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Degree of Proximity in the Construction of Social Representations: The Case of Intelligence

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The present article is devoted to the empirical endeavor of studying the effect of the degree of proximity, defined by specific socio-educational insertions, on the organization of social representations of intelligence. A questionnaire was answered by a sample of 752 participants belonging to five different social categories with different degrees of proximity and knowledge about intelligence: mothers, fathers, mother-teachers and non-parent students (psychology and science students). The questionnaire included different topics, namely concerning the concept of intelligence, its development and the effectiveness of teaching procedures. Results show that the principles organizing the contents of representations are linked to the personal involvement in intelligence, on which subjects more or less implied take different positions. Results produced suggest, therefore, that the content of representations is directly linked to the activation of social roles and the salience of the object, reflecting the functional character that the organization of representations has to specific social dynamics.
Keywords: social representations, intelligence, degree of proximity.

El presente artículo está dedicado a la tarea empírica de estudiar el efecto del grado de proximidad, definido por las inserciones socio-educativas específicas, en la organización de las representaciones sociales de la inteligencia. Un cuestionario fue respondido por una muestra de 752 participantes pertenecientes a cinco categorías sociales diferentes, con diferentes grados de proximidad y conocimiento sobre inteligencia: madres, padres, madre-profesoras y estudiantes sin hijos (estudiantes de psicología y de ciencias). En el cuestionario se incluyeron temas diferentes, principalmente en lo que respecta al concepto de inteligencia, su desarrollo y la eficacia de los procedimientos de enseñanza. Los resultados muestran que los principios que organizan los contenidos de las representaciones están vinculados a la participación personal en relación con la inteligencia, en la cual individuos más o menos relacionados adquieren diferentes roles. Por lo tanto, los resultados obtenidos sugieren que el contenido de las representaciones está directamente conectado con la activación de los roles sociales y la relevancia del objeto, reflejando el carácter funcional que la organización de las representaciones tiene para las dinámicas sociales específicas.
Palabras clave: representaciones sociales, inteligencia, grado de proximidad.

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Social representations theory offers an alternative view to a number of notions traditionally employed in social psychology, such as attitudes (Eagly & Chaiken, 1993; Fishbein & Ajzen, 1975; Petty, Fazio, & Briñol, 2009) or beliefs (McGillicuddy-De Lisi & Sigel, 1995; Sigel, 1985). The peculiarity of social representations in respect to other concepts in social psychology has been investigated in the literature (Carugati, 1990a, 1990b; Miguel, Valentim, & Carugati, 2009). In general terms, the main and distinguishing feature of social representations is that they are first and foremost interested in the production of cultural meaning systems (Moscovici & Marková, 2000) and, therefore, are taken as a molar concept which offers a broader theoretical schema for understanding the complex phenomena of production and reproduction of knowledge, capturing a more social, cultural and collective emphasis (Augoustinos, Walker, & Donaghue, 2006; Howarth, 2006a; Voelklein & Howarth, 2005). Additionally, social representations deal with the forms of common sense knowledge that are built and organized by individuals and groups during the daily routines of their lives (Jovchelovitch, 2008; Moscovici & Hewstone, 1984). Based on the assertion that social representations are modes of thinking elaborated in the course of communication and shared by members of social groups (Moscovici, 1981), the theory is "conceived as capable of responding to the context and positioning of the person speaking" (Castro, 2006, p. 254), consequently relating social groups to social knowledge (Carugati, 1990b; Carugati & Selleri, 2004). In this sense, social representations cannot be conceived as mere descriptions of contents of knowledge but rather as forms of socio-cognitive ruling, principles that generate positions in accordance with specific positions within a set of social relations and organize the symbolic processes that take place within these relations (Clémence, 2001; Doise, 1990, 1992; Doise, Clémence, & Lorenzi-Cioldi, 1992).

Considering the organizing principles of symbolic relations between individuals and groups, Doise (1993) has defined the theory as basically "a general theory about a metasystem of social regulations intervening in the system of cognitive functioning" (p. 157). Following Doise et al. (1992) model for the quantitative analysis of social representations, three aspects of social representations are to be studied: the organization of the representational field, the organizing principles of interindividual differences and their anchoring in related systems of symbolic meanings. Concerning the representational field, the interest is to explore the nature of shared aspects of representations, based on the assumption that there is a shared perception of a social object within a population. Organizing principles correspond to systematic variations in the weight individuals or groups give to different dimensions underlying the structure of the field of representation. The last element of the proposed model is anchoring, which leads to the consideration of how social position or social identities anchor people's representations (Doise, 1985, 1993). Doise (1992) has described three ways of analyzing social anchoring. The psychological analysis corresponds to general beliefs and values which define individual positioning. Psychosociological analysis of anchoring is linked to the way people perceive symbolic organization of positions, relations, and social categories. Lastly, the sociological analysis refers to the belonging of individuals to groups and to their shared social relations and experiences.

From this dynamic approach, Mugny and Carugati (1985) have shown, on their seminal work on social representations of intelligence and its development, that psychosocial variables such as the shortage of information regarding the object of representation, the (un)familiarity with that object, the necessity of decision making and the maintenance of a positive social identity organize representations of intelligence. This study is an interesting example of how different symbolic positions are anchored on specific socio-cognitive dynamics, which depend on the social positions that individuals occupy in the social space. More precisely, it has been shown that social identity steers the socio-cognitive management of the relative inexplicability of intelligence, leading specific representations to be produced by social categories for whom intelligence is a salient part of everyday experience and for whom it constitutes a significant part of their identity, namely parents and teachers. Further studies have provided empirical support to the fact that individuals are led to modulate the opinions they express in relation to intelligence when different group memberships are salient (Amaral, 1997; Poeschl, 1998, 2001; Räty & Snellman, 1995; Räty, Snellman, & Vornanen, 1993).

Additional evidence of this view is provided by some other studies, which show that the transformation of social representations are affected by several psychosocial factors such as personal involvement and distance to the object of representation. Whereas personal involvement can be conceived as a subjective and socially determined frame of reference that corresponds to an individual's relationship to a social object (Gruev-Vintila & Rouquette, 2007), distance to the object is defined by specific practices, knowledge level and personal implication concerning the object of representation (Abric, 2001a). Additionally, research has also shown that representations develop in a process directly related to the level of knowledge available to the subjects (Lo Monaco & Guimelli, 2008), which can assume different degrees depending on its source of origin: description knowledge, direct experience with the object and knowledge acquired by limited or intensive practices with the object (Salesses, 2005a, 2005b). Altogether, research has shown how different psychosocial factors are important mechanisms generating variations in the content of the representation. These psychosocial factors are, therefore, considered major explaining variables in social thought, which help to explain how the activation of social dynamics linked to the varying degrees of proximity that the social object implies is found to modify the formation and structure of a representation

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(Carugati, Emiliani, & Molinari, 1989; Carugati & Selleri, 2004; Carugati, Selleri, & Scappini, 1994; Dany & Abric, 2007; Emiliani & Molinari, 1994; Gurrieri, Wolter, & Sorribas, 2007; Molinari & Speltini, 1998).

That structure is, therefore, related to the instrumentality of knowledge (Jovchelovitch, 2007), reflecting the fact that the organization of representations is functional for specific social dynamics. Bearing on this assertion, in this paper we intend to study the relevance of specific social dynamics capable of intervening and shaping different representational maps. For this reason, the degree of proximity – closer or more distant – (Molinari & Speltini, 1998) to the object of intelligence is explored. The degree of proximity was defined by the combination of two elements: *direct experience* with the object of intelligence and its *affective salience*. Direct experience is conceived as the more or less daily experience of differences of intelligence between individuals, which constitute a sort of "hard core" (Abric, 1997a, 2001a) around which various social representations of intelligence are constructed (Mugny & Carugati, 1985). In terms of intelligence, the recognition of the differences is visible and immediately accessible to perception and, in the end, requires no analyzing. For example, no formal investigation would be needed to point up the enormous disparity in academic achievement: often pupils attending different schools, reputedly of different intellectual levels, will nevertheless achieve the same results; on the other hand, within the same school or class, the level of results varies a great deal from one pupil to another. Affective salience concerning the object is conceived in terms of personal involvement and responsibility towards the development of intelligence and decision making in educational matters, which may affect children's educational career. Drawing from their different social integrations, different subjects may experience more or less affective involvement towards intelligence, which may stem from the need to cope with diverse and possibly demanding requirements related to their educational role. In terms of representations of intelligence, distinct social groups are differently predisposed to focus on interindividual differences of intelligence as part of their daily lives, or to be personally implied and concerned with them, as a result of their social insertions. Research has focused on parents and/or teachers as the social groups most preoccupied with the issue, often comparing their representations with those of other groups who should be less concerned with it (such as non-parents or students), due to their lower level of both direct experience and affective salience (Amaral, 1997; Carugati et al., 1989; Carugati & Selleri, 2004; Carugati et al., 1994; Matteucci, 2007; Miguel, Valentim, & Carugati, 2010; Mugny & Carugati, 1985).

Hypotheses

As suggested by the organizing principles approach to the study of social representations (Doise, 1992; Doise et al., 1992) and supported by previous research (Molinari & Speltini, 1998; Spini & Doise, 1998; Wagner, Valencia, & Elejabarrieta, 1996), the general hypothesis of the present study implies that subjects occupying different degrees of proximity to the object of representation will display different representational organizations. More specifically, the following hypotheses were advanced: the different categories of participants – who present different degrees of proximity to the object, stemming from their several socio-educational positions – present different representations concerning the concept of intelligence (H1), the development of intelligence (H2) and the effectiveness of teaching procedures (H3).

Method

Participants

In the present study, a systematic sampling of contrasting populations was selected to test the hypotheses mentioned above. Following previous research (Amaral, 1997; Carugati et al., 1989; Emiliani & Molinari, 1994; Faria & Fontaine, 1993; Molinari & Speltini, 1998; Mugny & Carugati, 1985; Raty et al., 1993), participants were identified in terms of the direct experience and affective salience that intelligence was supposed to have for them, therefore grounding different levels of proximity to the object. The groups of participants in the study formed five distinct categories:

Mothers of school-aged children – participants to whom intelligence is a relevant part of their everyday lives and constitutes a significant part of their identity, therefore presenting a very high degree of proximity and involvement to the object (high experience, high salience);

Fathers of school-aged children – participants to whom intelligence is a relevant part of their everyday lives, but to whom, due to the dominant cultural models that attribute a historically preponderant social value to maternity (Poeschl, 2000), intelligence may not carry the same kind of implications and conflict as participants with a motherhood status (high experience, moderate salience);

Mother-teachers – participants with a double educational role (as mothers and as teachers) and whose parental and professional identities imply a very high degree of proximity and affective involvement to matters relating to intelligence and its development (high experience, high salience);

Psychology university students – childless men and women with no parental responsabilities in child education and development of intelligence but that, due to the course they are attending, may have some affective and conceptual involvement with the topics (low experience, moderate salience);

Science university students – childless men and women with no parental responsabilities in child education and development of intelligence and to whom the object of

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intelligence may present a low salience (low experience, low salience).

The choice of this systematic sampling of contrasting populations with different socio-educational positions was based on the assumption that, as a result of their social insertions, different groups of individuals may present diverse degrees of proximity to the object of intelligence, which has been shown to modulate the content of representations (Amaral, Carugati, Peixoto, & Selleri, 2006; Carugati et al., 1989; Molinari & Speltini, 1998; Mugny & Carugati, 1985).

This study involved 752 Portuguese participants: 117 fathers, 227 mothers, 122 mother-teachers and 286 university students. Considering the whole sample, 550 participants were women (73%) and 202 were men (27%), ranging from 17 to 69 years old (M = 32.34, SD = 10.24).

Separately considered, fathers presented a mean age of 40.39 (SD = 5.76; ages between 25 and 69 years old), mothers a mean of 37.73 (SD = 4.49; ages between 24 and 48 years old) and mother-teachers a mean of 41.89 (SD = 6.41; ages entre 29 e 60). Concerning the university students, 182 of them attended a degree in Psychology and had an average age of 20.56 (SD = 1.75; ages between 19 and 29 years old). The remaining 104 students attended science courses (24 of them attended a Mathematics course and 78 were Civil Engineering students). For these participants, the average age is 21.0 (SD = 2.70; ages between 17 and 34 years old).

Procedure

After verbal and written contact with school members explaining the general goal of the investigation and asking their cooperation, questionnaires were handled to children to be taken home to their parents. After being filled in, questionnaires were returned back to school, again via children. In order to increase the number of mother-teachers, some additional schools were contacted and requested to directly handle the questionnaire to teachers. As for students, university professors were asked to cooperate and allow the questionnaire to be filled in the context of their lectures.

In the first page, participants were requested for their collaboration and assured of the purely scientific context and purpose of the research. The questionnaire was anonymous and confidentiality was also guaranteed. All instructions were in writing and sufficiently detailed to enable the participants to answer the questionnaire on their own. Nonetheless, since the majority of participants filled in the questionnaire at home, the investigator's email contact was left in case of need for any eventual misunderstanding of instructions. Since students were questioned with the investigator's presence, all doubts or questions were immediately answered.

Those who expressed a wish to be informed of the results of the research were assured to be later sent a report with the main conclusions. All schools who played an important contribution for data collection were guaranteed the same.

Measures

The questionnaire included a demographic profile sheet which asked for the participant's age and sex, occupation and academic qualification. When applicable, the number and age of children was also asked. The questionnaire itself consisted of three sub-questionnaires, which we shall now detail.

Questionnaire 1: Nature of intelligence

A total of 42 items composed the questionnaire relating to the concept of intelligence. Subjects responded to each item by indicating the extent of agreement or disagreement on a seven-point scale (1 = *totally disagree*, 7 = *totally agree*). The items were formulated so as to represent a sufficiently broad spectrum of the views and positions previously identified in literature (Amaral, 1997; Amaral et al., 2006; Carugati et al., 1994; Faria & Fontaine, 1993; Matteucci, 2007; Mugny & Carugati, 1985; Poeschl, 1998, 2001; Sternberg, 1985, 2004; Sternberg, Conway, Ketron, & Bernstein, 1981), as well as in a preliminary phase of our research (Miguel, Valentim, & Carugati, 2008; Miguel et al., 2010). To present an overall idea, the main themes dealt with in this questionnaire were the following: heredity *versus* acquisition of intelligence (e.g., "gifted children are an example of the universally inborn character of intelligence"), adaptation to society (e.g., "intelligence is the individual's capacity to adapt to the society in which he lives"), cybernetic prototype of intelligence (e.g., "logic and mathematics are the prototypes of intelligence"), cognitive skills (e.g., "intelligence is gauged by the capacity of abstract thought"), unfamiliarity (e.g., "the existence of differences between individuals is a mysterious problem which science has been unable to solve"), teachers and failure (e.g., "failure is generally due to the teacher's lack of understanding of the child"), family inheritance (e.g., "intelligent children come from families where the parents value intelligence"), critical dimension (e.g., "being intelligent means agreeing to disagree with other people"), social skills (e.g., being intelligent means having good manners"), sociability (e.g., "being intelligent means being able to make friends"), social conformism (e.g., "being intelligent means conforming to the norms of a society"), integration of information (e.g., "an intelligent person is someone who is able to relate different subjects"), practical intelligence (e.g., "being intelligent means applying knowledge to new situations"), motivational factors (e.g., "the need to increase knowledge reveals a person's intelligence"), goal orientation (e.g., "being intelligent is having ambitions and being able to achieve them"),

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multiplicity of dimensions (e.g., "there is not only one way of being intelligent: there are several"), problem solving (e.g., "being intelligent is being able to solve problems"), learning (e.g., "intelligence is the capacity to learn from experience"), easiness (e.g., "intelligence is expressed by the easiness to perform certain tasks"), emotional intelligence (e.g., "being intelligent means being able to understand and adequately react to other people's emotions"), universality (e.g., "all people are intelligent in their own way") and cultural diversity (e.g., "even pupils that are unsuccessful in school can be intelligent in other domains"). A principal component analysis (PCA) was conducted on the 42 items with orthogonal rotation (varimax) and the five components retained by the *scree plot* were considered for the final analysis. In combination, these factors explained 44.7% of the variance (see Appendix 1). The first component – named *social intelligence* – accounts for a definition of intelligence as conformism to social norms and values, social adaptation, sociability and emotional regulation when in interaction with others, and explains 14.9% of the total variance. The items that cluster together in the second component – which explains 10.3% of variance – suggest that intelligence is an inner ability defined by higher cognitive processes, taking logical-mathematical reasoning as its prototype. For this reason, this component was named *cybernetic prototype and natural inequalities*. The third component – explaining 6.7% of variance – highlights the developmental potential of intelligence, defining it as an acquired capability and, therefore, a universal characteristic which all people can access. Therefore, it was named *acquisition of intelligence*. The fourth component, explaining 6.6% of variance, emphasizes the idea that it is teachers that, through a set of essentially relational characteristics, are responsible for children's failure. For this reason, it was named *teachers and failure*. The fifth component – which explains 6.1% of the total variance – stresses the practical nature of intelligence, defining it as the ability of *solving problems and integrating information.*

Questionnaire 2: Development of intelligence

Subjects responded to the total of 31 items by indicating the extent of agreement or disagreement on a seven-point scale (1 = *totally disagree*, 7 = *totally agree*). As in the previous case, the process which led to the construction of the questionnaire on the development of intelligence was based, on the one hand, on literature review (Amaral, 1997; Constans & Leonardis, 2003; Faria & Fontaine, 1993; Flament, 1999; Matteucci, 2007; Mugny & Carugati, 1985; Poeschl, 1998, 1999, 2001; Sternberg, 1985, 2004; Sternberg et al., 1981) and, on the other, on preliminary results of our research (Miguel, Valentim & Carugati, 2008, 2010). Once again, several themes were included: social determinism (e.g., "the family's cultural level affects the development of intelligence"), biological determinism (e.g., "intelligence does not develop, it is a hereditary gift"), parents' role (e.g., "parents are the child's main model for the development of his own intelligence"), teachers' role (e.g., "teachers' competence is the best assurance of the child's development of intelligence"), peers' role (e.g., "have a group of children working together: they will develop their intelligence better than if they each work for themselves"), child control (e.g., "the child's intellectual progress depends on parental control and demands"), motivational factors (e.g., "ambitious children reveal greater intellectual progresses"), affection (e.g., "the development of intelligence requires a balanced affective development"), autonomy (e.g., "in order to develop his intelligence the child must be autonomous"), communication and dialogue (e.g., "for the child to develop her intelligence, it is necessary that she is able to establish a good communication with her colleagues and with adults"), social interaction (e.g., "interacting with other people is an essential element in the development of the child's intelligence"), discipline (e.g., "without rules and discipline, the development of intelligence is compromised"), didactic games and materials (e.g., "the use of didactic games and materials – for example, *puzzles* or paper-and-pencil activities – stimulates the child's intellectual development"), *stimuli* (e.g., "the development of intelligence is highly dependent on the *stimuli* and incentives given to the child") and challenging (e.g., "in order to progress, the child has to be challenged"). Principal component analysis retained three components which, in combination, explain 42.4% of variance (see Appendix 2). The first component, which explains 16.7% of the total variance, relates the development of intelligence to affective equilibrium and disciplinary practices, putting especial emphasis on a set of variables which relate to *parents' role*. In the second component the development of intelligence is seen as the result of a set of incentives and external motivational strategies that promote intellectual development. For this reason, this component, which accounts for 14.2% of the total variance, was named *stimuli and incentives*. As for the third component – *school, teachers and modeling* – it is school and teachers who are emphasized, within a context of formal education, where severity and pressure on children are emphasized as major factors for their intellectual development. This factor accounts for 11.5% of variance.

Questionnaire 3: Effectiveness of teaching procedures

The third questionnaire was centered on teaching methods that participants judged appropriate for children who had consistent difficulties in certain academic areas and was composed of 19 items. Judgments about the relative effectiveness of the different educational solutions proposed were made on a seven-point scale (1 = *not effective*; 7 = *totally effective*). Since all the dimensions identified in the

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Table 1
Nature of intelligence. Comparisons between categories of participants: Means, standard deviations and univariate tests

	Fathers		Mothers		Mother-teachers		Psychology students		Science students		*Category*	*Age*
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*(4,648)	*F*(1,648)
Social intelligence	4.52	.97	4.68a	1.07	4.53	1.01	4.61a	.88	4.18b	.94	4.55**	1.47
Cybernetic prototype and natural inequalities	4.41	.84	4.55	.96	4.46	.90	4.53	.80	4.55	.75	.38	.37
Acquisition of intelligence	3.80	1.14	4.03	1.14	3.85	1.11	4.04	.96	4.11	1.07	2.11	12.42**
Teachers and failure	3.84b	1.02	3.72b	1.34	2.86a	1.28	3.85b	.97	3.85b	1.12	12.57**	2.27
Solving problems and integrating information	6.09	.57	6.03b	.63	6.28a	.48	5.96b	.58	5.88b	.60	2.95*	.86

For each variable, the means which display different letters differ statistically between categories of participants, at $\alpha < .05$, according to Tukey *post-hoc* test.
* $p < .05$; ** $p < .01$

preliminary phase of our research matched dimensions included in previous studies, all items used were from Mugny and Carugati's (1985) work. The teaching methods proposed covered an equally broad range of solutions, which we sum up to give an idea of the dimensions included in the questionnaire: motivation of the child (e.g., "help the child regain self-confidence"), reformulation (e.g., "make him do other problems of the same kind"), punishment (e.g., "give him a punishment"), extra homework (e.g., "give the child homework"), dialogue with parents (e.g., "talk to the parents about the child's difficulties"), repetition of correct models (e.g., "make him repeat the correct answer several times"), competition (e.g., "showing him that he is falling behind others"), work and peer-group relations (e.g., "make the child work in small groups"), *laissez-faire* attitude (e.g., "not to force him, things will come with time") and psychological diagnosis (e.g., "ask for the child to be given a psychological examination"). A principal component analysis was performed and the three component solution presented by the *scree plot* was considered. In combination, the three components explained 40.8% of variance (see Appendix 3). The first component, accounting for 18.4% of variance, stresses a set of variables which relate to the educators' role, suggesting that these agents should develop an emphatic relation with children in order to ensure a better climate in the classroom, encourage children and help them reformulate problems. Due to its content, this component was named *support practices*. In the second component, which explains 13.1% of the total variance, it is severe strategies that are emphasized: learning difficulties would be surpassed through the use of *severe practices*, centered on rewards and punishment, competition and extra homework. The third component accounts for 9.3% of variance and expresses the idea that the solution to children's difficulties should be left to time and professionals, therefore representing a sort of *patient intervention*.

Results

Nature of intelligence

As mentioned earlier, participants' age ranges from 17 to 69 years old. Given that the age span is quite large, the effect of this variable was considered necessary to be accounted for, in order to ensure that any differences in results were to be attributed to participants' category membership, independent of their age. Bearing this in mind, H1 was put to the test through a multivariate analysis of covariance (MANCOVA), which was conducted with the five components on the concept of intelligence as dependent variables, participants' category as the factor and age as the covariate. Using Pillai's trace, there was a significant effect of participants' category on their definitions of intelligence $V = .150$; $F(20, 2588) = 5.04$, $p < .001$, as well as a significant multivariate effect of age $V = .032$; $F(5, 644) = 4.32$, $p < .001$. Univariate analyses of each variable were then performed. As can be seen in Table 1, the univariate tests illustrated that there are category differences in *social intelligence*, *teachers and failure* and *solving problems and integrating information.* Participants' age presented a significant effect in *acquisition of intelligence.*

Concerning the first factor, Tukey *post-hoc* tests show that the definition of intelligence as learning social rules, adapting to society and being sociable – *social intelligence* – is less relevant for science students than it is for mothers and psychology students. As for *teachers and failure* – which represents the attribution of academic failure to teachers' pedagogical skills – results show that this components is less stressed by mother-teachers, as they present a mean that is statistically lower than the rest of participants. However, it is mother-teachers who compared to the remaining participants privilege a definition of intelligence as the ability to *solve problems and integrate*

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Table 2
Development of intelligence. Comparisons between categories of participants: Means, standard deviations and univariate tests

	Fathers		Mothers		Mother-teachers		Psychology students		Science students		*Category*	*Age*
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*(4,703)	*F*(1,703)
Parents' role	5.27	.72	5.40*a*	.78	5.40*a*	.88	5.09*b*	.69	5.00*b*	.88	2.86*	.15
Stimuli and incentives	6.14bc	.43	6.20*bc*	.48	6.33*c*	.48	6.11*b*	.59	5.82*a*	.71	7.64***	.03
School, teachers and modeling	4.61	.76	4.57	.96	4.35*a*	1.06	4.74*b*	.68	4.85*b*	.79	2.52*	1.96

For each variable, the means which display different letters differ statistically between categories of participants, at α < .05, according to Tukey *post-hoc* test.
* $p < .05$; *** $p < .001$

Table 3
Effectiveness of teaching procedures. Comparisons between categories of participants: Means, standard deviations and univariate tests

	Fathers		Mothers		Mother-teachers		Psychology students		Science students		*Category*	*Age*
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*(4,701)	*F*(1,701)
Support practices	5.88*bd*	.53	6.04*bc*	.53	6.12*c*	.51	5.86*d*	.54	5.67*a*	.56	7.16***	.23
Severe practices	3.51*a*	.92	3.42*a*	1.10	3.00*b*	1.07	3.40*a*	.85	3.62*a*	.97	5.24***	.13
Patient intervention	4.02*a*	.95	4.41*b*	1.12	4.84*c*	1.01	4.29*ab*	1.03	4.00*a*	1.15	9.88***	4.86

For each variable, the means which display different letters differ statistically between categories of participants, at α < .05, according to Tukey *post-hoc* test.
*** $p < .001$

information. Taken as a whole, results lend empirical support to H1 by showing that participants with different socio-educational positions differently privilege the several components concerning the definitions of intelligence.

Development of intelligence

To test H2, another MANCOVA was performed, now taking the components concerning the development of intelligence as dependent variables and participants' category serving as factor, while age was introduced as covariate. Results showed that participants' category was found to be multivariate significant V = .075; $F(12, 2109) = 4.51$, $p < .001$. However, participants' age showed no significant multivariate effect V = .003; $F(3, 701) = .68$, $p > .05$, meaning that there is no significant adjustment of group means due to differences in age. As presented in Table 2, subsequent univariate tests for inter-category differences were significant for *parents' role* and *stimuli and incentives*.

Tukey *post-hoc* tests found significant differences between categories of participants for *parents' role*, showing that this component is more stressed out by mothers and mother-teachers than by students (both psychology and science). As for *stimuli and incentives*, results reveal that science students differ from the rest of the participants by emphasizing it less and that mother-teachers underline it more. Taken together, results lend empirical support to H2, showing that different dimensions concerning the representations of the development of intelligence are differently valued by the several categories of participants, independent of their age.

Effectiveness of teaching procedures

To assess the effects of participants' category on representations of the effectiveness of teaching procedures, another MANCOVA was performed, taking the components on the effectiveness of teaching procedures as dependent variables, participants' category as the fixed factor and age as covariate. The analysis resulted in a significant multivariate effect of participants' category V = .120; $F(12, 2103) = 7.31$, $p < .001$. On the other hand, no multivariate effect of age was found V = .009; $F(3, 699) = 2.05$, $p > .05$. As shown in Table 3, the univariate tests for inter-category differences found significant differences in all three components.

Results reported in Table 3 revealed that, for *support practices*, science students differ from the remaining categories of participants, as they perceive these strategies as less effective. Additionally, psychology students differ

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significantly from some other participants in the sense that they stress less this component than mothers and mother-teachers, while valuing it more than science students. Another significant difference is found between fathers and mother-teachers as the latter outstand the effectiveness of support practices. Concerning *severe practices*, mother-teachers differ significantly from the remaining categories of participants, devaluing the effectiveness of these strategies. On the other hand, they seem to privilege strategies which focus on *patient intervention*, a component on which mothers also differ both from fathers and from science students, perceiving these strategies as more effective. Taken together, results lend empirical support to H3.

Discussion

The main goal of the present study was to explore how the degree of proximity to intelligence, deriving from different social positions, differently explains the effects of anchoring in the organization of social representations (Carugati et al., 1989; Doise et al., 1992; Molinari & Speltini, 1998; Spini & Doise, 1998). For this reason, participants with different degrees of proximity to intelligence – resulting from their different degrees of direct experience and affective salience, which derive from their varying responsibilities and integration in the socio-educational field – were included. Proximity to the object was operationalized as different social categories related to the issue of intelligence, therefore leading to the consideration of social anchoring of representations (Doise, 1992; Spini & Doise, 1998): due to their professional role or to the daily experience of interindividual differences of intelligence, parents and teachers comprise the social categories more highly implied in the subject; in opposition, the distance that childless participants experience from educational implications and responsibilities award them less proximity to the matter of intelligence and its development (Mugny & Carugati, 1985).

In general, the work that we have conducted allows to understand the role of the degree of proximity in the construction of social representations. More specifically, our results seem to confirm the pivotal role of direct experience and affective salience – originating from the different socio-educational insertions –, calling attention on the ways in which social groups generate representations which serve group purposes, namely the maintenance of a positive identity, has it seldom has been argued in the literature (Carugati et al., 1989; Mugny & Carugati, 1985). In fact, according to the hypotheses initially formulated, our results lend further support to the fact that different social positions channel the formation of specific representations, revealing a social anchoring (Spini & Doise, 1998) in social groups. Degree of proximity to the object of representation, which varies across the different social categories considered in this study, seems therefore to introduce systematic variations in the weight social groups give to different dimensions underlying the structure of representations of intelligence and its development.

In the most prominent work in the area (Mugny & Carugati, 1985), the maintenance of a positive self-esteem and of a satisfying social identity has been advanced as the principle for understanding the variability in representational contents. Results presented in this paper seem also to reinforce this perspective. In fact, the disagreement that mother-teachers reveal concerning *teachers and failure* – a component which relates academic failure to teachers' pedagogical skills – is consistent with results of previous studies (Amaral, 1997; Carugati & Selleri, 2004; Faria & Fontaine, 1993; Mugny & Carugati, 1985). The devaluation also shown by mother-teachers concerning the importance of *school, teachers and modeling* for the development of intelligence might be understood in the same vein. Due to their high appreciation of *parents' rol*e, it might be assumed that mothers and mother-teachers underline the importance of their own educational role in their children's development of intelligence. Taking the specific example of mother-teachers, if, on the one hand, results suggest a non responsibility of school and teachers (see Table 1), on the other hand the same does not happen when it is their parental role that is at stake (see Table 2). This result seems to be in line with previous studies (Amaral, 1997), which had also shown that, for teachers, the valorization of parents' role in the development of intelligence parallels a non responsibility of school and teachers, which, in situations of academic failure, allows them the maintenance of a positive self-esteem (Carugati et al., 1994; Valentim, 1997).

In the specific case of mothers, the emphasis on parents' role seems to conflict with previous results of our research (Miguel et al., 2008, 2010), according to which parents seemed to adopt a more playful view of their role in their children's development of intelligence and to attribute to school and teachers the responsibility for children's formal education, especially in teaching specific academic subjects. However, this is only an apparent contradiction, as the items that cluster in the component referring to *parents' role* convey a meaning associated with the quality of parent-child relations and disciplinary practices in the family arena. In this sense, the fact that mothers seem to delegate their children's formal education on school and teachers seems to find no correspondence in terms of their parental responsibility for children's discipline and monitoring.

In general, science students seem to adopt some of the elements which compose the "ideology of gift", initially identified by Mugny and Carugati (1985; see also Valentim, 1997). In fact, the devaluation of parents' role and of constant accompaniment for children's development of intelligence, the attribution of responsibility to school and teachers, the emphasis on an objective form of evaluation and the belief on the effectiveness of severe practices on children as well as the rejection of a social definition of intelligence seem

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to support a more "rigid" perspective of intelligence and its development. Psychology students, on the other hand, are more ambivalent, either agreeing more with science students – by devaluing parents' role in the development of intelligence and by stressing the importance of school and teachers to this process – or with mothers, as they also tend to privilege a definition of intelligence which highlights social dimensions and the ability to solve problems.

In a different vein, fathers seem to be the participants whose representations are the least clearly outlined: while the rest of the participants evidence a greater adherence or rejection to certain dimensions, fathers only evidence a median agreement with the topics at stake. These results might be better understood if we consider that their educational role does not allow them to distance themselves from the matters that relate to intelligence and its development, while however the proximity that they establish with the object of representation does not carry the same kind of implications and conflict showed by the subjects with a motherhood status (mothers and mother-teachers). In fact, if it is true that, as some studies have been reporting, the concept of fatherhood has been changing and that there is a greater involvement of fathers in their children's education (Pleck & Masciadrelli, 2004; Tamis-LeMonda & Cabrera, 2002), it is not untrue to state, historically speaking, that motherhood still has a more preponderant social value and that dominant cultural models still relate women to family context and childrearing (Poeschl, 2000; Silva & Poeschl, 2001/2002).

This way, the privileged acceptance that mothers revealed concerning the social definition of intelligence – expressed in items that convey to the adaptation to social norms, conformism and social integration – might transmit the importance ascribed to their own role as a socialization agent and to the transmission of socially defined rules, associated to the belief of intelligence as a legacy of the family values system (Faria & Fontaine, 1993).

The present study was based on the theoretical principle that, through the activation of social roles, the individual's proximity to the object of representation – taken as different degrees of relevance and implication of the object to a certain social group – define different social regulations, which intervene and shape the content of the representation (Molinari & Speltini, 1998; Moliner & Gutermann, 2004; Wagner et al., 1996). Results in fact provide empirical support to this principle by showing that, in face of such an intense topic in terms of personal involvement and responsibility, the contradictory and ambivalent aspects of the social representation are managed through a regulative mechanism which links several elements of knowledge based on the affective value associated to the specific social object. Different levels of proximity to the representational object of intelligence may, in fact, impose different degrees of personal involvement in decision making and action taking concerning children's education and development of intelligence, as well as imply differing demands on the need to maintain a positive self-identity, which may entail psychosocial variables and mechanisms that explain the modulation of representations across social groups. Therefore, data also suggests that the structure of a given social representation is related to the instrumentality of knowledge (Jovchelovitch, 2007), reflecting the functional character that the organization of representations has on specific social dynamics. Additionally, it must be taken into account that social representations define the experience of reality and contribute to the maintenance of institutionalized relations, in a ideological framework that serves to maintain social order and defend particular identities (Howarth, 2006b). By showing that the content and organization of representations of intelligence are not independent of social positions and roles that social actors occupy in the social space, results highlight the importance of positional and dynamic ideologies (Doise, 1982, 2011) in the construction of reality.

Nevertheless, we can underline some limits of this research. A first limit concerns the way in which individuals perceive and identify themselves as members of groups and their differentiated position with respect to other groups, as suggested by the theories of social identity (Tajfel & Turner, 1986) and self-categorization (Turner, Hogg, Oakes, Reicher, & Whetherell, 1987). Further studies should have to take into account and measure these processes. More specifically, in order to assess the degree of actual salience and involvement with the topic of intelligence, it might be of interest that future studies include a measure of identification with certain social categories and roles so as, in addition to considering objective social categories and studying sociological anchoring, psychosociological anchoring may also be regarded (Doise, 1992; Poeschl, 1998). Furthermore, this perspective would provide further theoretical elements to connect two fields of research – identity and social representations – as suggested by Breakwell (1993) and more recently by Moloney (2010) and Moloney and Walker (2007). A second limit concerns the relationship between social representations and practices. In fact, representations are taken as guides for action (Abric, 1997b, 2001b; Jodelet, 1989; Moscovici, 1961), which direct behaviors and social relations. Therefore, future studies should try to explore how these representations of intelligence might influence behavior, namely educational and teaching practices in children's development (Matteucci, 2007; Mugny & Carugati, 1985). In addition, and since identities do not have separate existences but are, instead, interacting entities, action decision may also be influenced by category memberships, especially when the object of representation is a puzzling and salient one. In the same vein as the contents of representations, differences in action taking may be, in fact, illustrated and explained by the different levels of experience towards the object of participants forming social categories (Abric, 2001a), which shape different levels of proximity to the

object. The question of social representations in relation to different forms of action is still underdeveloped and offers promising prospects for research. Despite its limits, we hope that this paper will contribute to take into account the proximity to the object in the study of representations and to raise this factor to the interest it deserves.

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APPENDIX 1

Nature of intelligence: Results of the principal component analysis after *Varimax* rotation

Items	*M*	*SD*	Factors				
			1	2	3	4	5
Being intelligent means being able to establish relationships with other people	4.52	1.49	**.798**	.074	.090	.080	.027
Being intelligent means being able to make friends	4.13	1.64	**.706**	.050	.101	–.022	.058
Being intelligent means having good manners	3.83	1.70	**.699**	.202	.225	–.008	–.075
Intelligence is the individual's capacity to adapt to the society in which he lives	4.84	1.45	**.691**	.027	.002	.081	.191
Being intelligent means adopting rules of social interaction	4.71	1.41	**.640**	.081	.187	.062	.139
Being intelligent means understanding and adequately reacting to other peoples' emotions	5.24	1.31	**.627**	–.037	.048	.083	.226
Being intelligent is having ambitions and being able to achieve them	4.81	1.47	**.626**	.203	–.022	.106	.018
Intelligence means managing to involve other people in conversation	4.26	1.53	**.484**	.325	–.096	.167	.009
Being intelligent means conforming to the norms of a society	4.37	1.72	**.447**	.149	.076	.133	.019
Being intelligent means behaving within the fundamental social values of society	4.80	1.51	**.445**	.303	.254	–.054	–.024
Intelligent people have good memory skills	4.72	1.46	.050	**.603**	–.032	.088	.077
Logics and mathematics are the prototypes of intelligence	4.54	1.61	–.002	**.597**	.085	.004	.099
Intelligence is expressed in quickness of performance	4.05	1.66	.128	**.547**	.310	.053	.010
Gifted children are an example of the universally inborn character of intelligence	4.54	1.60	.020	**.533**	–.023	.100	.050
Being intelligent means having a unique and general ability to perform well	4.59	1.63	.200	**.532**	–.071	.112	.015
The computer is the perfect model of what intelligence is	3.48	1.78	.050	**.517**	.185	.029	–.155
Intelligence is expressed by the easiness to perform certain tasks	4.62	1.60	.197	**.474**	.265	–.016	–.012
Intelligent people have good language skills	4.72	1.50	.280	**.452**	–.127	–.042	.222
Intelligence is the capacity to learn whatever you are taught	5.37	1.17	.185	**.414**	.134	.044	.115
People are not born intelligent: they learn how to become intelligent	4.53	1.59	.145	–.066	**.671**	–.035	.051
Intelligence is gauged by the capacity for concentration	4.27	1.61	.076	.218	**.609**	.023	.177
An intelligent person is someone who has strongly developed a specific skill	3.75	1.67	.031	.320	**.581**	.214	–.002
Everyone is intelligent in their own way	3.38	1.75	.226	–.029	**.477**	.245	–.197
Failure could generally be avoided, given more patience on the part of the teacher	4.28	1.63	.002	.052	.131	**.784**	.126
Failure is generally due to the teacher's lack of understanding of the child	3.22	1.47	.153	.116	.079	**.774**	–.073
Children's behavior problems are due to the teacher's lack of severity and discipline	3.49	1.53	.205	.141	.011	**.691**	–.030
Being intelligent means applying knowledge to new situations	6.14	0.77	.161	.089	–.073	–.040	**.790**
Being intelligent means being able to develop adequate strategies of problem solving	6.29	0.71	.176	.048	.002	.044	**.775**
Intelligence is the capacity to relate different subjects altogether	5.63	1.13	.035	.109	.292	.012	**.467**
Variance accounted for (total = 44.65%)			14.9	10.3	6.7	6.6	6.1

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APPENDIX 2

Development of intelligence: Results of the principal component analysis after *Varimax* rotation

Items	*M*	*SD*	Factors		
			1	2	3
For the child to develop her intelligence, it is fundamental to dialogue with her about her behaviors	5.50	1.11	**.675**	.174	.109
The quality of affective relations between parents and children influences the development of intelligence	5.71	1.14	**.645**	.254	–.053
For the child to develop her intelligence, it is necessary that parents keep up with all her activities	4.66	1.53	**.620**	-.036	.235
For the child to develop her intelligence, it is necessary that she is able to establish a good communication with her colleagues and with adults	5.40	1.14	**.612**	.225	.150
The child's intellectual development is influenced by the conscious that parents have on appropriate studying schedule	4.91	1.41	**.597**	.109	.201
Without rules and discipline, the development of intelligence is compromised	5.56	1.17	**.568**	.333	.042
A permissive family environment compromises the development of intelligence	4.76	1.43	**.546**	–.046	.131
Parents' interest and support to the child's schooling affects her intellectual development	5.46	1.30	**.474**	.256	.125
For the child to make progress, she has to be presented with challenges that stimulate her intellectually	6.24	0.70	.060	**.790**	.077
The development of intelligence is highly dependent on the stimuli and incentives given to the child	6.15	0.89	.181	**.715**	-.084
It is by questioning and stimulating the child's reasoning that the development of intelligence can be promoted	6.06	0.73	.157	**.666**	.184
The use of didactic games and materials – for example, puzzles or paper-and-pencil activities – stimulates the child's intellectual development	6.22	0.73	.119	**.656**	.104
For the child to progress intellectually, it is essential to stimulate the development of reading habits	6.01	0.92	.378	**.505**	.028
School is the main responsible for the development of intelligence	4.42	1.56	–.057	.086	**.721**
It is by contradicting the child when she is wrong that the development of intelligence is promoted	4.06	1.65	.073	-.044	**.577**
For the child to make progress, it is necessary to present her the right answer	4.53	1.55	.174	.023	**.569**
Teachers' competence is the best assurance of the child's development of intelligence	4.47	1.46	.208	.061	**.552**
Ambitious children reveal greater intellectual progresses	4.91	1.36	.154	.058	**.545**
Children with access to a wide variety of extracurricular activities have higher possibilities of developing their intelligence	5.32	1.29	.113	.280	**.419**
Variance accounted for (total = 42.4%)			16.7	14.2	11.5

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APPENDIX 3

Effectiveness of teaching procedures: Results of the principal component analysis after *Varimax* rotation

Items	*M*	*SD*	Factors		
			1	2	3
Help the child regain self-confidence	6.43	0.75	**.689**	–.111	.035
Check that he really understands the data of the problem	6.21	0.84	**.675**	–.182	–.076
Use more stimulating methods	6.28	0.78	**.673**	–.046	.120
Practice different problems which will help him find the right answer	5.93	0.95	**.601**	.020	.083
Improve the classroom atmosphere	5.78	1.02	**.552**	.095	.075
Talk to parents about the child's difficulties	5.88	1.10	**.519**	.012	.217
Make the child work in small groups	5.41	1.11	**.489**	.172	.294
Teach him to be rigorous in his work	5.75	1.08	**.481**	.394	–.237
Pay an individual attention to the child	5.66	1.22	**.446**	.063	.240
Make him compete with other children	3.58	1.66	–.021	**.717**	–.016
Show him that he is falling behind the others	3.26	1.58	.037	**.625**	–.176
Give the child homework	4.07	1.50	.042	**.612**	.095
Give him a punishment	2.00	1.37	–.152	**.604**	.089
Promise him a reward if he does better	4.02	1.67	.099	**.577**	.277
Ask for the child to be given a psychological examination	4.49	1.59	.205	–.013	**.697**
Not to force him, things will come with time	4.02	1.61	–.027	.052	**.681**
Present him easier problems which he can solve	4.48	1.52	.259	.056	**.480**
Variance accounted for (total = 40.8%)			18.4	13.1	9.3

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