



Social cognition in preschoolers: effect of early experience and individual differences

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Abstract:

Social cognition is the way in which people process, remember and use information in social contexts to explain and predict people's behaviour (Fiske & Taylor, 2013). Several dimensions external and internal to the child can influence children's social cognition. This study aims at analysing the effect of early type of care (0-3 years of age), gender, migrant status and maternal education on the social cognition of 118 Italian preschoolers. All the measures were not parent- or teacher-reported, but assessed through direct observation of the children. Type of care in early infancy, migrant status and gender did not show a direct effect on social cognition, whereas maternal education showed a direct effect. Maternal education effect interacted with type of care, migrant status and gender.

Keywords: Theory of Mind, Emotion Understanding, IQ, language, maternal education

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1. Introduction

Social cognition is the way in which people process, remember and use information in social contexts to explain and predict people's behaviour (Fiske & Taylor, 2013). In the current study, two aspects of social cognition are considered: Theory of Mind (ToM) and Emotion Understanding (EU). Theory of Mind (ToM) refers to the attribution of mental states (belief, desires, intentions, intentions, etc.) to oneself and others, and to the ability to use these attributions to understand, predict and explain one's own behaviour and that of other people (Mitchell, 1997). EU is one component of social cognition and emotional competence, and refers to the way in which persons understand, predict and explain their own and others' emotions (Dehnam, 1998; Harris, 1989; Saarni, 1999). ToM and EU are partly correlated (Cutting & Dunn, 1999).

Several dimensions external and internal to the child can influence children's ToM, EU and their development: among them type of care, parents' migrant status, maternal education, and gender.

1.1. Type of early childcare

In early childhood, toddlers receive two main types of care: centre-based and home-based. In centre-based care, children experience living in a group setting with adults and peers, and routines, spaces and toys are organized for a group of children and adults living together; moreover, the adults taking care of them are trained professionals. In home-based arrangements, children are more likely to be alone with adults or to share routines and toys with a very small number of other children, usually younger or older siblings. In these informal settings, caretakers are usually mothers, grandparents or non-professional baby-sitters (for a wider discussion, see Bulgarelli & Molina, 2016).

The literature emphasizes that type of care is associated with children's later development, reporting positive effect of centre-based care on cognitive and linguistic outcomes (Belsky et al., 2007; Broberg et al., 1997; Hansen, & Hawkes, 2009; Loeb et al., 2007; Magnuson et al., 2007; NICHD ECCRN, 2002; 2004; 2006; Sylva et al., 2004).

To our knowledge, no studies so far related social cognition in preschool age and type of care during early infancy. In respect to a more general social behaviour, centre-based care appeared to be related to teacher-report externalizing problems in preschool and school age (NICHD, 2002, 2005). A study on Canadian families revealed a general protective role of maternal care in the first year of life compared to nonmaternal care (care by relatives, non-relatives, day care centres, etc.): parent-reported physical aggression and emotional problems

at 4 years of age were lower in children from low-risk families who had been in maternal care (Côté, Borge, Geoffroy, Rutter & Tremblay, 2008). Coherently, in the US high quality centre-based care appeared to play a protective role on internalizing and externalizing behavior problem in preschoolers from low-income families (Votruba-Drzal, Coley & Chase-Lansdale, 2004).

1.2. Gender

Regarding ToM and EU, the majority of studies did not report gender differences (for instance, Bulgarelli, Testa & Molina, 2015; Renouf et al., 2010). When differences according to gender have been found (Mathieson & Banerjee, 2011; Wade, Browne, Madigan, Plamondon & Jenkins, 2014; Walker, 2005), usually girls appeared to be more precocious in false belief understanding than boys (Calero, Alejo Salles, Semelman & Sigman, 2013; Charman, Ruffman & Clements, 2002; Devine & Hughes, 2013; Hughes & Dunn, 1998). In several studies, the effect of families' characteristics and type of care interacted with gender. For instance, being a boy from high-risk family is associated with higher level of physical aggression (Côté et al., 2008); moreover, boys were more susceptible to both the protective effect of high-quality day care centres and to the detrimental effect of low-quality day care centres (Votruba-Drzal et al., 2004).

1.3. Migrant status

Social cognition is partly affected by cultural belonging (see for instance Molina, Bulgarelli, Henning & Aschersleben, 2014). Two cultural pathways to universal tasks of human development have been proposed: independence and individuation on the one hand, and interdependence and group membership on the other hand. These two dimensions co-exist in every culture, but cultures differ in the relative importance given to each of them (Greenfield, Keller, Fuligni, & Maynard, 2003; Suizzo, 2007). Individuals come into contact with their specific cultural orientation towards independence and interdependence facing multifaceted social interactions and experiences (Killen & Wainryb, 2000), shaping their socio-cognitive competences.

Not just a question of cultural belonging, migrant status is a condition with specific features related to entering a new social context: for example, separation from one's family, changes in economic status, negative stereotypes and discrimination, language barriers and higher levels of stress. Very often, the migrant condition combines with other variables that affect children's development, such as poverty status and dual language learning, whereby

children acquire both their parents' mother tongue and the language of the host country (De Feyters & Winsler, 2009; Winsler et al., 2014).

A Canadian study by Wade (2014) and colleagues showed that higher ToM performances at 5 years were predicted by female gender and language, but not by family income, migrant status or presence of siblings in the household.

Another study by the same group of research (Prime, Browne, Akbari, Wade, Madigan & Jenkins, 2015) showed that mother's communicative clarity and mind-reading (called cognitive sensitivity) were positively related to children's ToM at 5 years, receptive language and academic achievement in preschool age. This pattern of associations between mothers' cognitive sensitivity and children's outcomes was similar in both native and migrant dyads of mothers and children, suggesting that the underlying process was similar. Nevertheless, migrant status appeared to be a risk factor, because it was negatively associated to maternal cognitive sensitivity. Coherently with Prime and colleagues' results, U.S. immigrant mothers reported higher level of parenting stress than native mothers and stress predicted more aggressive behaviour in pre-school age children (Mistry, Biesanz, Chien, Howes & Benner, 2008).

1.4. Maternal education

Maternal education is the most robust sociodemographic predictor of mother and infant behaviour (Bornstein, Hahn, Suwalsky & Haynes, 2003; Mistry, Biesanz, Chien, Howes & Benner, 2008). Previous works showed that children's social-cognitive development is positively associated to parental education level (Cutting & Dunn, 1999; Perner, Ruffman & Leekam, 1994; Pons et al., 2003). Moreover, in the UK and the US, maternal education is positively associated with cognitive outcomes (NICHD HLB, 1998; NICHD ECCRN, 1997a; Peisner-Feinberg et al., 2001; Sammons et al., 2004). In Italy cognitive and linguistic competences are systematically related to maternal education as well (Bulgarelli & Molina, 2016).

2. The current study

The current study aims at analysing the effect of early type of care (0-3 years of age), gender and migrant status on the ToM and EU competences of a group of Italian pre-schoolers.

In a previous study run on preschool- and school-aged children, maternal education was shown to affect cognitive and linguistic outcomes, and type of care moderated this effect:

linguistic outcomes grew accordingly to maternal education in children involved in home-based care only, highlighting a protective role of centre-based care (Bulgarelli & Molina, 2016). In the current study, the effect of type of care, maternal education, parents' migrant status and gender on social cognition is deepened, controlling for cognitive and linguistic competences.

The presence of differences on ToM and EU due to gender, migrant status, maternal education and type of care will be verified. Maternal education is the only variable expected to affect ToM and EU. Then, the moderation effect of type of care on maternal education will be analysed.

This is a first investigation of this topic in the Italian context. Moreover, all the measures were not parent- or teacher-reported, but assessed through direct observation of the children.

3. Method

3.1. Sample

The sample comprised 118 typically developing children (average age = 59.6 months, range: 38.5 – 76.7 months; average IQ = 99.6, SD = 13.5), all of them attending kindergartens in Turin (Italy). Sixty-four children were girls (54.2%). A t-test analysis confirmed that the two subsamples of boys and girls were similar in respect to age ($p = .449$), IQ ($p = .174$), migrant status ($p = .650$), type of care in early infancy ($p = .530$) and maternal education ($p = .187$).

In respect to the type of care, in the first three years of life 54 children were involved in centre-based care (45.8%) and 64 children were in exclusive home-based care. Home-based care consisted in exclusive maternal care or in being looked after by other family members or babysitters. The data concerning the type of early care received in the first three years of life was collected retrospectively. A t-test analysis confirmed that the two subsamples of children in home-based care and centre-based care were similar in respect to age ($p = .852$), IQ ($p = .276$), gender ($p = .530$) and parent's origins ($p = .215$), but significantly differed by maternal education: highly educated mothers were more likely to choose for centre-based care ($p = .021$).

In respect to migrant status, 92 of the children had both Italian parents (77.9%); 14 had one foreign parent (11.9%) and 12 both foreign parents (10.2%). To run the analysis the groups of children with both native parents and with one native parents have been collapsed in

the group of non-migrant children, after having controlled that the two groups did not differ on the independent variables of the current study. A t-test analysis confirmed that the two subsamples of children with at least one native parents and the group of children with both foreign parents were similar in respect to age ($p = .433$), IQ ($p = .104$), gender ($p = .627$), type of care ($p = .402$) and maternal education ($p = .166$).

In respect to education, 53 mothers had a lower secondary school degree (44.9%), 52 had a upper secondary school degree (44.1%) and 13 completed higher education (11.0%). To run the analysis the groups of mothers with upper and higher educational level have been collapsed, after having controlled that the two groups did not differ on the independent variables of the current study. A t-test analysis confirmed that the two subsamples of children with low educated and high educated mothers were similar in respect to age ($p = .644$), gender ($p = .784$), type of care ($p = .116$) and migrant status ($p = .163$). IQ scores of children with high educated mothers were significantly higher than the scores of children with low educated mothers ($m_{LOW} = 96.98$, $m_{HIGH} = 101.78$, $t_{IQ} = -1.94$, $p = .055$).

Most of the children of the current study were also involved in the previous research by Bulgarelli & Molina (2016).

3.2. Measures and procedures

At three separate sessions within a month, the children were individually assessed at the kindergartens through three standardized tests: the Leiter-R (Roid & Miller, 1997; Italian version: 2002) was used to assess non-verbal IQ; the ToM Storybooks (Molina & Bulgarelli, 2012; Bulgarelli et al., 2015) was used to assess ToM and the Test of Emotion Comprehension (Albanese & Molina, 2008) to assess EU. The ToM Storybooks total score varied from 0 to 111. The TEC raw score varied from 0 to 9 and in this study the standardized z-score was used.

Parents were asked to complete a questionnaire on their socio-demographic background, which assessed both parent-related characteristics (place of birth, level of education) and child-related characteristics (birthplace, gender, type of childcare before 3 years of life).

For each child, parents' place of birth was coded as follows: (0) both parents native Italians, (1) one native Italian parent and one foreign-born parent and (2) both parents foreign-born. The migrant status was attributed to the child when both parents were foreign-born. To run the statistical analysis, children with both native parents and children with one native parents were collapsed in a single group.

Mothers' educational level was coded following the Italian school system: the label "lower secondary education" was assigned when subjects had attended at least 8 years of compulsory education; "upper secondary education" when they had attended about 13 years of school and "higher education" when they had attended at least 16 years of school/university, with bachelor's, master's and doctoral degrees collapsed together into a single category. To run the statistical analysis, children with upper educated mothers and children with higher educated mothers were collapsed in a single group.

3.3. Analysis

T-tests for small sample size were performed to control the presence of significant differences in the children's ToM and EU scores due to type of care, gender, migrant status and maternal education.

To investigate the presence of an interaction between type of care and maternal education, the t-test for the effect of maternal education on ToM and EU was performed separately on the children divided accordingly to type of care, gender, and migrant status.

4. Results

No effect on ToM and EU scores was due to type of care, gender and migrant status (Table 1). Children with high educated mothers had significantly high ToM and EU scores than children with low educated mothers (Table 1).

To investigate the presence of differences in the effect of maternal education, we analyse separately the different subgroups determinate by the other variables (type of care, gender and migrant status).

The effect of maternal education on ToM and EU was analysed in the two subgroups of children who were in centre-based care or in home-based care in early infancy. Type of care and maternal education interacted: ToM and EU scores significantly grew accordingly to maternal education in children in home-based care only (Table 2).

Table 1. Differences between groups in ToM and EU average scores (SD)

		N	ToM	t	p (two-tailed)	EU	t	p (two-tailed)
Type of care								
	Home-base	64	54.50 (12.73)			-.32 (1.03)		
	Centre-based	54	57.70 (17.55)	-1.12	.267	.04 (.98)	-1.94	.055
Gender								
	Girls	64	56.14 (16.59)			-.19 (1.04)		
	Boys	54	55.76 (13.38)	-.14	.892	-.11 (1.01)	.39	.696
Migrant status								
	Yes	12	49.92 (12.78)			-.53 (1.11)		
	No	106	56.65 (15.29)	-1.47	.145	-.11 (1.01)	-1.36	.177
Maternal education								
	Low	53	52.92 (13.32)			-.42 (1.06)		
	High	65	58.45 (16.16)	-2.00	.048	.06 (.94)	-2.60	.010

Table 2. Maternal education effect on ToM and EU average scores (SD) by type of care

Type of care	Maternal education	N	ToM	t	p (two-tailed)	EU	t	p (two-tailed)
Home-base	Low	33	50.85 (11.82)			-.59 (1.06)		
	High	31	58.89 (12.70)	-2.46	.017	-.03 (.94)	-2.22	.030
Centre-based	Low	20	56.35 (15.18)			-.14 (1.03)		
	High	34	58.50 (18.97)	-.43	.668	.15 (.95)	-1.03	.308

The effect of maternal education on ToM and EU was analysed in the two subgroups of children with migrant parents or native parents. Type of care and migrant status interacted: ToM and EU scores were significantly different accordingly to maternal education only in children with at least one native parent (Table 3).

Table 3. Maternal education effect on ToM and EU average scores (SD) by migrant status

Migrant status	Maternal education	N	ToM	t	p (two-tailed)	EU	t	p (two-tailed)
Yes	Low	6	48.50 (15.64)			-.71 (1.22)		
	High	6	51.33 (10.48)	-.37	.720	-.35 (1.07)	-.55	.597
No	Low	47	53.49 (13.08)			-.38 (1.05)		
	High	59	59.17 (16.52)	-1.98	.051	.10 (.93)	-2.53	.013

The effect of maternal education on ToM and EU was analysed in the two subgroups of girls and boys. Type of care and gender interacted: EU scores significantly grew accordingly to maternal education only in girls (Table 4).

Table 4. Maternal education effect on ToM and EU average scores (SD) by gender

Gender	Maternal education	N	ToM	<i>t</i>	<i>p</i> (two-tailed)	EU	<i>t</i>	<i>p</i> (two-tailed)
Boys	Low	25	53.28 (12.50)	-1.27	.209	-0.27 (1.03)	-1.06	.306
	High	29	57.90 (13.95)			.02 (.99)		
Girls	Low	28	52.61 (14.24)	-1.52	.134	-0.55 (1.09)	-2.60	.012
	High	36	58.89 (17.93)			.10 (.91)		

5. Discussion and conclusions

The aim of this study was to contribute to the debate about the effects of early childcare, gender and migrant status on children's outcomes as observed at pre-school age, by analysing preliminary Italian data. To our knowledge, this is the first study to investigate the role of type of care on social cognition.

Firstly, a direct effect of the independent variables was investigated. Type of care in early infancy, migrant status and gender did not show a direct effect on ToM and EU, whereas maternal education showed a direct effect. The literature reported potential detrimental effect of centre-based care on social behaviour, but this was not observed in respect to social cognition (ToM and EU). There is no consensus on the role of gender on the social cognition development; the current study supported the absence of direct effect of gender on social cognition. In the current study, migrant status did not affect children's outcomes, coherently with the Canadian study by Wade and colleagues (2014) and a previous study about cognitive outcomes run in Italy (Bulgarelli & Molina, 2016).

Maternal education appeared to be the only variable to directly affect children's outcomes during preschool age: in fact, ToM and EU scores grew accordingly to maternal education. The effect of maternal education on social cognition has been found in other studies (Cutting & Dunn, 1999; Perner, Ruffman & Leekam, 1994; Pons et al., 2003).

Secondly, possible interactions between the variables have been taken into account. Maternal education effect interacted with type of care, migrant status and gender.

ToM and EU scores of children who were in home-based care in early infancy were affected by maternal education, whereas this was not the case for children in centre-based care. Thus, professional care appeared to play a protective role for children with less educated mothers. It should be acknowledged that, in the current study, no information was collected concerning the quality of childcare facilities or parental styles, and our sample contained a relatively small number of children with university-educated mothers. It follows that the

results should be interpreted with caution. Nevertheless, these findings suggest a positive effect of centre-based care, which should be taken into account when designing policies for the inclusion of children whose parents are poorly educated.

Maternal education interacted with the children's gender and migrant status as well: EU scores differed by maternal education in girls only; ToM and EU scores differed by maternal education only in children with at least one native parent. Moreover, the ToM and EU scores of the children with both foreign parents were lower than the scores of mixed or native couples. In future studies, it would be important to deepen the possibility that these differences due to migrant status and gender could be mediated by the children's linguistic competence, that are related to the migrant status and to gender as well. Moreover, the pattern of effects observed in this study could be limited to preschool age and further investigation on older children are needed.

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