected, even after controlling for the stability of variables over time, that socially appropriate behavior would be a significant mediator in the relation between emotion knowledge components and peer likability. Our final goal was to examine potential bidirectional relations among the constructs. It is possible that early socially appropriate behavior would predict later emotion knowledge components and/or that earlier peer likability would predict children's later socially appropriate behavior.

Method

Participants

Participants were a part of a larger research project aimed to understand children's social adjustment. For the present study, in the initial year of data collection (T1), the participants were 88 Italian children (46 boys and 42 girls), ranging from 41 to 77 months of age ($M = 58.65$ months, $SD = 11.09$), enrolled in four classes in a preschool of Rome. All children in each class participated at T1. Lead teachers (one for each class) were all female, having from 21 to 25 years of teaching experience. At T2, one year later, a subsample of the children (those who remained at the same school) were assessed. This subsample consisted of 48 children (26 boys and 22 girls), ranging in age from 53 to 82 months ($M = 62.67$ months, $SD = 6.76$). Children who were new to the classroom/school were not included in the study. Children came from middle or upper-middle socioeconomic status families, and informed parental consent was obtained at T1 for all participating children.

Attrition Analysis

The attrition (45% of children) was mainly due to the unavailability of children because they transferred to primary schools in different urban areas of Rome. SPSS 21 was used to test the pattern of missingness using Little's test (1988) for missing completely at random (MCAR, in which the missingness is unrelated to both observed and unobserved variables in the model). The test was statistically significant, indicating that the variables in our analysis did not meet the strict assumption of MCAR, $\chi^2(11) = 59.667$, $p < .001$. *T*-tests comparing children who attrited from those who remained in the study indicated that children who attrited were older, displayed higher T1 socially appropriate behavior, and scored higher on T1 emotion recognition and situation knowledge than those who stayed in the study for both assessments, $t(83, 83, 75, 80) = -12, -2.5, -3.8$, and -3.0 , $ps < .001, .01, .01$, and $.01$, respectively. Hence, as recommended by Enders (2010), the inclusion of age, socially appropriate behavior, emotion recognition, and situation knowledge at T1 allowed us to control for the missingness, suggesting that at least missing at random (MAR; the missingness of one variable is dependent on one or more observed variables in the analysis) could be supported (see also Tabachnick & Fidell, 2007). To account for missing data, we

used Full Information Maximum-likelihood (FIML) estimation of the parameters in Mplus 5.1 (Muthén & Muthén, 2007). FIML has been found to produce reliable estimates of missing data under ignorable missing data pattern such as MAR (see Baraldi & Enders, 2010; Enders, 2010).

Procedures

In the current study, we focused on children who were 3-6 years of age at T1. After obtaining consent from parents, lead teachers completed an evaluation scale of children's socially appropriate behavior during the Spring of T1 and T2. The scale took approximately 10 minutes to complete. Teachers were not paid for their efforts. In addition, children, after having expressed their assent to participating in the study, completed the emotion knowledge and sociometric procedures. The tasks were conducted individually for each child in a quiet room made available by the school. Each child's evaluation session (i.e., both emotion knowledge and sociometric tasks) lasted 40-45 minutes (approximately, 25 minutes for the emotion knowledge task and 15 minutes for the sociometric task), which included time for the examiner to establish rapport with the child (approximately 5 minutes). Children did not receive a prize for participation. In both T1 and T2, the same procedure was used.

Measures

Emotion knowledge: The Affective Knowledge Test (AKT)—Children's recognition of emotion was evaluated using the AKT measure (Denham, 1986; for the Italian translation, see Camodeca & Coppola, 2010). For the emotion recognition session of the measure (8 items), children were asked to name four basic emotions from drawings of faces depicting happy, sad, angry, and afraid facial expressions (labeled expressive knowledge) and to identify each face nonverbally, by pointing (labeled receptive knowledge). For the stereotypical situation knowledge session, children were asked to make inferences in 8 vignettes that described an emotional situation (e.g., “feeling angry when one's tower was destroyed”). Responses were coded as correct (2 points), correct valence only (1 point), or incorrect (0 points). Average scores for recognition knowledge (i.e., expressive and receptive knowledge) and stereotypical situations knowledge were computed. As a measure of reliability, we computed omega values within a confirmatory factor analysis framework (see measurement invariance section). Omega values were acceptable for T1 emotion recognition, T1 stereotypical situation knowledge, and T2 stereotypical situation knowledge ($\omega_s = .69, .76$, and $.69$, respectively). These estimates are comparable to alpha values (see Zinbarg, Revelle, Yovel, & Li, 2005) reported in previous studies with U.S. samples (e.g., Bassett et al., 2012; Denham et al., 2002). However, because the emotion recognition at T2 showed a ceiling effect ($M = 1.90$, $SD = 0.11$), it was not used in further analyses.

Children's socially appropriate behavior—The Social Competence and Behavior Evaluation scale (SCBE-30; LaFreniere & Dumas, 1996), which was originally created for children 30–78 months old, was completed by teachers to assess children's social behavior. The 30-item scale is rated on a 6-point Likert-type scale resulting in three subscales that assess children's Social Competence, Anxiety-Withdrawal, and Anger-Aggression. In the current study, only the Social Competence subscale (defined as socially appropriate behaviors) was used. This 10-item subscale includes items that assess positive social

interactions (e.g., accept compromises, works easily in groups) and prosocial behavior/empathy (e.g., shares toys, comforts other children). The scores from the items were averaged, α s = .81 and .85 for T1 and T2, respectively. This scale has been previously used in the Italian context, with good psychometric properties (Pecora, Sette, Baumgartner, Laghi, & Spinrad, 2015).

Peer-rated likability—At T1 and T2, peer likability was evaluated using a sociometric procedure (Asher, Singleton, Tinsley, & Hymel, 1979). First, each child was shown individual pictures of his or her classmates and asked to name about 10 of them to confirm recognition of the classmates. Then, children were asked to sort pictures of their classmates into one of three boxes identified by a sad face (“children you don't like to play with”), a neutral face (“children you ‘kind of’ like to play with”), and a happy face (“children you like to play with a lot”). A score of 1 (disliked), 2 (neutral), and 3 (liked) was assigned for each child scored. Peer likability was assessed with an average score, and the scores were standardized within each class.

Analytic Strategy

We first computed descriptive and correlational analyses. Next, we tested the measurement invariance of scales used at both time-points (i.e., situation knowledge and socially appropriate behavior). Finally, we computed a two-wave Autoregressive Cross-lagged (ARC) model with maximum-likelihood estimation of the parameters (see Zuffianò et al., 2014, for a similar approach). A two-wave ARC mediational model is superior to the T1 only model in that it (a) allows to better understand the direction of causal influence among variables, (b) enables for more stringent testing of alternative models, and (c) controls for the stability of variables over time (see Cole & Maxwell, 2003; Maxwell & Cole, 2007).

In the ARC model, we estimated the autoregressive paths (or the stability over time) of the variables of interest (i.e., paths from T1 situation knowledge to T2 situation knowledge, from T1 socially appropriate behavior to T2 socially appropriate behavior, and from T1 peer likability to T2 peer likability) and the across-time paths from: (1) T1 emotion recognition to T2 situation knowledge in lieu of an autoregressive path for emotion recognition; (2) T1 emotion recognition to T2 socially appropriate behavior; (3) T1 situation knowledge to T2 socially appropriate behavior; (4) T1 emotion recognition to T2 peer likability; (5) T1 situation knowledge to T2 peer likability; and (6) T1 socially appropriate behavior to T2 peer likability. In the same ARC model, we tested the correlations among the variables within T1 and within T2 (Cole & Maxwell, 2003). To account for age and child sex, we added direct paths from children's age and sex to all variables.

To formally test the mediational effect of children's socially appropriate behavior from emotion knowledge (i.e., emotion recognition and situation knowledge) to peer likability, the asymmetric confidence limits for the distribution of product outlined by MacKinnon, Lockwood, Hoffman, West, and Sheets (2002) were used. The upper and lower values for the 95% confidence limits (CI) of the indirect effect were calculated using the Rmediation package, which generates asymmetric confidence intervals for indirect effect according to the distribution of the product method (Tofighi & MacKinnon, 2011).

Finally, bidirectional paths were added individually to the model: (a) from T1 peer likability to T2 socially appropriate behavior; (b) from T1 peer likability to T2 situation knowledge; and (c) from T1 socially appropriate behavior to T2 situation knowledge. In order to establish the best fitting model, the chi-square difference test for nested models was used.

According to a multi-faceted approach to the assessment of model's fit (Tanaka, 1993) and to the sensitiveness of χ^2 statistic to sample size that easily produces a statistically significant result (Kline, 2010), we used the comparative fit index (CFI), the root mean square error of approximation (RMSEA) with 90% confidence interval (CI), and the standardized root-mean-square residual (SRMR). We considered CFI values greater than .90 (Bollen, 1989), RMSEA values less than .07 (Browne & Cudeck, 1993), and SRMR values less than .08 (Kelloway, 1998) as evidence of acceptable model fit. As discussed above, FIML was used as a method for handling missing data in Mplus 5.1 (Baraldi & Enders, 2010; Enders, 2010).

Results

Descriptive Analyses

Preliminary analyses revealed no univariate outliers. The skewness and kurtosis indices for all study variables were judged sufficient to meet the assumptions for the analyses (i.e., values less than |2| for univariate skewness and |7| for univariate kurtosis; Curran, West, & Finch, 1996). Correlations among the variables are presented in Table 1. T1 emotion recognition was positively associated with T1 situation knowledge, T1 socially appropriate behavior, T2 situation knowledge, and T2 socially appropriate behavior. Further, T1 socially appropriate behavior was positively associated with T2 socially appropriate behavior and T1 and T2 peer likability. Children's age was significantly positively related to T1 emotion recognition and T1 situation knowledge. Child sex was not significantly related to any of the study variables.

Measurement Invariance

Before analyzing the longitudinal relations between emotion recognition, situation knowledge, socially appropriate behavior, and peer likability, we analyzed the longitudinal invariance of each scale across time. The longitudinal configural invariance (i.e., the same pattern of fixed and free factor loadings across the two time-points) was compared, using the chi-square difference test (i.e., χ^2), with the longitudinal metric invariance (i.e., the same factor loadings for items were specified across the two time-points). For each scale, latent constructs were defined using item parcels (or the average of a set of items) because they are preferred especially with a small sample size (see Little, Cunningham, Shahar, & Widaman, 2002). For both situation knowledge and socially appropriate behavior, the difference in overall chi-square between the longitudinal configural invariance [i.e., situation knowledge, $\chi^2(15) = 18.113$, $p = .26$, CFI = .97, RMSEA = .05 (90% CI = .001- .118), $p = .46$, SRMR = .07; socially appropriate behavior, $\chi^2(27) = 46.124$, $p = .01$, CFI = .93, RMSEA = .09 (90% CI = .042 - .134), $p = .08$, SRMR = .09] and the longitudinal metric invariance produced a significant increase in the chi square (i.e., situation knowledge, $\chi^2(3) = 10.134$, $p = .02$; socially appropriate behavior, $\chi^2(4) = 9.608$, $p = .05$). To obtain partial metric invariance, one item parcel for each scale was freely estimated. Then, the longitudinal partial

metric invariance was not significantly different from the longitudinal configural invariance (i.e., situation knowledge, $\chi^2(2) = 5.388, p = .07$; socially appropriate behavior, $\chi^2(3) = 7.023, p = .07$). Thus, for situation knowledge and socially appropriate behavior, we found a partial metric invariance of the factor loadings of the items across the two time-points (for more details, see Millsap, 2011).

Longitudinal Relations of Emotion Recognition, Situation Knowledge, and Socially Appropriate Behavior to Peer Likability

First, we tested a model in which only the stability of variables across time was estimated, $\chi^2(9) = 21.353, p = .01$, CFI = .88, RMSEA = .13 (90% CI = .056- .194), $p = .04$, SRMR = .10. Then, we computed a full cross-lagged path model in which the hypothesized across-time paths were estimated (see Figure 1), $\chi^2(3) = 3.507, p = .32$, CFI = 1.00, RMSEA = .04 (90% CI = .001- .190), $p = .42$, SRMR = .03. The addition of the cross-lagged paths significantly improved the fit of the model ($\chi^2(6) = 17.846, p = .01$). Specifically, the model indicated that T1 emotion recognition predicted T2 situation knowledge and T2 socially appropriate behavior, but T1 situation knowledge did not predict T2 socially appropriate behavior. Furthermore, T1 socially appropriate behavior predicted T2 peer likability. Children's age was significantly associated with T1 emotion recognition, T1 and T2 situation knowledge, and T2 socially appropriate behavior. In the model, children's sex (favoring girls) was only related to T2 socially appropriate behavior. The model showed evidence of stability of situation knowledge and socially appropriate behavior but not peer likability. In terms of within time correlations, T1 emotion recognition was positively related to situation knowledge and children's socially appropriate behavior. Children's socially appropriate behavior was associated with peer likability. Overall, the variance explained (R^2) by the model was .50, .48, and .14 for T2 situation knowledge, T2 socially appropriate behavior, and T2 peer likability, respectively.

The Mediation of Socially Appropriate Behavior between Emotion Recognition to Peer Likability

We estimated mediated effects by using the product between the unstandardized cross-lagged regression coefficients of emotion recognition at T1 on socially appropriate behavior at T2 (path *a*) and socially appropriate behavior at T1 on peer likability at T2 (path *b*) as recommended by Cole and Maxwell (2003; Maxwell & Cole, 2007). The unstandardized mediated effect (95% CI = .01 – .27) using the Rmediation package was statistically significant (the 95% asymmetric lower and upper CI limits did not include zero), highlighting the role of socially appropriate behavior in mediating the effect of emotion recognition on peer likability.

The Bidirectional Paths between Peer Likability, Socially Appropriate Behavior, and Situation Knowledge

None of the additional bidirectional paths was significant. Moreover, the addition of these bidirectional paths did not significantly improve the fit of the model ($a = \chi^2(1) = 0.74, p = .39$; $b = \chi^2(1) = 0.12, p = .73$; $c = \chi^2(1) = 2.72, p = .10$).

Discussion

Researchers have argued that it is critical to study the processes that lead to success in peer relationships in the early years because high quality peer relationships represent a crucial developmental achievement (Bandon et al., 2010; Denham, Bassett, Thayer et al., 2012; Gower et al., 2014; McCabe & Altamura, 2011). The main goal of this study was to investigate how distinct emotion knowledge components and children's socially appropriate behaviors were associated with peer likability over 1 year in a sample of Italian preschool children. We expected that children's socially appropriate behavior mediated the relation between the multi-dimensional construct of emotion knowledge and peer likability.

In the present study, one of our contributions was to differentiate between components of emotion knowledge (i.e., emotion recognition, situation knowledge). Our longitudinal findings showed that only early emotion recognition was positively related to children's socially appropriate behaviors one year later. The ability to recognize emotions (expressive and receptive knowledge) contributes to socially appropriate behavior likely because children who can identify facial expressions of emotion are able to interpret another's cues and subsequently appropriately respond to others' needs (Parker, Mathis, & Kupersmidt, 2013). Conversely, children who do not correctly read others' facial expressions have been shown to be at risk for withdrawn behavior (Heinze et al., 2015) and aggressive problems (Alonso et al., 2012). Although unexpected, children's ability to infer others' emotions from situational cues was unrelated to socially appropriate behavior in our sample. That is, whereas being able to identify facial emotional expressions predicted socially appropriate behavior over time, the ability to understand the causes of particular emotions (e.g., fear in response to seeing an unfriendly dog) did not. Perhaps this ability is somewhat abstract (and underdeveloped) in preschool-aged children. Further, as suggested by social information processing theory, preschool children need to recognize others' emotions in the moment (e.g., if the peer is afraid) to identify possible social interactions and to decide how to respond (see also Widen & Russell, 2010). As children develop, the ability to identify the causes and consequences of others' emotions (e.g., the peer is afraid because s/he is alone in a dark room) may be used to respond to the peers' emotions or prevent future negative emotions (play with the lights on). Our results support the view that the two related skills of emotion knowledge are differentially associated with socially appropriate behavior and peer likability. Because the two components of emotion knowledge have different developmental trends and correlates, researchers should investigate when and under what circumstances situation knowledge may predict children's social behavior. For example, as children develop, situational knowledge may carry more weight in predicting children's social behaviors. Also, the link between emotion knowledge and children's social behavior may be moderated by children's sex. In a recent study, Heinze and colleagues (2015) found that young children's emotion recognition predicted low loneliness for boys, whereas situation knowledge predicted relatively low internalizing symptoms for girls and negative peer nominations for boys. Thus, it is important to consider the role of child sex in understanding the relations of emotion recognition and situation knowledge to children's social and emotional outcomes in other preschool samples.

As was found in prior concurrent work with the same sample, we found a significant relation between socially appropriate behavior and peer likability at T1 (Sette et al., 2013). A unique finding for this longitudinal study (in addition to the inclusion of emotion knowledge components) was that children's capacity to cooperate, to help others, and to initiate and maintain social relationships at T1 was positively related to peer likability a year later, even after controlling for stability in peer likability. These results are particularly important in the Italian educational context (and in other contexts with similar characteristics) because children generally maintain relationships with the same peers over the course of preschool. Therefore, interventions might focus on designing programs to improve socially appropriate behaviors, and, in turn, children's success in peer relationships across three years of preschool.

Consistent with our predictions, children's socially appropriate behavior mediated the relation between emotion recognition and peer likability using two time-points. Although other researchers have shown the importance of socially appropriate behavior as mediator in the link between emotion knowledge and peer likability (Mostow et al., 2002), our study is unique in its focus on preschool-aged children and by “unpacking” emotion knowledge by considering emotion recognition and situation knowledge separately.

Bidirectional relations among constructs across the year also were investigated in the present study. Consistent with findings by Mostow et al. (2002), our results showed that the associations between emotion recognition, socially appropriate behavior, and peer likability were primarily unidirectional in preschool children. Accordingly, children who display high levels of emotion knowledge are better able to decode peers' emotional cues, and such emotional skill is associated with socially appropriate behaviors (Brownell, Svetlova, Anderson, Nichols, & Drummond, 2013; Brownell, Svetlova, & Nichols, 2009; Eisenberg, Spinrad, & Knafo, 2015). However, even though we did not find significant bidirectional relations, more research should be conducted in order to better investigate the longitudinal associations among constructs in other preschool-aged samples.

We also tested the stability among the study variables, except for recognition knowledge because it showed a ceiling effect at T2. Specifically, we found substantial stability with respect to situation knowledge and socially appropriate behavior across 1 year. These results are consistent with research in both the U.S. and Europe across three-, four-, and five- year-old children (Shin et al., 2011; Santos, Vaughn, Perceguina, João, & Shin, 2014). On the other hand, we did not find stability in peer likability across 1 year. One possible explanation for this instability may be because the group of peers differed from one year to the next, even though more than half of children remained in the same class from T1 to T2. Indeed, older children at T1 dispersed to many different primary schools at T2, and new classmates entered from one year to the next in each class. Our findings suggest that group contextual factors may be important to understand the stability/instability of children's sociometric status (Cillessen, Bukowski, & Haselager, 2000).

The present study has several strengths. First, we considered the mediating role of socially appropriate behavior in the association between children's emotion knowledge and peer likability in Italy, an educational context in which teachers and peers are generally

unchanged during the three years of preschool. Next, we examined emotion knowledge as a multi-dimensional construct composed by two separate dimensions of emotion recognition and situation knowledge. We also included multi-method data, including emotion knowledge interviews with children, teachers' reports, and peers' sociometric data. Finally, we considered a two-wave ARC model in which the stability and directionality among constructs were tested.

Despite these strengths, this study has several limitations. First, although we assumed that our missing data were MAR, we recognize that is not possible to test the MAR assumption that the probability of missingness on a variable Y is only a function of the other variables of the model, and not of the variable Y itself (Enders, 2010). However, as suggested by Barardi and Enders (2010), FIML, compared to traditional techniques such as single-imputation method, provides better estimates of missing data even when the data are missing not at random (MNAR). In addition, although our sample size was adequate to identify sufficient power as suggested by G-Power 3.1 (a sample size of 43 subjects was considered satisfactory to identify a medium effect size of Cohen's $f^2 = .15$) and we controlled for children's age (a variable related to missingness), we encourage the replication of our findings in studies with higher retention rates and larger samples. Moreover, because we observed a ceiling effect on children's emotion recognition at T2, its stability was not tested over 1 year. In order to investigate the stability and impact of recognition knowledge over time, longitudinal works with younger children need to be conducted. In addition, future cross-cultural studies should be conducted in order to understand the development of children's emotion knowledge across different cultures. Specifically, emotion situations may be interpreted differently depending on the culture (Morgan et al., 2010). Another important limitation was that the age ranges differed across the two time-points considered. There was more variability in age at T1 than at T2 because older children moved to primary schools. This restricted range in age at T2 may have impacted our results. Finally, we did not focus on other individual characteristics (i.e., temperament, verbal ability) that might contribute to children's emotion knowledge components. For example, Fine et al. (2006) found that children who display higher levels of intense negative reactions may have more difficulty in interpreting the emotions of others based on situational cues. Also, Morgan et al. (2010) found that children's verbal ability was positively associated with emotion recognition and situation knowledge. Thus, future researchers should consider these additional potential predictors.

In the present study, children's emotion recognition and socially appropriate behavior played an important role in the prediction of peer likability in preschool children. Results of this study suggest that parents and teachers should work to promote and improve children's socially appropriate behaviors and emotion knowledge components. These results could be particularly important in the Italian educational context (and in other similar contexts) where a sense of belonging and emotional connectedness in relationships is prevalent. Italian teacher training should focus on improving children's early emotion knowledge, because such skills appear to play an important role in developing children's socially appropriate behavior and success in peer relationships across time. Further, such interventions may also have effects on later academic and behavioral outcomes (Nix, Bierman, Domitrovich, & Gill, 2013).

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Figure 1.

Longitudinal associations from emotion recognition, situation knowledge, and socially appropriate behavior to peer likability

Note. Standardized path coefficients for the two-wave Autoregressive Cross-lagged (ARC) path model were reported ($N = 88$).

Confidence intervals (95%) for standardized parameters were reported in parenthesis.

Nonsignificant paths are represented by dashed lines. The mediated effect is shown in bold.

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

Table 1

Descriptive statistics and correlations among study variables

Variable	1	2	3	4	5	6	7	8	9
1. Time 1 Age (in months)	–								
2. Child sex	.01	–							
3. Time 1 Emotion Recognition	.35**	.05	–						
4. Time 1 Situation Knowledge	.36**	.13	.57**	–					
5. Time 1 Socially Appropriate Behavior	.19	.13	.34**	.16	–				
6. Time 1 Peer likability	.20	–.05	.16	.05	.40**	–			
7. Time 2 Situation Knowledge	.14	.12	.45**	.49**	.27	.02	–		
8. Time 2 Socially Appropriate Behavior	.11	.26	.42**	.11	.41**	.19	.18	–	
9. Time 2 Peer likability	–.19	.09	.22	.04	.43**	.21	.29*	.13	–
Mean	58.65	–	1.78	1.51	4.02	2.11	1.70	4.18	1.98
Standard Deviation	11.09	–	0.25	0.35	0.80	0.25	0.30	0.96	0.24

Note. The sample size was $n = 88$ for Time 1 and $n = 48$ for Time 2. Sex (0 = boys; 1 = girls). Emotion recognition and situation knowledge at Time 1 and Time 2 ranged from 0 to 2 while socially appropriate behavior at Time 1 and Time 2 ranged from 1 to 6. For peer likability, we reported the unstandardized mean score for ease of interpretation. For all variables, higher scores indicate more of that quality.

* $p < .05$.

** $p < .01$.