Intelligence and its development:
Social representations and social identities

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From the paradigm of social representations theory, results from an interview-based study are presented. Forty-five Portuguese participants with different educational roles were interviewed individually about their definitions of intelligence and perceived family and school contributions for its development. Content analyses of the answers led to the differentiation of distinct categories, presenting intelligence as a multi-dimensional concept and identifying which specific educational practices are perceived as enhancing its development. Subsequent correspondence analyses shed light on the relationship between the various representational components and individuals' group membership, as defined by their educational roles. Extracted dimensions and typologies illustrate the socio-cognitive complexities of representations both by disentangling which domains build up an intelligible sense of intelligence for each group of participants and by demonstrating social representations' function in protecting a positive self-image. Theoretical and practical implications of these findings in educational research and intervention are discussed.

The concept of intelligence is extremely charged and value-laden in our society since it is, in general, associated with the notion of success. As one of the most predominant positive values in our culture, intelligence has been a heavily researched psychological construct during the past few centuries (Carugati, 1990a, 1990b) and constitutes an issue that is particularly conducive to the development and expression of differentiated social representations (Poeschl, 2001).

Bearing on intersubjectively shared meanings for understanding and communicating (Duveen & Lloyd, 1990), the theory of social representations is concerned with how new knowledge is produced and accommodated in the social fabric (Carugati, 1996; Moscovici & Hewstone, 1984), "how science manages to become part of our cultural heritage, of our thinking, of our language and daily practices" (Moscovici, 2001, p. 10). Therefore, by paying particular attention on common sense theories concerning abstract concepts (Valentim, 2003), social representations focus on the manner in which individuals try to grasp and understand things around them and solve their commonplace puzzles (Moscovici, 1981). Concerning intelligence, the representations people construct enable them to cope with the strange – the complex and unexplainable nature of intelligence – and make the unfamiliar familiar (Mugny & Carugati, 1989). Common sense definitions of intelligence as social skills and adaptability or as the cognitive ability to solve abstract problems, especially in logics and mathematics (Amaral, 1997; Mugny & Carugati, 1989; Poeschl, 1998), reflect the world-making capacities of social representations and bridge the distance between social actors and the world by creating meaning, tools, and understanding (Jovchelovitch, 2007; Moscovici, 1998).

Evidently there are many other theoretical approaches that study how people acquire, organize and use their knowledge. However, social representations theory

differs from these approaches because it concerns the organization of concepts elaborated in the course of communication and, consequently, relates social groups to social knowledge (Carugati, 1990a). In this sense, representations go far beyond their cognitive and symbolic functions to include the identity function and all it implies in terms of social interaction, as "identities also project individuals into a social world marked by a complex set of relationships between social groups" (Duveen, 2001, p. 267). By situating subjects in the social field, social representations allow, as stated by Mugny and Carugati (1989), "the elaboration of a satisfying social and personal identity, one that is compatible with socially and historically determined systems of norms and values" (p. 162). In this sense, different group memberships may then entail different positions regarding the several dimensions of representations, as individuals are led to modulate the positions they express in relation to a multitude of socially relevant objects (Doise, Clémence, & Lorenzi-Cioldi, 1992). In the special case of intelligence, research provides support for the influence of social positions and social identities in building up intelligence as a matter of social controversies, as polysemic and many-sided, as a cognitive polyphasia, where the importance and accessibility of its dimensions vary according to the status of the groups, as to enable them to legitimate their positions in the social field and maintain a positive social identity (Amaral, 1997; Faria & Fontaine, 1993; Mugny & Carugati, 1989; Poeschl, 1998; Raty & Snellman, 1995).

By constructing our everyday experience, social representations help us to justify our attitudes and actions, as well as to anticipate and influence them. By reflecting social rules and relations, social representations function as guides for action, which legitimate and orient behaviors, and justify and influence social relations (Abric, 1997; Jodelet, 1989). Given this prescriptive character of social representations, and

since adults intervene continually over the course of a child's existence, it is surely not unreasonable to assume that their ideas about intelligence and development will have a major influence on their interventions with children (Mugny & Carugati, 1989).

Duveen and Lloyd (1990) describe social representations as significant structures which enable the identification of the groups which construct them as well as the content which is represented. Moreover, social representations are significant structures in the sense that they are functional in building social identities and in negotiating identity conflicts. For instance, teachers may also be parents: as teachers, they may be compelled to defend the school system against the failure of pupils (Valentim, 1997); as parents, they are compelled to defend their own children against the school, i.e. against themselves as teachers. Another category of people is working mothers. As housewives, they might be prone to explain intelligence and development as a product of their own direct commitment in child-rearing as a task socially assigned to mothers; as working mothers, they may feel guilty in relation to these tasks (Carugati, Emiliani, & Molinari, 1989; Carugati & Selleri, 2004).

Both cases (mother-teachers and working mothers) are but two instances of people involved in what Duveen & Lloyd (1990) suggested is the *sociogenesis* of social representations. In fact, more than twenty years ago (Mugny & Carugati, 1989) it has been theorized and empirically shown that sociogenesis is the result of the interplay of two conditions: 1) conceptions, ideas and images of a given issue or a set of interrelated issues which should be salient and relatively inexplicable and 2) specific categories of people for whom the topics activate identity conflicts.

Moreover the choice of intelligence and development as a matter of research could also be studied as a case of *themata* (Moscovici & Vignaux, 2000) insofar as they elicit a long lasting antithetical or conflicting dyad concerning their origins: nature *vs.*

culture. Intelligence and development are thematised and foregrounded in public discourse under certain social and historical contexts. They become the focus of social attention and a source of tension and conflict, and thus come to operate as "first principles", "compelling ideas" or "source ideas" of social representations.

In the present study, it is our purpose to capture the elements constituting the representations of intelligence associated with the social categories of interest, as well as the practices, both from school and from family, perceived as favorable to its development. These social categories should be the ones most predisposed to focus on inter-individual differences or to be professionally concerned with them (Mugny & Carugati, 1989). Therefore, since parents and teachers experience these differences as a part of their everyday lives, these social categories were selected for the current study. Additionally, and although less directly implied in these issues, students were also considered due to their "in-between position" between family/parents and school/teachers: even though they are not in an educational role, they are still part of the educational system.

METHOD

Sample

This study involved 45 participants from the Coimbra region (Portugal), including 20 men and 25 women, aged 19 to 46 (33 years old on average). Resulting from the cross-conjugation of different educational roles (teachers *versus* non-teachers; parents *versus* non-parents), the subjects who took part in this study consisted of four groups: parents (who are not teachers) ($n = 12$), teachers (who are not parents) ($n = 10$), parent-teachers (who are both parents and teachers) ($n = 14$), and university students ($n = 9$). Table 1

presents the breakdown of sample characteristics in terms of participants' sex and educational roles.

		Teacher									
		Yes				No				Total	
		Female		Male		Female		Male			
		n	%	n	%	n	%	n	%	n	%
Parent	Yes	7	15.56	7	15.56	6	13.33	6	13.33	26	57.78
	No	7	15.56	3	6.67	5	11.11	4	8.89	19	42.22
Total	n		24				21			45	
	%		53.33				46.67				100

Table 1. Frequencies and percentages in terms of participants' educational role and sex

Instrument

The interview schedule was designed in order to examine participants' understanding of the 1) definition of intelligence, 2) family contributions for the development of intelligence and 3) school contributions for the development of intelligence. Questions were addressed as follows: *"What is being intelligent?", "How can family contribute to the development of intelligence?"* and *"How can school contribute to the development of intelligence?".*

Procedure

Audio-recorded interviews were conducted individually with all of the 45 participants. All the interviews took place in a quiet setting and lasted from approximately 30 minutes to more than 1 hour.

Data analysis

It is frequently maintained that all methods have specific limitations as well as particular strengths and that the use of methods should be predominantly influenced by substantive research questions (Kelle, 2006). In the present study, both so called qualitative and quantitative methods were used, which fulfilled different yet complementary purposes: while the "qualitative analyses" allowed us to enhance our understandings and insights into a situation or phenomena – intelligence and educational practices – the "quantitative approach" gave an overview of the object under study. By combining both methods, a mixed-method approach was used in order to produce a more coherent and complete picture of the investigated domain than a mono-method research could yield.

The qualitative methodological approach used in the present study relied on the tradition of content analysis. The strongest reason for using such an inductive method was the need to explore the underlying themes in participants' speeches and identify their social construction concerning representations of intelligence and educational practices.

Data analysis began with the production of *verbatim* transcripts of the interviews. The interview transcripts were then broken into three *corpora* of answers deriving from each one of the three questions posed to the participants. Separate content analyses were then conducted for each *corpus*. Codes were identified and continuously compared to each other so that similar phenomena were grouped in the same category. The inductive coding process ended in a grouping of substantive codes with similar content into summarizing descriptive categories, which were then given a name and a definition. In order to determine the reliability of the categories, the answers of 12 participants (27% of the total sample) were recoded by an independent coder who, until

that moment, had not participated in the research process[1]. Categories produced by the "blind" coding process matched most of the initial ones. In fact, nearly all of the disagreements in the reliability check were due to differences in the frequency of each category, and not to the general content of the category *per se*. Despite the substantial agreement, in the cases where overlap was not accomplished discussion was carried out and categories were reviewed, in order to achieve a suitable match for subsequent research steps.

Once the categories were identified, the frequency of responses to each category was then crossed with respondents' membership in the four groups defined by different educational roles. For each one of the three sets of categories (definition of intelligence, family contributions and school contributions), a correspondence analysis (Doise et al., 1992; Pestana & Gageiro, 2008) was then performed both to detect links between the various representational components and to shed light on the relationship between these components and individuals' group membership. The frequency of categories retained for analyses was not uniform. In fact, for the correspondence analysis concerning the question *"What is being intelligent?"*, 9 categories were considered, with each one being covered by 7 or more participants. For analyses on contributions about the development of intelligence, the number of retained categories also varied: for the question *"How can family contribute to the development of intelligence?"*, 7 categories were taken into account (with each category being covered by at least 10 participants) and for the question *"How can school contribute to the development of intelligence?"*, 12 categories were retained (with at least 3 participants covering each one of them). The criterion underlying the number of retained categories was – while comprising the

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maximum number of categories – to include the ones which seemed to be psychologically more significant.

RESULTS

What is being intelligent?

Through content analysis, a plurality of categories was generated, which evidences the polysemic nature of the concept and attests the difficulty in providing it with a unique and definite meaning (see Appendix 1).

Intelligence as a many-sided subject is, indeed, expressed by many of the participants in the interviews. The difficulty participants had in finding a concrete definition of intelligence is particularly outlined, not only because participants are faced with the need to answer a question and define an abstract concept, but also because they raise the question of the multiplicity of definitions: intelligence is viewed as a very difficult construct to define, as an aggregate concept which assembles a series of domains, skills or abilities. As one participant clearly expresses:

> *"I have always considered there were several types of intelligence. There is the theoretical intelligence, which comes from books [...]. Then you have another type of intelligence, which is the ability to work a way out of all your daily situations. Or even a more practical wisdom. I don't know… but it seems like being intelligent is a mixture of all this."* (student, male, 22 years old)

It might be for that reason that the question of the multiplicity of definitions is generally associated with expertise. From this point of view, intelligence is expressed in terms of skillfulness in a set of specific areas. Being intelligent is, therefore, showing proficient knowledge and skills in specific domains, whatever these may be. One participant describes it this way:

"People turn out to be specialists in certain areas… and the simple fact that someone is very intelligent or very comfortable in a specific area does not mean that he or she is also comfortable in another totally different domain."
(father, 37 years old)

In addition to the previous category, other elements also express important definitional components of intelligence. For example, many participants identify easiness as a very particular and stressing feature of intelligence: intelligent people find it easy to learn, to solve problems, to achieve goals, to integrate information, and so on.

Also emotional intelligence – as the ability to manage own and others' emotions, to positively evidence emotions, to interpret emotions other people express – arises as a definitional component of intelligence.

Correspondence analysis of the answers to the question *"What is being intelligent"* reveals two major dimensions that, together, explain 95.9% of the total inertia. Although very high, the percentage of explained inertia also parallels results by Amaral, Vala and Carugati (2004) in the Portuguese context. Table 2 depicts coordinates and contributions for the two retained dimensions. Dimension 1 (71.1% of inertia) clearly opposes parents to teachers. The underlying meaning in this dimension seems to be an opposition between what literature (Mugny & Carugati, 1989) has commonly termed as the cybernetic prototype of intelligence – cognitive and abstract thought abilities – and some sort of social adaptation gauged by the ability to achieve personal goals. The second dimension (which explains 24.8% of inertia), while clearly opposing parent-teachers to students, seems also to contrast participants with children (parents and parent-teachers) to participants with no children (teachers and students) and to expresses an opposition between the development of a personal line of thought by the critical integration of information and a more uninvolved learning.

	Coordinates		Contribution to dimension		Explained by dimension	
	1	2	1	2	1	2
Parents	-.751	.322	.309	.096	.851	.092
Parent-teachers	.272	.469	.059	.297	.329	.575
Teachers	.984	-.399	.463	.129	.891	.087
Students	-.608	-.787	.169	.478	.490	.484
Multiplicity and expertise	-.405	-.067	.067	.003	.860	.014
Integrating information	.042	.822	.001	.365	.004	.989
Problem solving	.719	-.705	.165	.269	.633	.360
Easiness	-.131	.044	.005	.001	.321	.021
Learning	-.869	-.906	.155	.285	.608	.391
Applying knowledge	-.020	.337	.000	.039	.002	.381
Cognitive skills	1.431	.134	.373	.006	.994	.005
Emotional intelligence	.464	.079	.034	.002	.940	.016
Achieving goals	-1.047	.313	.200	.030	.904	.048

Table 2 - Dimensions and their correspondence to group membership and representations of intelligence

Based on factorial coordinates, three types of participants (parents, teachers and students) were identified, showing the relationship between components of intelligence and participants' group membership. As shown in Figure 1, parents share a representation of intelligence which is largely organized around the abilities to achieve goals (whatever these goals may be) and to learn (also whatever the knowledge to acquire may be – e.g., learning to walk or learning school subjects). On the other hand, teachers seem to favor domains that relate to their own professional role and didactic work: intelligence as the ability to solve problems and having some specific cognitive skills, such as memory and reasoning. The dominant fact in the students' responses is their definition of intelligence as the ability to learn/acquire knowledge and also to solve problems, the first being a definitional feature that they share with parents and the latter one that they share with teachers.

Participants with a double educational role (parent-teachers) did not constitute such a solid type as the previous ones. However, parent-teachers seem to value the ability to integrate information and to apply knowledge as definitional components of intelligence, while also regarding emotional intelligence and easiness as important attributes associated with the concept.
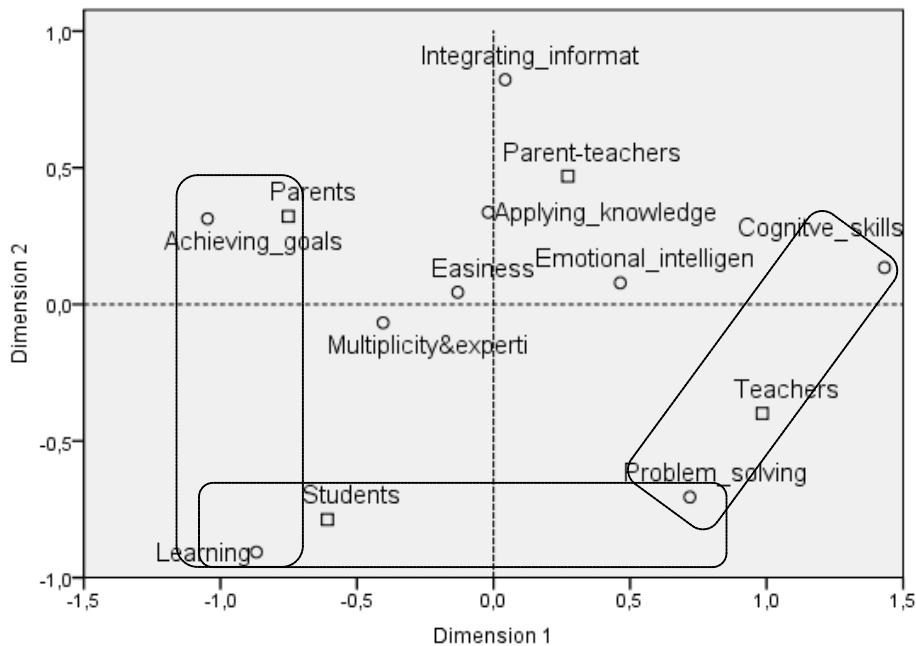

Figure 1. Correspondence analysis on the relationship between components of social representation of intelligence and participants' group membership.

How can family contribute to the development of intelligence?

Family was recognized as having an important role in the development of intelligence. One interviewee describes it this way:

> *"The role of a mother or a father, whether you like it or not, is extremely important. And not even school, or teachers or anything else can replace that role […]. I think family is the basis."* (mother-teacher, 37 years old)

Concerning concrete actions family might take to help children develop their intelligence, it was frequently mentioned that family – and parents in particular – *"might do lots of things"* (mother-teacher, 46 years old). In fact, a wide variety of these

family contributions were identified and various categories were generated by the content analysis (see Appendix 2).

Correspondence analysis concerning family contributions for the development of intelligence revealed two dimensions that respectively account for 79.4% and 18.4% of inertia (Table 3). Dimension 1, while opposing parents to parent-teachers, also expresses a more playful approach to the development of intelligence, based on amusing games and materials, as opposed to a more structural family contribution, which relies on providing emotional stability and diversified experiences and activities. In Dimension 2, school tradition-based education, which emphasizes books and reading, is opposed to a more pupil-centered approach, highlighted by the need to provide *stimuli*.

	Coordinates		Contribution to dimension		Explained by dimension	
	1	2	1	2	1	2
Parents	-1.050	-.014	.700	.000	.998	.000
Parent-teachers	.572	-.195	.244	.059	.909	.051
Teachers	.278	.797	.041	.692	.200	.792
Students	.162	-.455	.015	.249	.176	.665
Games	-1.125	-.218	.629	.049	.981	.018
Books and reading	.448	-.646	.083	.359	.494	.495
Stimulating	-.200	.649	.014	.314	.164	.835
Various activities	.588	.443	.114	.135	.726	.198
Emotional support	.645	-.356	.126	.080	.852	.125
Challenging	.305	.316	.028	.063	.582	.301
Accompanying children	-.137	.029	.005	.000	.578	.013

Table 3 - Dimensions and their correspondence to group membership and family contributions to the development of intelligence

Once again the analysis yielded three distinct types (teachers, parents and students – see Figure 2). Teachers' answers are more associated with the need to grant children the access to a wide variety of activities – which may include sports, playing a musical instrument, *ballet*, cinema, concerts or traveling – as well as to stimulate

children by all means and in different areas. The access to books and reading – either by buying books or going to the library, reading bedtime stories or motivating children to read their own books and stories – is more marked among students than other participants. Parents seem more prone to consider the family's contribution for the development of intelligence as linked to didactic games and materials, such as puzzles, chess, computer games, coloring books or other paper-and-pencil activities. Insofar as emphasis is put on the didactic and educational nature of the materials, parents seem more likely than other participants to take a playful view of family's part in the development of intelligence. A significant aspect then emerges: parents' speeches are not explicitly associated with the importance of the family for the development of intelligence, especially in terms of formal education and their active involvement.

Although not constituting such a distinct type, parent-teachers' answers are linked to the need of family emotional support, challenging and constant accompaniment as basic conditions for the development of intelligence. Parent-teachers, unlike parents, do not take a playful view of parental responsibility on the development of children's intelligence. Still, the answers they give seem to reveal a kind of ambivalence in the parent-teachers who are both more severe from the educational point of view (as they stress the need to challenge and constantly accompany children) and more empathetic from the familiar point of view (as they emphasize the need to assure emotional support). Their answers may, therefore, be interpreted as the product of their dual identity as parents and teachers.
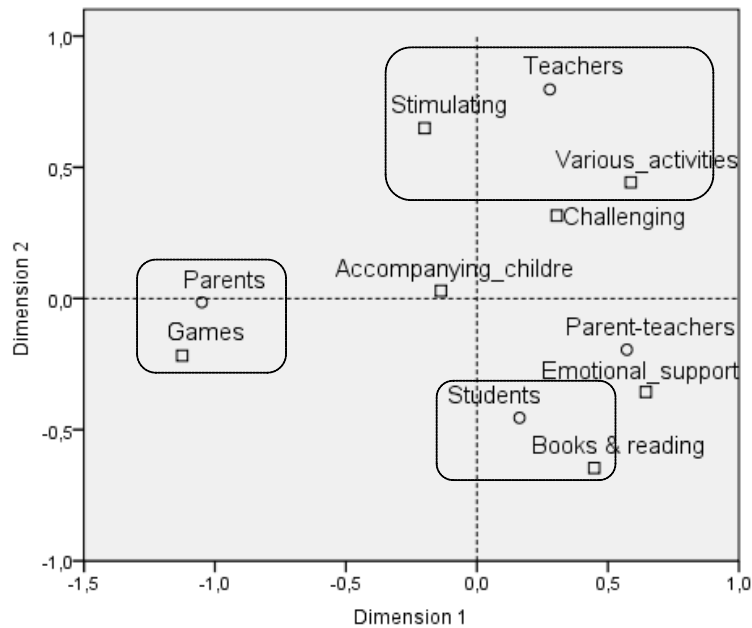
Figure 2. Correspondence analysis on the relationship between family contributions for the development of intelligence and participants' group membership.

How can school contribute to the development of intelligence?

The fact that school has, for long, been a relevant institution whose influence on intelligence represents an explicit goal is clearly expressed by an interviewee when he says:

> "I think that school… all its activity combines to that purpose. First, endow children with knowledge. Then making them articulate that knowledge and develop their intelligence." (father-teacher, 41 years old)

Therefore, alongside the family, school is also perceived as having an undeniable influence on children's development of intelligence. Another participant puts it as follows:

> "I think school is also a fundamental part in children's development. Because children start attending school when they are very young… and at that time their cognitive structures are still underdeveloped. Teachers are essential." (student, female, 22 years old)

Once the importance of school in the development of intelligence was acknowledged, specific perceived contributions to that process were addressed in the interviews. A wide variety of answers were produced, which led to the construction of the categories (see Appendix 3).

Two dimensions resulted from the correspondence analysis concerning the relationship between perceived school contributions for the development of intelligence and participants' group membership, which together account for 82.8% of inertia (57.7% and 25.1% respectively for Dimension 1 and Dimension 2). Table 4 depicts coordinates and contributions for the two retained dimensions. Teaching methods as opposed to exemplification and child's motivation provide meaning for Dimension 1, which also opposes parents to teachers. On the other hand, Dimension 2 seems to express an opposition between school geographic insertion and socio-interactional opportunities provided by extra-curricular activities, as well as contrast parent-teachers to students.

	Coordinates		Contribution to dimension		Explained by dimension	
	1	2	1	2	1	2
Parents	-.674	-.038	.217	.001	.595	.001
Parent-teachers	-.026	1.031	.000	.643	.001	.887
Teachers	1.789	-.146	.766	.008	.965	.004
Students	-.170	-.641	.016	.348	.063	.588
Stimulate and motivate	-.050	-.073	.001	.003	.014	.020
Good teachers	-.442	.530	.052	.113	.454	.430
Teaching methods	-.698	.461	.091	,060	.532	.153
Teach	.161	-.456	.004	.050	.098	.517
Extra-curricular activities	-.623	-1.016	.052	.208	.362	.635
Conviviality and sociability	-.496	-1.246	.026	.251	.162	.675
Child characteristics	-.647	.199	.044	.006	.769	.048
Emotional stability	.889	.207	.063	.005	.817	.029
Giving examples	1.983	.626	.314	.047	.911	.060
School environment	-.125	1.203	.001	.175	.008	.475
Child's interests	1.903	-.790	.289	.076	.884	.100
Reasoning	.889	.207	.063	.005	.817	.029

Table 4 - Dimensions and their correspondence to group membership and school contributions to the development of intelligence

Once more, analysis highlights three distinct types of participants (students, teachers and parent-teachers – see Figure 3). Students' answers are associated with school-supported extra-curricular activities for the development of intelligence and are more likely to consider school as the perfect setting for conviviality and the establishment of social relations that promote the development of social intelligence. Furthermore, these participants also emphasize the need to value children's interests, particular curiosities and personal motivations towards specific areas or school subjects. These topics are also particularly featured by teachers, along with the need to provide children with examples of how to deal with different situations, stimulate reasoning and enable emotional stability. Although other categories were mentioned, the most prominent result of parent-teachers concerns the importance of the school environment (in terms of infra-structural conditions and its geographical location) as a contribution to the development of intelligence.

While not constituting such a distinct type, parents' answers point out important aspects that relate to teachers. It may be for that reason that parents place emphasis on good and competent teachers and their mission to teach children a whole range of school subjects. Related to these is the fact that parents assign school in general, and teachers in particular, the responsibility for stimulating and motivating children, especially through the use of less theoretical teaching methods, which emphasize the practicable nature of school subjects. Parents also mention that teachers should take children's personal characteristics into account, in terms of their specific skills and abilities, and outline the need of school adapting to children, rather than just the other way around.
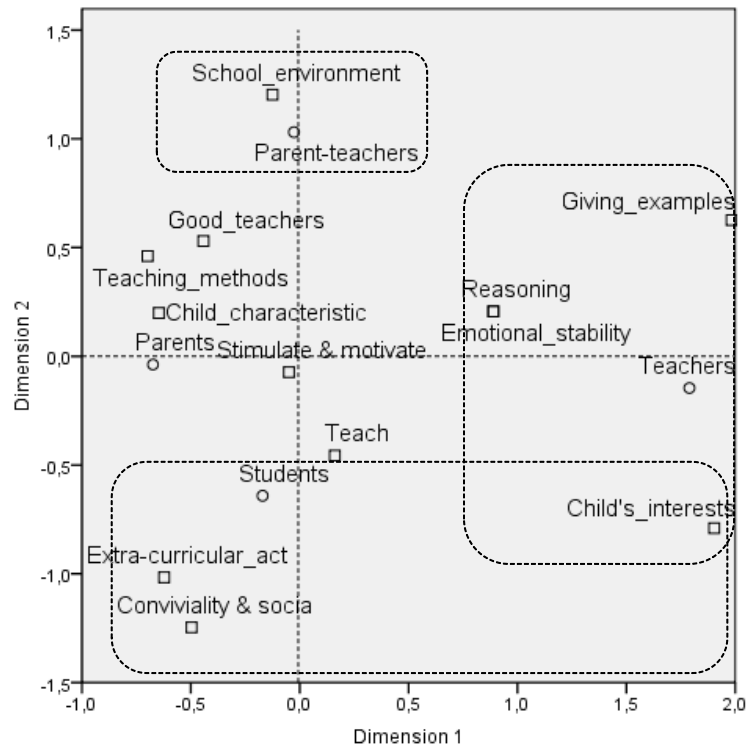
Figure 3. Correspondence analysis on the relationship between school contributions for the development of intelligence and participants' group membership.

DISCUSSION

"In constructing what is real for a group of people, representational orders express identity, frame thinking and action, allow communication and social integration" (Jovchelovitch, 2007, p. 113). Representations built around the concept of intelligence are an interesting example of these dynamics.

The heterogeneity of representations of intelligence in our study, which we can assume is explained by the complex nature of intelligence, shows representations of intelligence as means of sustaining and producing patterns in social life. Major findings presented particularly featured definitional components of intelligence – such as cognitive abilities, social skills, problem solving, information integration or multiplicity of definitions – often found in literature concerning social representations of

intelligence (e.g., Amaral, 1997; Faria & Fontaine, 1993; Mugny & Carugati, 1989; Poeschl, 2001), which enable individuals to share meanings for understanding such an abstract and controversial concept (see also Sternberg, Conway, Ketron, & Bernstein 1981; Sternberg, 1985).

Although social representations are very persistent once created (Carugati & Selleri, 2004), the processes that originates them will not disappear or fade away (Breakwell, 1993). Consequently, social meaning concerning a specific social object is continuously built and negotiated, leading to the transformation of social representations. In some sense, social representations can be re-elaborated as social actors encounter new experiences linked to new social positions. Alongside already identified categories, the overall results of the interviews disclosed new important dimensions that are worthy of note. In fact, although previous studies emphasize social and relational intelligence as an important domain in representations of intelligence (Amaral, 1997; Mugny & Carugati, 1989; Poeschl, 1998), the very own reference, in participants' speeches, to the concept of emotional intelligence is a relatively new one, which might probably be a consequence of the diffusion of Gardner's multiple intelligence theory (1983). Moreover, the importance of a wide variety of activities for the development of intelligence and the importance of instructive games and materials to that process comprise relatively new elements. Still, this should not come as a surprise, especially if we consider Moscovici's (1981) remark on the mobile and circulating character of social representations, their plasticity and dynamic forms. These new elements reflect the contemporary version of common sense, which is endlessly originated and reconstituted in daily life in the course of communicative processes, be it inter-individual or inter-group communication, mass communication or scientific diffusion.

Altogether, results support the emergence of social representations of intelligence and perceived contributions for its development specific to parental and teaching experience. Since shifts take place as a result of these experiences, it must therefore be acknowledged that social identities have general socio-cognitive consequences of their own. As Moscovici and Hewstone (1983) argue, social representations contribute to group identity formation in the sense that by merely sharing a social representation, group members come to feel a common identity since they have a common "worldview". Such is the case, for example, of representations of intelligence, where the organizing effects of group membership and educational roles are very prominent. In valuing the ability to learn and to achieve goals as definitional components of intelligence, it would seem that parents are likely to develop a somewhat long-term perspective of intelligence and value-laden dimensions that "equip" their children both for their schooling and their future life as adults. Since parents are faced with the need to socialize and educate their children, emphasis is not only set on school career as definitional of intelligence, but also on more generalized abilities to succeed in the world (as students, as citizens, as future adults and professionals). In fact, the particular emphasis and the endorsement of a representation of intelligence in terms of social adaptation and the ability to achieve personal and social goals – which expresses the mastering of social rules and a sort of inner motivation which prompts children to develop their intelligence – has previously been found in the Portuguese context (Amaral, Carugati, Peixoto & Selleri, 2006; Amaral, Peixoto & Carugati, in press). On the teachers' side, the endorsement of a cybernetic prototype of intelligence – which emphasizes cognitive abilities and problem solving capacities – may be explained as an effect of "professionalisation", which introduces its own particular dynamics into the representations of intelligence. As these representations play both a directly practical

and functional role in the way teachers organize their teaching activities, emphasis on such dimensions of intelligence with a high educational valence might be explained as having a dynamic role in professional identification. In short, and as Mugny and Carugati (1989) point out, "teachers demonstrate an institutionalization of the whole definition of intelligence, so that it comes to be seen in terms of success in the most institutionally valorized school subjects" (p. 137). To sum up, results present an example of the processes through which social representations themselves evolve and are transformed, therefore leading to the consideration of social representations from a sociogenetic point of view (Duveen & Lloyd, 1990): by articulating the individual and the collective, social representations of intelligence are organizing principles of ideas (Carugati, Selleri & Scappini, 1994) which set the basis for the re-construction or re-elaboration of social representations according to specific social groups and identities. It is through social interactions and communication that identities come alive (Howarth, 2010), hence showing how people collectively participate in the social and ideological (re)construction of the relations they live (Howarth, 2004).

Particular attention also needs to be given to the "self-defensive" function, which is very salient in the results. For example, when asked about family contribution for the development of intelligence, parents emphasize didactic games and materials and, therefore, take a more playful view of their own role in this process. The fact that they do not explicitly assert the importance of the family for the development of intelligence, especially in terms of formal education and parents' active involvement, leads us to assume that, while clearly not dismissing themselves from their children's education and intelligence development, parents tend to implicitly assign this function to others, namely teachers. This fact is even more striking if we consider parents' emphasis on learning as a definitional component of intelligence. Indeed, we seem to

have come to a "paradox", which raises the question: if parents define intelligence as the ability to learn but they do not ascribe themselves an active role in that process, who is then responsible for teaching children the subjects they should learn in order to "become" intelligent? Parents' answers on school contributions for the development of intelligence might give us a clue. In fact, parents are most in agreement with dimensions which outline the role of school in teaching and highlight the importance of good teachers as well as their teaching methods. Clearly, responsibility is set on school itself and the teachers' competence seems to be a special concern for the development of intelligence, which is very much in line with Mugny and Carugati's (1989) seminal work (see also Carugati, Selleri, & Scappini, 1994). This emphasis might be understood if we consider that school is largely definitional of intelligence (see Valentim, 1997) and assumes that, according to dominant cultural models, it is a "good parents' role" to assure that their children attend good schools. Still, since parental identity has its own socio-cognitive operations, such a delegation of family's role in the development of intelligence and the consequent important responsibility that school is assigned, operate as a "sort of defense of the self-image when the social identity – in this case a parental one – is capable of threatening its positivity" (Mugny & Carugati, 1989, p. 102).

On the other hand, when asked about school contributions for the development of intelligence, teachers value dimensions that somehow relate to children but, by no means, explicitly value topics concerning their own responsibility and procedures, especially good teachers and teaching methods. Moreover, considering their educational and professional role, as well as their institutional duties in teaching, the fact that teachers, unlike parents, do not stress the ability to learn as a definitional component of intelligence may be very intriguing and must be further explored.

CONCLUSION

In the present study, the relatively new emphasis on the emotional component of intelligence adds to previous research that identified social adaptation and motivational factors as a particularly important feature in Portuguese samples and may, therefore, provide further insight as a context-specific definitional component of intelligence. Furthermore, in line with Mugny and Carugati (1989), the present study represents, in the Portuguese context, a new attempt to include different categories of participants as defined by their educational roles and, as so, to analyze the construction of social representations of intelligence also in regard to participants with no active parental or teaching role, such as students. All in all, this study also provides further support to previous investigations on social representations of intelligence. In fact, both by disentangling the domains that build up an intelligible sense of intelligence and also by showing the re-construction of representations from different points of view, results lend further support to a very stable socio-cognitive organization of representations, which is maintained and consistently corroborated over the years (Carugati & Selleri, 2004) and in different contexts, such as Italy and Switzerland (Mugny & Carugati, 1989), South Korea (Yun, 1992), Finland (Räty & Snellman, 1995) and Portugal (Amaral, 1997).

A major goal inherent in our study was to identify issues yielding implications for future research endeavours. The approach used in this study allowed us to seek meanings and actions people evoke when it comes to intelligence and educational practices. On completion of this research, it is worthwhile envisaging further research which would examine in greater depth the hypothesis that representations of intelligence orient actions and interventions educators take towards children, especially in the case

of parents and teachers. Teachers make sense of their complex world and respond to it by forming a complex system of personal and professional knowledge and implicitly held assumptions. Literature points to the fact that teachers' implicit theories about education are powerful forces in shaping their decisions and practices in the classroom (Berry, 2006; Laplante, 1997; Stanovich & Jordan, 1998). Therefore, the importance of examining teachers' representations of intelligence must be emphasized, since the lack of a clear understanding of the relationship between these representations and implemented practices may lead researchers to advocate for specific uses of teaching strategies that teachers are unable to facilitate or support, because of their underlying representations and theories of learning and instruction. As for parents, literature has for long discussed the consequences of parents' ideas both for parents and for children. In fact, empirical evidence has been provided for the important role of parental ideas as determinants of parental actions (for a review, see Miguel, Valentim & Carugati, 2009) and for the effects of parenting practices and styles on child outcomes and behaviors (English, 1998; Lamborn, Mounts, Steinberg & Dornbusch, 1991; Rossman & Rea, 2005). Given its important theoretical and practical implications, the reflection on the relation between social representations of intelligence and educational practices and styles should be encouraged as an important field of both school and parental research and intervention.

Dedication: We dedicate this paper to Gerard Duveen, who passed away on November 8, 2008. His approach to social representations and social identity has a major part in the framing of this empirical research. Particularly the third author had a long scientific and friendly intercourse with Gerard, inviting him as visiting professor at Bologna University, and participating at various colloquia across Europe. Gerard's scientific heritage is a major gift for the new generations of researchers both in social and developmental psychology.

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APPENDIX 1

Categories for "What is being intelligent?"

Name of category	Definition	Examples from speeches
Multiplicity and expertise	Intelligence as an aggregate concept which assembles a wide variety of dominions and definitions; intelligence as a result of proficient knowledge and skills in a specific area	*"There are several different domains… and each person has a special ability and a more refined sense of intelligence for some areas than for others."*
Problem solving	Having the ability to look at a problem or situation and solve it	*"Having the ability to solve… analyze information, process it, understand it and being able to solve the problem. For me, that is intelligence."*
Integrating information	Having the ability to integrate information, make connections and distinctions between ideas and things, grasp abstract ideas and complex situations	*"To articulate their own knowledge and, for example, all we experience. Being able, for example, to listen to news and have a critical opinion on it. But, it order to have that critical opinion, the person must have meditated. But, to meditate, the person needs to have a certain knowledge. Knowledge that was understood and assigned a meaning."*
Easiness	Having the ability for easy achievement	*"I think everyone has a different type of intelligence and I think it has exactly to do with that: with the ability to do something, with the ease with which somebody can do something."*
Learning	Being able to learn in order to acquire a huge store of information	*"Intelligent people have the ability to learn, to capture things easily."*
Applying knowledge	Being able to apply knowledge to particular problems and new situations	*"Being intelligent is being able to acquire knowledge. And, once that knowledge is acquired, applying it in the most correct manner."*
Cognitive skills	Having general mental abilities, such as memory and reasoning	*"Reasoning. I think intelligence has everything to do with reasoning."*
Achieving goals	Being able to define attainable goals and accomplish them	*"Everyone has personal aims, everybody has goals to attain. And I think that is being intelligent, being able to achieve those goals is being intelligent."*
Emotional intelligence	Being able to express and manage emotions; interpret emotions other people express	*"In order to get along with other people, you need to have a certain intelligence, you need to manage your own feelings and interpret other people's emotions."*

APPENDIX 2

Categories for family contributions for the development of intelligence

Name of category	Definition	Examples from speeches
Games	Providing didactic games and materials	*"I think there are many things: playing games, drawing with children. For example, I bought my children many books with paper and pencil activities… coloring, completing sentences and dot-to-dot activities. That's stimulating intelligence: playing games, making rimes."*
Books and reading	Providing children with books and promoting their reading behavior	*"Reading. Showing that it is very important to read… parents must read to children. "*
Stimulating	Providing stimuli for learning and problem solving	*"When I talk to parents, I ask them to daily develop questions that make children think, that stimulate them."*
Various activities	Giving children the access to a wide variety of activities and experiences	*"Also making the child listen to music, play some musical instrument. I think that helps developing intelligence. Then also playing football, volleyball, practicing sports. I think it is all very important."*
Emotional support	Providing emotional support and feeling of belonging	*"It is essential to have a good family environment. That's absolutely necessary. Because the child may be intelligent, but if she is facing family conflicts or distress, she will be affected."*
Challenging	Presenting children with challenges	*"For example, if the child asks a question… if parents can explain or can make the child achieve an answer by herself… if this is done on a daily basis, I think this will help the child develop her intelligence."*
Accompanying children	Being close to children and knowing their needs and expectations	*"I think it is important that the child is accompanied, observed… one must be attentive to all signs. When the child arrives home, ask her about homework, if she has already done it… see, one must always see."*

APPENDIX 3

Categories for school contributions for the development of intelligence

Name	Definition	Examples from speeches
Stimulate and motivate	Providing stimuli and motivating for learning and surpassing difficulties	*"I think by stimulating them, and most important of all, captivating them for what they are learning. Because if children are not captivated, if they don't find it interesting, if it is not a challenge… I think they will loose interest, because the child needs stimuli, needs challenges. And by doing that, I think [teachers] are stimulating them [...] And mainly of all, making them like to learn."*
Teaching methods	The way the teacher presents the subject matter	*"If teachers are able to involve, to talk about subjects in a very natural fashion and adapting them to daily situations, I think people are more easily motivated to learn the subjects [...] If there is the ability, from the teacher's part, to talk about it in a more practical way, I think it makes it much easier."*
Teach	Providing a huge store of information related to several subject matters	*"First, school-specific goals: teaching history, geography, and so on. School subjects are important."*
Good teachers	Teachers' competence and their availability to help children surpass their difficulties	*"On the school's part, the teachers' dedication, their engagement, their availability to help students surpass their difficulties."*
Extra-curricular activities	Providing activities outside school subjects	*"Another thing that I think school should develop is school sports. And also other kinds of groups: science club, geography… I think it is very important that children have many options in terms of extra-curricular activities."*
Child characteristics	Taking children's general characteristics in attention	*"She has always liked to learn, she loves to learn. I didn't say anything… but the teacher noticed that she always wanted more and more… so she is in the first grade, but also doing some second grade exercises. [...] I think the teacher developed this ability of hers, didn't she?"*
Conviviality and sociability	Prompting children's conviviality and social relations	*"Also school trips…I think they are very important. Not only they enable contact with other places, but also prompt interactions between people, between teachers and students, and between students themselves. Of course they also have that [interaction] in classes and in the playground… but it's a different situation and I also think it is important."*
Emotional stability	Enhancing children's emotional stability	*"I feel like children go to school… but they also have affection needs. I think that all that one can do which might bring emotional stability to the child…I think that also contributes for her development of intelligence."*
Giving examples	Providing examples of specific approaches to problem solving	*"First of all, showing different perspectives of the subject they are trying to develop. Give examples."*
Child's interests	Taking children's interests and motivations in attention	*"I think that school should try to adjust students' interests and develop… meet their interests and develop them."*

Reasoning	Stimulating the ability to reason clearly	*"What the school may develop is reasoning. Reasoning as the ability to organize learned concepts, easiness to learn. I think should be the school's role: stimulate reasoning."*
School environment	Contextual environment	*"School and its infrastructures."*