

Self-Recognition and Self-Regulation: The Relationship with Socialization Trajectories and Children's Sex

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The initial process of self development involves interaction with others and the establishment of relationships taking different paths depending on the socio-cultural context. Self-recognition and self-regulation are considered manifestations of this development between 18 and 24 months of age. This study aimed at analyzing the relationship between these two aspects, maternal beliefs about autonomy and relatedness, as well as identifying differences between boys and girls in this developmental stage. Participants were 94 mothers of different educational levels and their children of 17-22 months of age in two Brazilian cities. Socialization Goals Inventory and Parental Practices in the First Year Inventory were used to collect data on mothers' beliefs. Children performed tasks related to self-recognition (the mirror test) and self-regulation (compliance to requests). The group of mothers studied valued both autonomy and interdependence. Children's responses are consistent with a perspective of relational autonomy, which value both independence and interdependence. Differences were found in relation to sex in both self-recognition and self-regulation, and baby girls showed superior performance than boys in both tasks.

Keywords: self-recognition, self-regulation, socialization, children.

El proceso inicial del desarrollo personal implica la interacción con los demás y el establecimiento de relaciones por caminos diferentes dependiendo del contexto socio-cultural. El Auto-reconocimiento y la auto-regulación se consideran manifestaciones de este desarrollo entre los 18 y los 24 meses de edad. Este estudio tuvo como objetivo analizar la relación entre estos dos aspectos y las creencias maternas sobre autonomía e interdependencia, así como la identificación de las diferencias entre niños y niñas en esta etapa evolutiva. Los participantes fueron 94 madres de diferentes niveles educativos y sus hijos de 17-22 meses de dos ciudades brasileñas. Para recoger datos sobre las creencias de las madres se utilizó el Inventario de Objetivos de Socialización y el Inventario de Prácticas de Cuidado. Los niños realizaron tareas relacionadas con el auto-reconocimiento (la prueba del espejo) y con la auto-regulación (cumplimiento de peticiones). El grupo de madres estudiadas valoró tanto la autonomía como la interdependencia. Las respuestas de los niños son consistentes con la perspectiva de autonomía relacional, que valora tanto la independencia como la interdependencia. Se encontraron diferencias en relación con el sexo, tanto en auto-reconocimiento como en auto-regulación y las niñas mostraron un rendimiento superior a los varones en ambas tareas.

Palabras clave: auto-reconocimiento, auto-regulación, socialización, niños.

The formation of a sense of self is one of the most important themes in developmental psychology (Rochat, 2003) and an appropriate one to the examining of the relationship between biology and culture. We can study how this basic predisposition follows different trajectories in different cultural backgrounds. For this, we take Rochat (2010) conception of self as a phenotype, product of the relations of the genotype and the environment, and the idea of a construct that includes the notion of person, and, in a way his/her personality (Kagitçibasi, 2007), the 'I-self', and the 'me-self'. The first relates to the self as agent of knowledge. The second, the me-self, is the object of knowledge by others, and includes the material social and spiritual me (Kagitçibasi, 2007). We focus here on the 'I-self', which we understand it is constructed based in biological and perceptual processes since birth. It includes the components of self awareness, self agency, self continuity and self coherence.

Based on evidence from empirical studies, especially over the last three decades, it has been possible to conclude that at birth infants seem to have an initial self, which is determined by their ability of differentiating their bodies from others (Rochat, 2001, 2011). This capacity seems to be based on direct perception and integration of various modalities (Meltzoff & Brooks, 2007), plus the feelings' experience, which role has been stressed by Rochat (2011). From this early beginning, important milestones occur at two months and nine months (Rochat, 2011). At 18 months, children acquire a conceptual form of reflexive self-consciousness, linked to their ability to symbolize, and show evidence that they understand what it means to have a self. "They are newly capable of re-cognizing themselves for themselves, inclined to work on their self-presentation with others in mind [...]. They show the first explicit signs of self-conscious emotions [...]." (Rochat, 2011, p. 115). They are able to cooperate with others, seem to anticipate that others make judgments about them, and do self-describing emissions.

As the self develops in interaction with others and is manifested by several interrelated aspects (Jennings et al., 2008), along with self-recognition there is the development of self-regulation. It consists in the children's ability to regulate their behavior in relation to others; the monitoring and modulation of cognition, emotion and behavior in the attempt to meet goals and/or to adapt in specific situations to broader social and cognitive demands (Berger, Kofman, Livneh, & Henik, 2007). Self-regulation includes the capacity to respond to requests; to initiate and terminate behaviors according to situational requests; to modulate the intensity, frequency and duration of motor and verbal in social contexts; to abdicate of acting upon a desired objective or object; and to behave in a social acceptable manner in the absence of external regulators (Kopp, 1982).

Self-regulation behaviors begin to appear during the second year of life in many cultural communities (Keller,

2007; Kochanska, Coy, & Murray, 2001; Kopp, 1982). Studies include tasks such as compliance to requests and delayed gratification. Keller et al. (2004) used both kinds of tasks in a study with children at 18 to 20 months. In the compliance to requests, one the mother asked the child three times to bring an object to her and another three times to put an object away to another person or place. When the child showed no reaction that had anything to do with the request, the mother was instructed to repeat the request up to six times. The mother was instructed not to interfere other than by repeating the request if necessary. The behavioral reaction of the child was coded as: internally regulated compliance (the child performs according to the request without having to be reminded), externally regulated compliance (the child complies with the request but stops several times and has to be reminded at least once to finish the task), partial compliance (the child starts acting according to the request stops), or noncompliance (the child does not follow the request). In the delayed gratification task, the child was presented with attractive food items by the experimenter in a transparent container. The experimenter instructed the child not to open the container until she/he came back and left the room for two minutes. The mother was instructed to remind the child not to open the container until the experimenter returned if he/she attempted to do it. Children's reactions were coded as: internally regulated compliance, externally regulated compliance (after mother's reminder) or no compliance. According to Keller et al. (2004) children from cultures in which children experience proximal parenting style (characterized by body contact and body stimulation) and in which interdependency in valued develop self-regulation earlier.

Despite the study of ability and willingness to modulate behavior according to commands and expectations of caregivers being a fertile area, the majority of the research has been conducted with American and European families (Edwards & Liu, 2002), with the exception of Keller and colleagues' studies. Results of the study of Jennings et al. (2008) indicate that the most important extra-individual factor in the development of self-regulation is the expression of maternal affection. More affectionate mothers favor the development of self-regulation. This is a variable that can produce intracultural differences in the development of self-regulation. The authors have also found a relationship between self-recognition and self-regulation. For them, with the development of self-consciousness, children at 18-20 months or more understand themselves as the source of their actions and realize that they affect others, allowing greater capacity for self-monitoring. Maternal affective reactions and these cognitive abilities and motivation lead to the development of self-regulation.

The recent study of Broesch, Callaghan, Henrich, Murphy, and Rochat (2010) brings new evidence on cultural differences on self-recognition. They include some samples not previously studied by other authors, such Kenya and

Fiji, comparing children from non-Western rural communities and two Western urban ones. They have observed a type of response that they labeled *freezing* in the Kenyan children, even the ones older than the age in which they are expected to pass the mark test. This behavior was observed also more frequently in children from Fiji and from Grenada than on the ones from Canada and United States. It has been interpreted as an indication that the absence of response to the mark test should be considered with caution, not necessarily indicating lack of self-awareness, but a consequence of some socialization practices.

Although an expressive body of literature presents evidence of this capacity of children to the self-recognition at 18-20 months, the interpretation of the results it not without controversy. Some authors (Heyes, 1994; Povinelli, Landau, & Perilloux, 1996) have questioned if the behavior of spontaneous touching the mark in his/her face or other part of the body after seeing a mark in the mirror is an indication of an important milestone in self development in primates and humans. Furthermore, there is a lack of direct empirical evidences that support the association between the mirror self-recognition and a theory of mind (Nielsen & Dissanayake, 2004). However, Nielsen, Suddendorf, and Slaughter (2006) suggest that there is some kind of development that occurs between 4 and 18 months that provides, at least, the capacity to compare, and perceive inconsistencies between the mental image and the mirror image. There have been are some questions also about the procedure of using lipstick to mark the face at the test. Some studies have used adhesives in this task (Povinelli et al., 1996; Nielsen et al., 2006; Broesh et al., 2010). This can be an alternative to avoid the possible influence of odors and perhaps greater familiarity with lipstick by the girls.

However, authors who are authorities in this area argue that the expression of self-awareness is represented in the child's ability to recognize his/her image in the mirror (Rochat, 2003; Keller, 2007), which is the product of previous achievements (Berthenthal & Fischer, 1978). For Keller (2007), this is evidence of a categorical self concept in terms of "awareness that the self is a separate physical entity and a source of actions, words, ideas and feelings" (p. 229). Based on her investigations, using the lipstick procedure in many cultures, the author concludes that the mirror self-recognition test is the best measure for self-referential behavior, and an indicator of self construction. We have adopted the same procedure of those authors, believing that its validity has support in the studies conducted by them.

Thus, although there are different interpretations about the meaning of self-recognition, mainly due to cultural differences, it is possible to argue that the half of the second year of life is an important period in the development of self-consciousness and key aspects involved in this process

are indications of self-awareness (Rochat, 2011), and regulating their behavior on that basis (Keenan, Gallup, & Falk, 2004). This process takes place in relationship with others (Schore, 1994) and it follows various trajectories and rhythms, according to interactional patterns characteristic of different developmental pathways.

Different ontogenetic trajectories, for the development of varied orientations of the self have been suggested (Kagitçibasi, 2007; Keller, 2007). They are based on the importance attributed to the dimensions of separation and relationship and are defined as independent, interdependent and autonomous-relational self. In the first one, the emphasis is on independence, including autonomy and separation, featuring a distal type of relationship. It is considered as characteristic of urban and educated western middle-class families. The interdependent self privileges heteronomy and respect, characterizing a proximal type of relationship. In this orientation body contact and stimulation are emphasized, and it is considered characteristic of rural families with low socioeconomic and educational backgrounds. In the third orientation, autonomous-relational self, both autonomy and relationship are prioritized. This model is observed on urban families and educated middle-class in traditionally interdependent societies. Based in those conceptions, some studies show differences between children of different cultures in the tasks of self-recognition and self-regulation as mentioned above (Keller et al., 2004; Keller, 2007).

Keller et al. (2004) compared samples from urban Costa Rica (hypothesized as a context favoring autonomy and respect), Greece (a context that fosters autonomy), and rural context in Cameroon (which give priority to the relationship). Results indicate differences among the three groups, with better performance in the task of self-recognition by the group of Greek children, followed by the Costa Rican group and, in third place, by the Cameroonian group. The opposite trend was observed in tasks of self-regulation. The new evidence from Broesh et al. (2010) indicates the need of further studies with non-Western and non-urban populations to confirm this trend.

In general, those results highlight the need to think about the kind of self considered when theorizing about its development, not favoring one characteristic of some specific cultural groups (urban, educated and Western) and the importance of gathering data from different cultural contexts, such as Brazil. In addition, a gap in cultural studies seems to be the lack of consideration that the socialization of boys and girls in different cultural backgrounds follows distinct patterns, reflected in several differences between men and women in adulthood.

The basis for these differences can be thought both in terms of the evolutionary characteristics of our species, and stereotypes of gender roles. In evolutionary terms, the two sexes differ in their interpersonal functions related to survival: while women were generally responsible for children's care,

men were responsible for obtaining food. These activities required different skills (Brody, 1985). In regards to gender role stereotypes, the literature is vast and controversial and will not be discussed here. However, some evidence can be cited. Cross and Madson (1997) discuss how independent and interdependent selves can be built even in societies that, in general, are considered individualistic such as the United States, and that gender differences can be observed in these contexts. In general, one can say that the differences in girls and boys' socialization range in degree and direction in different cultures (Cross & Madson, 1997). Sex differences in self-recognition and self-regulation are either not considered in the studies, or their evidence is not clear. However, the study carried out by Herold and Akhtar (2008) on the relationship between self-recognition and perspective-taking, using the classic mirror task in a sample of American children aged 18-20 months, found that more girls showed self-recognition than boys.

In relation to self-regulation, the evidence is more robust. Previous studies have pointed to the trend of girls having greater self-regulation ability than boys (Kochanska & Aksan, 1995; Kochanska et al., 2001; Moilanen, Shaw, Dishion, Gardner, & Wilson, 2009). There is, however, evidence in other directions, possibly because of the use of different instruments. Jennings et al. (2008) found no relationship between scores in self-regulation and sex of children aged 20-27 months. The authors used four tasks: to postpone action, the ability to modulate voice and motor speed, and to control behavior from a signal. The score in self-regulation was the average of standardized scores in the four tasks, and an alpha of .53 for this measure was found. This low alpha may have affected the outcome.

In Brazil, studies on maternal beliefs have shown intracultural differences, with a general tendency to value both autonomy and interdependence in socialization goals for the children, as well as in care practices (Seidl-de-Moura et al., 2008; Vieira, Seidl-de-Moura, Lordelo et al., 2010; Vieira, Seidl-de-Moura, Macarini et al., 2010), using samples of mothers from different geographic regions, and contexts. Another study compared socialization goals of Brazilian and German mothers (Friedlmeier Schäfermeier, Vasconcellos, & Trommsdorff, 2008), and found similar results. The authors found a more collectivist / interdependent tendency in the Brazilian sample in general, but their results did not indicate differences between the samples on independency goals. The general trend of this set of studies using Brazilian samples seems to point to a trajectory of socialization fostering the development of autonomous-relational selves (Kagitçibasi, 2007).

Based on the literature, our hypotheses are that, in general, mothers in the present study will value both autonomy and interdependence in their socialization goals and practices, indicating a trajectory of development of autonomous-relational selves for their children. Regarding the development of self-recognition and self-regulation, we

hypothesize that, due to this trajectory and the relationship pointed out by Jennings et al. (2008), there will be an equivalent proportion of children presenting self-recognition and self-regulation behaviors (internal or external). In relation to children's sex, and considering both the literature and the Brazilian cultural and historical context, we hypothesize differences between boys and girls both in self-recognition as in self-regulation, with girls displaying more of those behaviors than boys at the age range considered.

Method

Participants

Participants were 94 children from both sexes aged 17-22 months and their mothers, 44 dyads from Rio de Janeiro (Rio de Janeiro), and 50 from Itajaí (Santa Catarina). They are both urban contexts. Mothers age ranged between 19 and 43 years and children had a mean age of 18.99 months. Mothers were distributed by different levels of education: incomplete secondary level (22.3%); from complete secondary level until some years of college (37.3%), and at least undergraduate level (40.4%). [see Table 1 for socio-demographic characteristics of the group of participants]. Although we did not explore further the socio-economic levels of the families, we tried to have diversity in terms of education of the mothers, which may somewhat indicate differences in those levels. It has to be acknowledged however, that there is a predominance of educated families from middle-class.

Instruments and tasks

For mothers:

Instrument to assess Parental Ethnotheories

Inventories on socialization goals and parenting practices in the first year were used to collected data. The scales were translated and adapted from original instruments used by Keller et al. (2006).

Socialization Goals Inventory

The inventory consists of a list of phrases that indicate views on goals that parents will try to achieve in the development of their children during their first three years of age. The sentences are read one at a time to mothers. It is then asked that they indicate whether they agree or not with the affirmatives on a scale from 1 (do not agree) to 5 (totally agree), reacting spontaneously without much thought. The principal components factor analysis yielded two dimensions (Keller et al., 2006): autonomy goals (five items), as "developing competitiveness", and relational goals (five items), such as "obey the elders". The subscales of the two dimensions showed adequate levels of reliability

Table 1
Socio-demographic characteristics of participants

	Rio de Janeiro	Itajaí	Total
N	44	50	94
Mothers' age (years)	$M = 32.64$ ($SD = 5.49$)	$M = 29.42$ ($SD = 5.7$)	$M = 30.93$ ($SD = 5.8$)
Children's age (mo.) ($SD = 1.2$)	$M = 19.35$ ($SD = .77$)	$M = 18.68$ ($SD = 1.03$)	$M = 18.99$
Girls	45.5%	42%	43.6%
Boys	54.5%	58%	56.7%
Mothers' educational level			
Incomplete secondary level	20.5%	24%	22.3%
Complete secondary level	34.1%	40%	37.3%
Undergraduate education	45.4%	36%	40.4%

(Cronbach's alpha of .93 for the total sample for the autonomy goals subscale, and .88 for the relational goals one). The two measures were not significantly correlated.

Parental Practices in the First Year Inventory

This inventory consists of a list of ten sentences about the correct way of a mother to deal with her baby or small child. It is said to the participant that some of the things may be more familiar than others to her and that perhaps she will agree with some sentences and disagree with others. It is then asked to the mother to imagine a baby of about three months-old, and to say whether she agrees or not with each sentence on a scale from 1 (do not agree) to 5 (totally agree), reacting spontaneously without much thought, as in the previous inventory. Examples of items are: "You should let babies cry a bit and see if they console themselves"; "A baby should always be near his mother, thus she can immediately react to its signals". The socialization goals are classified into two dimensions: autonomy (five items) and relational (five items).

For the children:

Self-recognition Task

The classic mirror task (Rouge test) was employed to assess self-recognition. This task was used in studies reported by Keller (2007). It was presented in the natural environment of the family, usually the living room. The mother was always present and for most of the children, other relatives were present since this is common in Brazilian families. Instructions were given to all the persons present not to interfere in the task, and the setting was as quiet as possible (without TV, radio and telephone interference). The material was a mirror in which the child could see his face and torso when standing in front of it.

First, the child's attention was called to the mirror, and he/she was allowed to become acquainted and explore his/her mirrored image. After five minutes, the mother or the experimenter made a small mark with odorless play lipstick on the child's cheek, naturally and without attracting the child's attention. Immediately after the mark was made, the child's attention was once more called to the mirror, and his/her reactions were observed and coded. This was already the test. The following categories were used: the child points to and tries to clear the mark on her face (action toward the self), the child points to and tries to clean up the image in the mirror (action toward the image), the child looks in the mirror, but does not react (looking without reaction), and the child has other reactions not related to the task.

Self-regulation Task

Each child was tested for compliance to prohibitions, using a task reported by Keller (2007). In this task the experimenter showed to the child a transparent box without a lid and with some color toys inside. She said that she had to leave the room and that the child can play with the toys when she returns. Before leaving, she tells the mother that do not prevent the child to picking up the toys, but that she can remind him/her only once, saying, for example: "Remember what the lady said? You can only play when she returns". The mother was also instructed not prevent the child to pick up the toys, in case he/she insisted in touching or playing with the toys after her reminder.

The experimenter then left the room and the child with the mother and the box within reach of the child, for the duration of two minutes. In her absence, the scene continued to be filmed by an assistant. After the two minutes, the experimenter returned to the room and did not react either to the child attending to her request or not.

The child's behavior in this task recorded in video was coded into three levels: the child waited without being reminded (internal regulation), the child only waited after being reminded (external regulation), and the child did not delayed getting the toys (absence of self-regulation).

Data collection

Initially, an application manual was elaborated and training of research teams in both cities was conducted. The contacts with families were made directly or through selected nursery schools. When the participant agreed to receive the researchers, an appointment was scheduled to explain the project, present the informed consent form, and - if there was an acceptance - request the mother's signature.

Mothers were interviewed individually in a place chosen by them. In the second part of the data collection, the focus was on the child. This session with the child was recorded on video and started with a period of 10-15 minutes of free playing. Each child participated in two activities: one related to self-recognition, and other to self-regulation, as described previously, both in the presence of the mother and other members of the families. The children's sessions occurred mostly in the families' living rooms. Beside the experimenter, an assistant participated, recording the entire session in video.

Ethical procedures

The study was conducted in accordance to the rules and regulations in force in Brazilian ethics committees for human research, and was approved by the committees of both the State University of Rio de Janeiro and the Federal University of Santa Catarina. The informed consent was presented and signed by mothers.

Reduction procedures and data analysis

Mothers' scores in the different inventories assessing parental ethnotheories were considered (Autonomy and Relational Goals and Practices). Children's variables were: sex; self-recognition score (presence or absence), self-regulation score (Internal regulation; external regulation and absence).

The instruments answered by mothers were coded and transcribed into a general data sheet. The videotaped sessions with children were coded for each task / variables (self-recognition; self-regulation), according to the categories previously defined, by judges who did not know mothers' scores in the instruments. Reliability was assessed between two coders who examined independently 30% of the tapes. The agreement in self-recognition scores was 100% and in self-regulation 77.78%.

For quantitative analyses, paired *t* tests, chi-square, correlation, ANOVA, and logistic regression were used to identify differences and predictors of self-recognition and self-regulation.

Results

Maternal beliefs on practices and socialization goals

The scores in the inventory of maternal beliefs about socialization goals and practices (autonomy and interdependence) were compared to provide indications on the trajectory of self construction. Paired *t* tests were used to compare autonomy ($M = 3.92, SD = .62$) and relational goals ($M = 4.04, SD = .66$). No significant difference was found and the scores in two variables are positively related ($r = .54, p < .05$). Thus, this group of Brazilian mothers seems to give importance both to autonomy and to interdependence in the development of their children.

In relation to beliefs about practices, mothers' responses in the instruments used also did not differ significantly. That is, they report equally to perform care practices that promote independence ($M = 3.24, SD = .62$) and relationship with others ($M = 3.20, SD = .72$). In this case, it was noted a negative relationship between the variables ($r = -.27, p < .05$). The more the mothers reported practices of autonomy, less reporting of interdependence was observed. The results observed in these analyses confirm our hypothesis that a tendency toward a trajectory that favors the construction of relational and autonomous selves would be observed. In order to understand the relationship between beliefs about goals and practices, we compared the scores in the sub-scales of autonomy and interdependence in both instruments. Comparisons of means using paired *t* tests indicate significantly higher scores in goals than in practices. For autonomy, the result was $t(93) = 7.16, p < .05$; for interdependence, $t(93) = 9.62, p < .05$. Mothers have higher scores in reporting goals toward autonomy or interdependence than in reporting beliefs in practices promoting them.

Self-recognition and self-regulation on a path of relational-autonomy: children's performance and differences between boys and girls

After the results in mothers' beliefs, we sought to verify self development of their children in the tasks used and the consistency with predictions made. We recoded the variable self-recognition, into three levels (action toward the self, action toward the image, no action or other unrelated behaviors). We created two age levels: less than 20 months and 20 months and more, and compared the two variables, using a Chi-square test. The results were not significant, and the distribution of the children on the categories can be observed on Table 2. As it can be verified children were observed for self-oriented responses in 48.9% of the cases.

Self-regulation was recoded in three levels: internal regulation, external regulation (depending on reminders of adults) and absence of self-regulation. The distribution according to age levels can be seen on table 2. It was observed that 27.47% of children displayed indicators of internal regulation and 13.18% of external regulation. This

Table 2

Children's performance on self-recognition and self-regulation tasks according to age levels

	17 to 20 months	> than 20 months	Total
Self-recognition			
Action toward the self	37.23%	11.7%	48.93%
Action toward the image	6.38%	2.13%	8.51%
Absence of reaction or unrelated behavior	27.66%	14.9%	42.55%
Self-regulation			
Internal regulation	20.88%	6.59%	27.47%
External regulation	6.59%	6.59%	13.18%
Absence of regulation	43.62%	14.26%	57.88%

means that 40.63% of children have some capacity of self-regulation. If we take into account the age, we observe that 37.88% of the children with younger than 20 mo present self-regulation (external or internal) and 42.84% of the children older than 20 mo show this capacity. Age levels and performance on this task are not related according to Chi-square test performed.

Performing a Chi-square test with the results on self-recognition and self-regulation, it was not observed a significant difference in the distribution. These results indicate that this group of children is developing equally in self-recognition and self-regulation, as expected, according to the development path of self construction privileged by their mothers (autonomous-relational).

The hypothesis of differences between boys and girls was confirmed. Apparently, the performance in self-recognition and self-regulation is related to the sex of the child in this group. A Chi-square analysis revealed a significant relationship between the presence of self-recognition and sex of the child ($\chi^2_1 = 6.1, p < .05$). There are more girls (48.8% girls) with self-oriented responses than boys (37.3% of boys). In the task of self-regulation it was also found a relationship with the child's sex, according to chi-square analysis ($\chi^2_2 = 8.08, p .05$), with girls also showing better performance than boys. No difference was found between the ages of children (in months) and their performance in both tasks, which was expected due to the small age range considered.

To verify whether the goals and practices of mothers differed for boys and girls, ANOVAS with gender as a factor and mothers' scores in each inventory as variables of interest were carried out. No significant differences were detected, suggesting that the factors that explain the differences between boys and girls in these tests are not detected by the inventories of socialization goals and practices of care used and must be investigated in future studies.

Finally, in order to more precisely identify the predictors of self-recognition and self-regulation, the obtained scores were analyzed with logistic regression for the variables of interest. Confirming the results of the Chi-square, it was found that the baby's sex is a significant predictor of self-

recognition scores [Wald = 0.46, Exp (B) = 3.12, $p = .01$], and girls are more likely to present self-recognition than boys. Age was not a predictor in this group.

Regarding self-regulation, besides the sex of the baby, mother's scores in relational goals is a statistically significant predictor. Girls are more likely to demonstrate ability to self-regulation [Wald = 5.40, Exp (B) = 2.91, $p = .02$] than boys. Furthermore, the more mothers value relational goals, the more likely the children present self-regulation [Wald = 3.08, Exp (B) = 3.08, $p = .03$]. With this analysis, we found that besides the general congruence between mothers' cultural models and the development of children's self in its aspects of self-recognition and self-regulation, there is a more accurate relation in the aspect of self-regulation to mothers' goals. The valuing of interdependence by mothers predicts the development of self regulation in children 18-22 months old.

General Discussion

In relation to cultural patterns of mothers and the developmental trajectories favored, the results of a set of recent Brazilian studies (Friedlmeier et al., 2008; Seidl-de-Moura et al., 2008; Vieira, Seidl-de-Moura, Lordelo et al., 2010; Vieira, Seidl-de-Moura, Macarini et al., 2010) are corroborated. Our hypothesis that Brazilian mothers show a tendency of an autonomy-relational path theorized by Kagitçibasi (2007) and verified in studies of Keller and her collaborators (Keller, 2007), was confirmed both in socialization goals and in practices reported.

The results of self development in terms of self-recognition and self-regulation are consistent both with theory and with evidence from previous studies. There were no significant differences in performance in the two types of task in the same direction of Keller et al. (2004), with children of Costa Rica, considered a context in which autonomy and interdependence are equally valued. That is, in this case, due to the appreciation of both dimensions of autonomy (self-control, competitiveness, separation and unity) and interdependence (emphasis on group goals and focus of social roles, duties and obligations), one can explain

why similar percentages of responses in self-recognition and self-regulation in children were found.

Regarding the hypothesis of sex differences, the results bring a contribution to the literature in relation to self-development in girls and boys, and support the idea that there are differences in socialization according to gender (Cross & Madson, 1997). In self-recognition, the better performance of girls corroborates the results of Herold and Akhtar (2008) in a study with American children. On self-regulation, our results sustain evidences in the literature with children in this age group, indicating that girls show greater ability to self-regulation than boys (Kochanska & Aksan, 1995; Kochanska et al., 2001; Moilanen et al., 2009). As Jennings et al. (2008) had registered in their study, it has been also found that there is a relationship between self-recognition and self-regulation, which seems to indicate that these two aspects of self-awareness and social interaction are part of a more general process of development.

It is possible to think these results about sex differences in evolutionary terms considering the distinct interpersonal functions. According to this view, women are generally responsible for children's care and perhaps this function can be associated to the idea of the necessity of better self-regulation. Also, taking in account gender role stereotypes, and using models of independent and interdependent self-construals, we can speculate that in cultural contexts where autonomy and independence, are both valued, it's expected that girls better adhere to the social rules and self-recognize themselves earlier.

Despite of the contribution of the present study, it is possible to affirm that it has some limitations. Regarding socio-demographic aspects, we evaluated only mothers' educational level. Although there is evidence in the literature about the role of maternal affection in the development of self-regulation, this was not investigated. We believe that differences in this variable can explain some intra-cultural differences. In relation to maternal beliefs and practices, we think that the set of instruments to collected data could be extended so that we can identify more clearly the role of socialization in the differences between the sexes. Finally, although referring to Brazilian mothers, this group of participants was selected only in two urban contexts, in contrast to previous studies about beliefs and practices with broader samples. Since there is evidence of differences in cultural models when the mother lives in capitals or in inner cities (Vieira, Seidl-de-Moura, Macarini et al., 2010), studies on self-recognition and self-regulation in other Brazilian contexts need to be conducted. We may find the behavior identified by Broesch and colleagues (2010) in children from rural areas of Brazil. The age range needs to be expanded and longitudinal investigations, including other maternal and context variables, should be considered in future studies. The tasks used have limitations and their range needs to be broadened to capture the different aspects of self development. Moreover, as pointed out by Broesch

et al. (2010), in future studies it is necessary to improve and control the procedures used, especially in cross-cultural studies, such as familiarity of the experimenter with the child, instructions that are given to children, nature of the mark and to place on the child's body where it is made. The results of differences between boys and girls could be interpreted as being due to girls being more familiarized with lipsticks than boys. Different tasks and materials (such as post-it) should be used in future studies to test this possibility.

Despite those limitations, we believe that the study brings a contribution to the literature in socialization trajectories and self-development. It can be concluded that the development of self, as indicated in tasks of self-recognition and self-regulation is an interactive process, which follows paths affected by several variables. The way the autonomy and independence are valued in a cultural context, in contrast to the emphasis on interdependence and the relationship, leads to differences in those achievements. However, other proximal and distal variables can affect development, including biological propensities resulting from our evolution in the ancestral environment and differences in the expression caregivers' affection. Broad and inclusive models, explaining this development and seeking to account for biology and culture as inseparable dimensions, and the emotional, motivational and cognitive aspects in the construction of the self with others are needed.

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