3
The Other Race Effect in Caucasian and Japanese Children in Brazil: Evidence of a developmental change

3.1
Abstract

The other-race effect (ORE;) has been confirmed by several experimental studies and concerns about the condition in which the individual has greater difficulty in recognizing faces of different races of their own. Few studies have investigated this ORE during the development of the face processing system. The aim of this study was to investigate the development of the ORE in Caucasian and Japanese children born and living in Brazil. To this end, two different but related approached were followed. In the first case, 37 Japanese children and 37 Caucasian children split into two age groups were tested. Japanese children did not present the classical ORE in favor of their race faces, while Caucasian children demonstrated the ORE in both age groups. This indicates that the ORE is present very early in development of face recognition and that the contact with faces of another race during childhood modulates the effect. In the second case, the implicit association with the Japanese or Brazilian culture, was tested. The results showed that Japanese children, while living in Brazil are affiliated to Japanese culture. These findings suggest that the experience with faces from the children's visual context is crucial for shaping the face recognition processing system in early childhood, resulting in differences on the accuracy for other-races face recognition in adulthood, even when culture plays an important role.

Keywords: Face Recognition; Other-Race-Effect; Development; Culture; Implicit Association

3.2
Introduction

Faces are the most prevalent class of visual stimuli in the environment of the person. Since from birth, we encounter thousands of faces that vary in terms of identity, gender, age and race. The face recognition involves processing and interpretation of a set of visual stimuli, which depends on factors such as gender, age and race of face

One of the most important influence in face recognition is the effect of the race (also known as “other race effect” (ORE), "bias of the same race," "effect of identification between races") that points to a difference in the degree of recognition to individuals of their same race (Brigham & Malpass, 1985, Chance & Goldstein, 1996).

First reported by Malpass & Kravitz (1969) the ORE corresponds to the condition in which the person is more inclined to respond correctly when identifying faces of their same race. Indeed, it is common to think that other race faces seem more similar to each other than faces of our own race. For example, Feingold (1914) postulated that an American who has no contact with Asian faces realize then as very similar. The opposite was also found. For Asians, Caucasians all look alike. The ORE has been widely replicated in laboratory and in natural environments. (Bothwell et al, 1989, Brigham & Malpass, 1985, Shepherd, 1981).

Some researchers suggest that the ORE may be explained by the fact that humans develop specialized forms of realizing the characteristics of the faces of his own race group (Lindsay et al, 1991). Other researchers suggest that the degree of contact and experience with people of other race groups decreases the ORE, explaining the effect by contact and experience admixed (Furl et al 2002, Levin 2000).

Little is known about the development of this phenomenon during childhood. Some studies indicate that the ORE emerges between 3 and 9 months of age (Bar-Haim, et al, 200; Kelly et al, 2007b) Other researchers suggest that the effect does not exist before 5 years old (Chance et al, 1982). Some studies explain the ORE as the result of the exposure that the subject suffers from individuals of other races, improving the repertoire of recognition over the years. (Valentine et al, 1995; Feinman & Entwisle, 1976) In fact, there is a prominent part of the experience of the child in the development of their abilities to process faces, that is the foundation of experience with faces in adult life.

3.3
The Maturity of Face Recognition

Many researchers in the development of face recognition pay attention in a particular question: When the perceptual ability to recognize faces of the child, matures to adult levels? Studies with children show remarkable abilities of face recognition very early in life, demonstrating that this abilities depends both on the innate mechanisms and the experience, starting early in development and improving as the child develops.(Kelly et al, 2007)

Newborns can recognize their mothers (Bushnell, 2001; Pascalis et al., 1995), discriminate the identity of new faces with hair (Pascalis & Schönen 1994) and hairless (Turati et al., 2006), and recognize the identity of new faces across changes in viewpoint (Turati,Bulf ,& Simion ,2008 , Pascalis et al., 1998).

Studies with babies with a mean age of 43 minutes of life demonstrate natural interest in human faces (Johnson et al., 1991). In this study, the newborn were presented to faces and non-faces schemes. The results indicated that the babies had more attention to faces schemes. Probably such behavior is related to adaptive aspects in terms of recognition of their caregivers. Moreover, these results indicate that the learning for the future face recognition begins early in childhood development. Experiments with babies two-days old, show that they look more to their mother´s faces than to strangers, probably because they discriminate the maternal face developing some recognition mechanism (Bushnell, Sai & Mullin, 1989).OuvirLer foneticamente

Children under the age of 6-9 months can still distinguish faces from different races and species with which they have no previous experience, focusing more attention on the same-race faces (Kelly et al. 2007; Pascalis, De Haan, & Nelson, 2002).

Studies has shown that the face recognition memory of children, in experimental contexts, improves greatly with approximately 5 years old and is approaching the level of recognition memory in adults only later in adolescence (Blaney & Winograd, 1978, Carey & Diamond , 1977; Carey, et al, 1980, Ellis & Flin, 1990; Flin, 1985). This is not just a phenomenon of memory, performance on discrimination between faces tasks also improves greatly between 5 years and adulthood (eg, Carey et al. 1980; Mondloch, et al.,, 2004; Mondloch, et al, 2002).

Lundy, et al, (2001) demonstrated that the inability to match faces in children, disappeared when the distracting paraphernalia (i.e. hat, glasses, earring), were eliminated. The same happened when Diamond & Carey, (1977) increased the size of the face, which shows that the difficulties with narrowing the focus of visual attention, or worse visual acuity, can contribute for poor performance among children in the face recognition tasks.

There is no doubt that general cognitive factors influence the perception of faces and contribute to their improvement with age, as seen in experimental trials. For example the sustained attention - that is, the concentration instructed - improves until at least 10 years old (Mondloch et al. 2004). Thus, even in the most friendly and well-designed tasks for children, temporary lapses in concentration will occur more frequently in children than in adults. Such lapses can reduce the accuracy of perception in children, even without any characteristic changes in the perception of faces related to age.

Crookes & McKone, (2009), compared the face-space in two groups of children with different ages (5-7 and 9-11 years old) and demonstrated no quantitative differences1 in face recognition, arguing that the abilities systems of children to encode and store faces is as effective as those of adult observers. This statement corroborates the theory that the advantage of face memory in older children and adults is explained by differences in attention and / or interest that affect the performance of explicit memory in a task. (Mondloch et al. 2006).

The results of Crookes & McKone (2009) strongly suggest that there is a differentiated development in the accuracy of the process carried out by mechanisms of face perception related to face identity, beyond infancy. The substantial improvements in performing the experimental task, after 5-7 years, reflect improvements in general cognitive abilities. These results points to the fact that, although there may be changes in velocity of the perception of older children, the maturity of the quantitative mechanisms related to the accuracy of face recognition appears early in the development (5-7 years old maximum)

Thus, there is no evidence that the face-space in children has smaller, poorer or less suitable dimensions for faces than in adults. It is generally agreed among

[1] Effects of development results from quantitative differences, when older and younger participants use the same cognitive process to perform a task, but the older participants have better performances. Qualitative differences occur when younger and older participants use different cognitive processes to accomplish the same task.

developmental researchers that all the qualitative aspects of adults are present in face processing in young children. (Crookes & McKone, 2009)

Some studies (Carey 1992, Carey et al. 1980;) proposed that the strong influence of the experience's effects continues into adolescence, and that the primary cause of adult expertise in face recognition comes from more than 10 years of practice in face discrimination within a class. However, current studies (Crooke sans McKone, 2009) show evidence that the social significance of face discrimination from individuals of the same species - which in humans is mainly driven by information from the face - led to the evolution of a system that many skills are present even at birth, and the quantitative maturity of these skills occurs earlier, determining any effect from increased experience with faces in the development face perception after infancy .

Traditional theories (Diamond & Carey, 1986) suggests that the perceptual processing of facial identity matured very late in development - adolescence - and that the ongoing experience with faces as a class was the engine that causes this development. In its review and new results, Crookes & McKonne, (2009) demonstrated that, in contrast, face recognition is fully mature - both quantitatively and qualitatively - in childhood (and possibly earlier). Theses authors agree with the traditional theories that experience with faces improves the accuracy on recognition tasks, especially with other-race faces, but the size of the experience with faces is not the engineer that causes the maturity of face recognition processes. This conclusion is consistent with the picture that emerges from recent studies with children, where it was shown that even infants have face recognition abilities much better than researchers could have imagined previously. (Crookes & McKone, 2009)

3.4
The Development of the ORE

The Other Race Effect (ORE) is one great example of how face recognition memory improves with age. As previously mentioned, the ORE is the effect by which it is more difficult to recognize faces from another race than faces from the person´s same race. The ORE is evident in both children and adults.(Meissner & Brigham, 2001) The question addressed now is: When in the child development the ORE emerges?

There is a great inconsistence in the studies investigating the age that the ORE arises. Chance et al, (1982) found evidence that Caucasian children and adolescents between 7 and 20 years showed greater accuracy with Caucasian faces than Asian, but this effect did not appear in children under 6 years old. Pedzek et al, (2003) found the ORE in black and Caucasian children between 5 - 8 years old.

Kelly et al, (2007) demonstrated that the ORE emerges as a result of the exposure to faces of the same race group of the newly born child, that will develop special skills to recognize these type of faces. These findings points to an earlier onset of the effect, also suggesting the important role of the early experience with a face type to develop preferences during childhood.

These preferences developed during early childhood will modulate the face recognition performances toward an improvement of accuracy for the children's own race faces. These performance improvement are explained by the way faces are encoded in the memory.

It had been demonstrated that the averaged of faces that the person had contact though all life time generate a prototype face. (Valentine & Bruce 1986, Valentine & Endo, 1992, Valentine, 1992). Some studies further suggested that the face of an individual is stored in a multidimensional space, as a set of information necessary to match against the prototype.

This proposal was called "Prototype Hypothesis" and is an explanation for the way faces are encoded. (Bruce, Burton & Dench, 1994, Jonh Milne & Willian, 1997, Byatt & Rhodes, 1998) If the prototype is the result of the average of all faces that the person has encountered in his life, so it can be expected that Ler foneticamenteindividualization of the prototype's dimensions will be optimized for the recognition of faces of the person's own race group. When the experience with other-race faces begins early in childhood, the prototype will extend to include characteristic of these other-race face. (Valentine, 1991, Kelly et al, 2007)

Pezdek et al, (2003) suggest that the multidimensional face space, where faces are allocated in long term memory, may explain the ORE in children, but there is a quantitative difference between adult´s and children´s face space. For example, the representational space for children's face tends to retain less information and less appropriate configuration of features, than does the representational space for adults. Recent findings about spontaneous preferences, have confirmed the influence of different facial feature inputs as the face prototype acquires during infancy. (Crookes & McKone, 2009)

Shepherd (1981), corroborate with hypothesis that development of the ORE is based on the role of experience with other races. For example, children that lives in miscegenatated neighborhoods presents less ORE, what Cross et al, (1971) denominated The Differentiated Experience Hypothesis, as an explanation for the ORE.

In order to study if the race effect suffers modification by new experiences that occur in children after three years old, Sangrigoli et al, (2005) evaluated the face recognition skills in adults of Korean origin who were adopted with 3 to 9 years old by European and Caucasian families, compared with a control group of Caucasians born in Europe. The participants, now adults, were presented to Asian and Caucasian faces in a task of sample games. Based on the Differentiated Experience Hypothesis, if the sensitive period to the effect of another race does not extend beyond the third year, the performance of adopted Koreans should not be influenced by experience with Caucasian faces. If the time-sensitive effect of race extends beyond the third year, their experience with Caucasian faces should reduce or even reverse the effect of race. In their results, Sangrigole et al, (2005) found no differences in the abilities of facial recognition between the two groups, demonstrating that Koreans adults reversed the ORE. These findings supports the theory that previous visual experiences are erased as a result of immersion in an environment of totally new faces. These results are in agreement with results obtained in language tests with the same population of Koreans adopted. Ventureyra et al, (2004) found no remaining traces of previous exposure to Korean, which suggests that adopted children have lost all the skills in their native language.

There is an analogy between the sensitive period of development of face processing and speed of perception systems. In the field of face processing, as in language, the environment can influence behavioral norms for several childhood years, until at least 9 years old. Sangrigoli et al, (2005) postulated that plasticity is still present up to 9 years and that the identification procedures can be substantially modified during childhood. The early existence of the race effect along with the development of extended face processing shows that face processing system is developed in part through interaction with the environment in which the child is.

De Heering at al, (2010) tested 23 Asian children, between 6 and 14 years old who were adopted early (between 2 and 26 months) in a European country (Belgium). In their results they found that Asian children performed equal to recognize Asian or

Caucasian faces when tested 6 to 14 years after the adoption. The balance of performance between Asian and Caucasian faces was neither correlated with age of arrival in the European country, nor exposure time to other race faces during childhood. These results support the recent observation (Sangrigoli et al., 2005) that the advantage in face processing of the race itself may be modulated by experience with the race, if the start of exposure to other race faces begins during development. However, De Heering at al, (2010) disagreed with Sangrigoli et al., (2005) results in the sense that the ORE was not reversed in their study, but only annulated.

The discrepancy on literature justifies the main objective of this study that is to identify the latency and the development of the ORE in younger children from two different races and cultural environments, born and living in the same country. Therefore it is important to pay attention on cultural issues such as culture influences in perception processes.

3.5
Culture Issues Related to Face Perception

People can only pay attention on a small portion of events in their complex and constantly changing environments. Empirical evidence suggests that people from different cultural backgrounds allocate their limited attention in very different ways. Research in cultural psychology has demonstrated that cognitive activity of Asians differ systematically from Westerners, including categorization, causal explanation and logical inference versus dialectic (Nisbett, 2003; Nisbett, et al, 2001). According to these findings, people from Asian Cultures (eg, China, Korea & Japan) tend to pay more attention to contextual information than their counterparts in Western cultures (eg, Ji, Peng, & Nisbett, 2000; Kitayama, et al, 2003).

Markus & Kitayama (1991) postulated that, historically Asians have developed greater sensitivity to the environment, greater harmony and participation in the social world which results in greater attention to environmental information and the relationships between the elements of the context. This pattern of attention is still dominant in contemporary societies in East Asia such as China, Korea and Japan (Bond & Cheung, 1983; Fiske, et al, 1998; Triandis, 1995).

Massuda et all, (2008) showed that Asian paintings often show a horizon lines higher than in Western paintings. Model’s size of Asian paintings in general, are lower than in Western paintings, consistently with the artistic traditions of the east and West.

Nisbett et al. (2001) argue that differences in social practices can be attributed to cultural differences, eg the ideologies of East Asia such as Buddhism and Taoism in general, tend to emphasize that all things in the world are interconnected. In contrast, the Greek origin of the Western cultural tradition directs his efforts to understand and track the objects without worrying about the relationships among themselves or with information from the environment. The Western metaphysics in general, attempted to the discovery of universal rules that govern situations and behavior, emphasizing the autonomy and independence of individuals, which remain the dominant features of the thought of Greek descent societies, including Western society.

A good example of this historical difference in ideology is in portrait painting, often used as a symbol of power by kings and queens. Generally, the pictures depict a Western individual, aiming it becomes salient, distinguished figure, recording their existence for posterity. For this reason, the model occupies a larger fraction of the picture space. In contrast to the tradition of portraits from noble family members Mikado and Shoguns - of the military governments, did not emphasize the extent of the individual in context (Shimada, 1990), the model size was relatively small, embedded in a background important scene. Sometimes, the open space was filled with visual information, such as a mattress, a folding screen and a blind, but sometimes it is filled with comments written by those who evaluated the pictures.

Currently Massuda (2010) demonstrated the vestige of this cultural difference when invited Americans and Asians to photograph a model. Americans students shut the machine zoom focusing only on the bust, while Asian students fit the model with the context, opening more zoom the machine.

Chua, Boland, & Nisbett (2005) replicated experiments with eye movement and demonstrated that the Americans looked at first and for a longer time for central objects while Asian participants showed more eyes movement toward the background These results demonstrated that Asians tend to process visual images contextually, paying more attention to substance and relations, while Westerners tend to focus on salient objects and their properties. Nisbett & Masuda, 2003 argue that social practices in East Asian cultures tend to facilitate individuals' sensitivity to social and contextual stimuli.

The work of Masuda, et al. (2008) supports this assertion when in their experiments, participants were presented with various images of prominent cartoon figures with smaller and less important figures in the background. Upon being invited to judge the facial expressions of the target figures, the Japanese students were more influenced by emotions in facial expressions of the figures from the background than their American counterparts. In a causal explanation and categorization, Masuda & Nisbett (2001) suggested that such patterns of attention are the basis of cultural variation of social-cognitive process.

These variations in cognitive processes can be accessed through the implicit association that the subject has with one culture. The stronger the subject´s association, the stronger the cultural influence on the development of cognitive processes and consequently the person´s behavior. The implicit association of a concept is very strong for the subject. Greenwald et al, (1998), exemplified this phenomenon through the strength of the association of male names with masculine faces, ie, it is very easy to quickly respond male names to male faces than when the person has to assign a task associating male names to female faces. Implicit attitudes are manifested through actions or judgments controlled by an evaluation automatically activated without the knowledge by the subject of the cause for this activation. Greenwald & Banaji, (1995) defined implicit attitudes as “introspectively unidentified (or inaccurately identified) traces of past experience that mediate favorable or unfavorable feeling, thought or action toward social objects.” P.8.

Therefore the purpose of this paper is to investigate the emergence and maturing of the ORE in a task of face recognition, in children with different cultural backgrounds: Caucasian and Japanese descendants. Two such studies were proposed. The first study aimed to analyze the development of the ORE in Brazilian and Japanese children belonging to two different age groups: 5-7 years and 9-11 years. Tests of memory and face perception were Applied to Avoid bias effects by external variables between and within the groups.

The second study aimed to examine the influence of cultural affiliation of the children, ie if the ORE exists even though the children feel associated with different cultures. For such an Implicit Association Test the IAT was proposed. The Implicit Association Test (IAT) is a measure of spontaneous self-concept, which avoids the processing and conscious control of information and has been extensively used in researches, because it avoids problems external to the assessment, observed in traditional scales, where the individual can alter the results for different reasons, as concern the assessment situation and unmasking the emotional state. The IAT assumes that when two concepts are strongly related, the subject has faster reaction time when comparing these two concepts. The extremely rapidly way that the subject must respond to such discrimination tasks, ensures that the association between concepts escape conscious control.

3.6
Method – Study 1 – The development of the ORE:

Participants

A group of 74 Brazilian and Japanese descendent children, born and living at Rio de Janeiro and Niterói, split into 2 age range groups participated in this study. The selection of age groups was based on previous research demonstrating that the ORE is found during childhood. (Kelly et. al., 2007, De Heering et. Al., 2010). The first age group included 38 Caucasian and Japanese children, from 5 - 7 year old. The second age group included 36 Caucasian and Japanese children, from 9-11 years old. The Japanese children, from both age groups attend to activities at Nikkey Society2, Cosme Velho, Tingá, RJ e Niterói. Caucasian children were students from "Dispensário Santa Terezinha M.J". Gávea, RJ and "Golfinho Feliz" kindergarten at Niterói, RJ. All participants were tested in their study environments during the regular activities

Group	Age ange 1				Age Range 2			
	Age (SEM)	Female	Male	Total	Age	Female	Male	Total
Japanese	5.78 (0.20)	52.63 %	47.37%	19	10.3 (0.19)	50.00%	50.00%	18
Caucasian	5.98 (0.15)	57.98%	42.11%	19	10.11 (0.19)	50.00%	50.00%	18
Total	5.84 (0.12)	55;26%	44.74%	38	10.19 (0.14)	50.00%	50.00%	36

Table1- Age and gender distrubuition of Japanese and Caucasian children split by two age ranges. Age range 1: children from 5 – 7 years old. Age range 2: children from 9-11 years old

Stimuli:

12 photographs of Caucasian children faces (6 male and 6 female photographs) and 12 photographs of Japanese children faces (6 male and 6 female

[2] The NIKKEI association promotes the culture to Japanese descendants living in Brazil. For more information: http://www.nikkeirj.com.br/

photographs) were kindly provided by Professor Kang Lee of the Institute for Child Studies at the University of Toronto, Canada. The photographs of the faces were cut into oval-shaped with 493 pixels x 493 pixels. The images were cropped to eliminate cues such as hair, earrings, acne. From the 12 Caucasian faces (6 males and 6 females) and the 12 Japanese faces (6 males and 6 females) twelve pairs of faces were generated - 6 pairs of Caucasian faces (3 male pairs and 3 female pairs) and 6 pairs of Japanese faces (3 male pairs and 3 female pairs). Each face appeared four times –two times as target (left and right side)and two times as non-target (left and right side), in a total of 96 trials. The faces were exposed in a 15 inches flat screen monitor of a notebook computer Dell Latitude D505 Intel Pentium-M 1.6 Ghz.

Procedure:

The participants were tested individually in a match to sample task programmed on the software Inquisit (Millesecond Software).

The first task was formulated as a control task to avoid that the differences in memory test of face recognition is due to external variables such as cognitive differences, or difficulties in dealing with the program and the computer. In the first task eight objects were selected for a memory task (hat, umbrella, acoustic guitar, bag, shoe, pencil, apple, rose).

Each trial consisted in the display of a target object at the center of the screen (for 500 ms) followed, after a 1 second grey screen, by two objects presented side by side. The objects remained on the screen until the participant pressed one of the two response buttons to indicate which picture matched the target. Responses were effected with the right and left index fingers and the participant was instructed to respond as fast and accurately as possible. No feedback was given. The next trial started 1 second after the response. Each participant did two blocks of trials in one session: the first block was the training block with 8 trials and the participants were told it was not being computed. The other block started right after the first was finished and consisted of 32 trials using the same set of 8 object presented successively with a different random order. In a block, each object was presented a total of 4 times (twice as a target and twice as a non target -- twice on the right, and twice on the left side of the screen). The order of the presentation of the targets was the same for all participants. After this task was finished the participant were asked to remain sitting for the second task.

The second task was the main task called Face Recognition task and each trial consisted in the display of a target face at the center of the screen (for 500 ms) followed, after a 1 second grey screen, by two faces presented side by side. The faces remained on the screen until the participant pressed one of two response buttons to indicate which picture matched the target. Responses were effected with the right and left index fingers and the participant was instructed to respond as fast and accurately as possible. No feedback was given. The next trial started 1 second after the response. Each participant did two blocks of trials in one session: the first block was the training block with 8 trials (the images used in the training block were cartoons, not the photographs) and the participants were told it was not being computed. The other block started right after the first was finished and consisted of 96 trials using the two sets of 6 pairs of faces (described at the "stimuli" section) presented successively with a different random order. In a block, each face was presented a total of 4 times (twice as a target and twice as a non target -- twice on the right, and twice on the left side of the screen). The order of the presentation of the targets was the same for all participants.

The other-race effect had already been observed in adults with a presentation duration of 250 ms (Sangrigoli and Schonen, 2004) and 120 ms (Lindsay, et all, 1991). The reaction time was collected. Figure 1 presents the configuration of the task.

Figure 1- Face recognition task configuration. The target face presented alone in the first screen followed by the gray screen and finally the two faces. The red arrow idicates the right answer key

When finished this task a range of 20 to 30 minutes was given. Tests of memory and face perception were applied to avoid bias effects by external variables between the groups. Soon after the break each participant was asked to participate in a memory test.

The first test was the Finger Window Card a subtest from the Wide Range Assessment of Memory and Learning (Sheslow and Adams, 1990). The WRAML was designed to be an inclusive memory battery that is normed for children between 5 and 17 years of age. An advantage of using a test such as the WRAML is that it provides a number of memory tasks that are all based on a common normative group and that have known intercorrelations and factor structure. This allows for meaningful comparison across tasks, within and between groups.

The Finger Window Card task requires the participant to recall the sequential placement by the examiner of a pencil into a series of holes placed in a plastic card. The sequences stars with 2 numbers and goes through a 7 numbers sequences. The test score is due to the number of the whole sequences that the participant hits.

The test is considered a measure of spatial working memory and is comparable with the Spatial Span subtest of the WMS–III. Figure 2 presents the Finger Window Card from the examiner view.

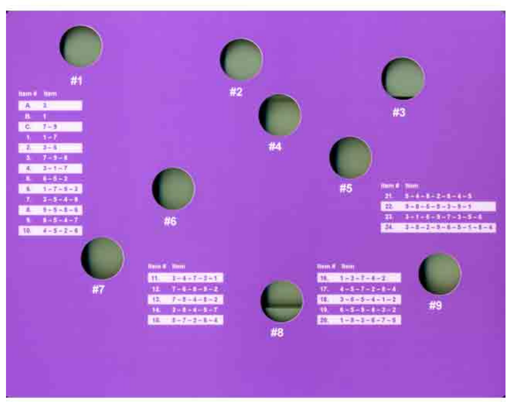

Figure – The finger window card test from the examiner's view. The number sequences are the sequences in witch the examiner puts the finger in the roles. After the examiner finishes presenting the sequence, the children has to put finger in the same roles, presenting the same sequences. There is no number on the children's view of the card.

As soon as the child finishes the Finger Window sequences, were asked to participate into a face recognition memory task. We used a subtest from the

NEUPSILIN Fonseca, Salles , Parente, no prelo) battery. The NEUPSILIN is a brief Neuropsychological Assessment Instrument in with the objective is to provide a brief neuropsychological profile through the following functions: temporoespatial orientation, attention, perception, memory, arithmetic skills, language, praxis and executive function (problem solving and verbal fluency). The instrument allows to define, in a session, the functions preserved and the ones with some prejudice, being a good specific neuropsychological tests to select for use in further research.

The subtest used was the Face Recognition test, where the participant was asked to recognize pictures of man and woman's faces from different perspective (front and profile). They were also presented to two faces and asked to find those faces in a six faces group. The score of the test is due to the number for hits in both threads.

3.7
Statistical analysis

The main purpose of the first study was to investigate the development of the ORE between two age groups of Caucasian and Japanese children. To this end, each group's reaction time to recognize Caucasian and Japanese faces were collected. Descriptive analyses were used to demonstrate the sample's means and SEM in the tasks. To analyze the differences between groups at the face recognition task, we used the the Repeated Measures ANOVA. The analyzed factors were: Type Faces (The reaction time for recognizing Caucasian and Japanese faces); Race (Caucasian and Japanese descendent children) and Age Range (5-7 years old and 9-11 years old). We used Post-Hoc test to verify differences within Caucasian children. We also used a T-test to verify the difference of the delta between Type Faces in Caucasian children from both age ranges, to analyze the magnitude of the ORE. The same factors were used to analyze children's errors on face recognition task. A ANOVA was used to detect differences between groups in the Object Recognition, the Finger Window and NEUPSIN tasks.

3.8
Results:

Face Recognition task

The figure 3 presents the differences in participants reaction time means to recognize Caucasian and Japanese faces divided by age groups. In the first age group (5-7 years), Caucasian children showed reaction time mean = 1332.86 milliseconds (ms.), SEM = 61.23 when recognizing Caucasian faces, while presented reaction time mean= 1481.19 ms., SEM = 77.98.when recognizing Japanese faces. Japanese children obtained a mean of 1185.39 ms., SEM = 69.04 when recognizing Caucasian faces and 1234.61 ms., SEM = 85.56 when recognizing Japanese faces.
In the second age group (9-11), Caucasian children obtained reaction time mean = 991.67 ms., SEM = 82.86 recognizing Caucasian faces, while recognizing Japanese faces their reaction time mean =1281, 39 ms., SEM = 88.06. Japanese children obtained mean =844.22 ms., SEM = 65.34 to recognize Caucasian faces and 884.97 ms., SEM = 68.18 recognizing Japanese faces.

The Repeated Measures ANOVA showed no three ways interaction: Type Face, Age Range and Race, $F(1,70) = 1.65$, $p > 0.2$ indicating that when taken into account the three variables, the main effect is diluted.

The same Repeated Measure ANOVA revealed a two-way interaction of Race and Type Face $F(1,70) = 8.92$ $p < 0.05$, showing that performance in recognition of Caucasian and Japanese faces depends on the children's race. Inspection of the graph indicates that Caucasian children recognize Caucasian faces more quickly than Japanese faces. This interaction is not associated with children's age group, since the 3-way interaction was not significant. Among the 2-way interactions, no significance was found between Type Face and Age Range, $F(1,70) = 1.3$, $p > 0.2$, demonstrating that recognition of Caucasian and Japanese types of faces behave the same way in both age groups, 5-7 and 9-11 years old. On figure 3 we can see that the 5-7 age group demonstrated higher reaction time than in the 9-11 age group. We also found no interaction between Age Range and Race, $F(1,70) = 0.29$, $p > 0.55$, indicating that the Japanese children, regardless of age range, are faster than the Caucasian children. Inspection of the graph shows that the Caucasian children have more difficulty when to recognize faces of another race.

The Repeated Measures ANOVA revealed 3 main effects: Type face F(1.70)=20.527; p<0.005; Age Range F(1.70)=19.63; p<0.05; Race F(1.70)=11.38; p<0.05

The post-hoc test demonstrated differences only within Caucasian subjects. First age group: Caucasian children t(18)=2,98; *p<0,05, Japanese children t(18)=0,799; p=0,435,. Second age group: Caucasian children t(17)=3,543; **p<0,002, Japanese children ; t(17)=1,582; p=0,132.

Figure 3 also presents the difference between Type Faces in Caucasian children from both age range. The delta mean between Type Faces recognized by Caucasian children in the 5-7 age range was 148,319 ms. EPM=49.764 The delta mean between Type Faces recognized by Caucasian children in the 9-11 age range was = 289,716 ms. EPM= 81.769. T-test demonstrated the difference of the delta between Type Faces in Caucasian children from both age range, T(35)=2.154; p<0,05 revealing the difference on the ORE size. An inspection on figure 3 shows that the size of the ORE increases with age.

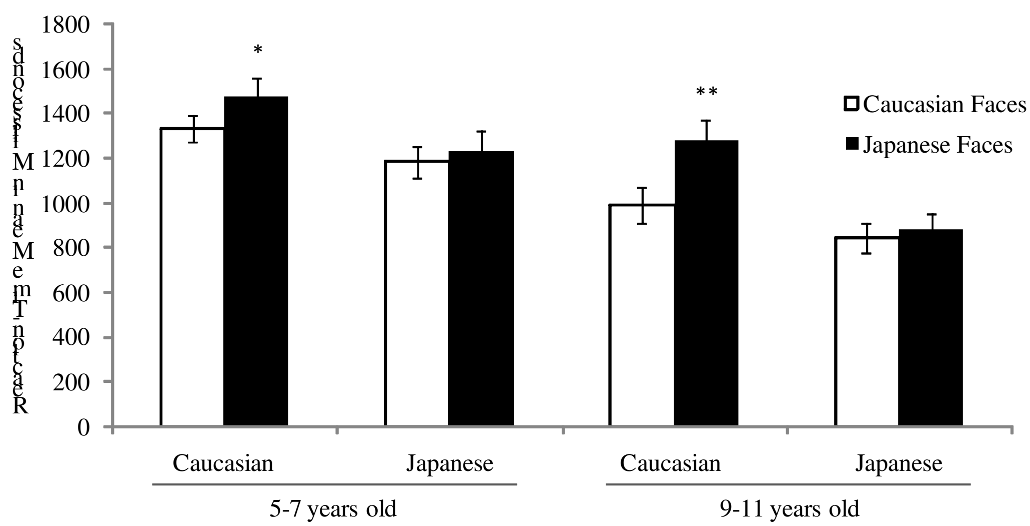

Figure 3 Reaction-Time Means in milliseconds of Caucasian and Japanese children in the Face Recognition task. The children are split by age range. The white bar represents the reaction-time mean for Caucasian faces. The black bar represents the reaction-time mean for Japanese faces.

Errors analyses

The figure 4 presents the differences in error means of participants to recognize Caucasian and Japanese faces divided by age groups. In the first age group (5-7 years), Caucasian children showed error mean = 8.52, SEM = 0.78 when recognizing Caucasian faces, while presented error mean=9,15 SEM = 0.83 when recognizing Japanese faces. Japanese children obtained a mean of 9.26 SEM = 0.72 when recognizing Caucasian faces and 9.68 SEM = 0.54 when recognizing Japanese faces.

In the second age group (9-11), Caucasian children obtained error mean = 9.611., SEM = 0.85 recognizing Caucasian faces, while recognizing Japanese faces their error mean =9.72 SEM = 0.89. Japanese children obtained mean =9.44., SEM = 0.90 to recognize Caucasian faces and 8.55 SEM = 1.13 recognizing Japanese faces.

The Repeated Measures ANOVA showed no three ways interaction: Type Face, Age Range and Race, $F(1,70) = 1.28$; $p=0.722$ indicating that when taken into account the three variables, the main effect is diluted.

No two ways interaction was found between Type Face and age range; $F(1,70)=0.687$;$p>0.410$, nor between Age Range and Race; $F(1.70)=1.508$; $p>0.307$, nor between Type face and Range; $F(1.70)=0.300$; $p>0.585$. The inspection of figure shows that there were no mean errors differences between or within the groups, demonstrating that even being faster, the Japanese children's mean errors behaved the same way as Caucasian children's

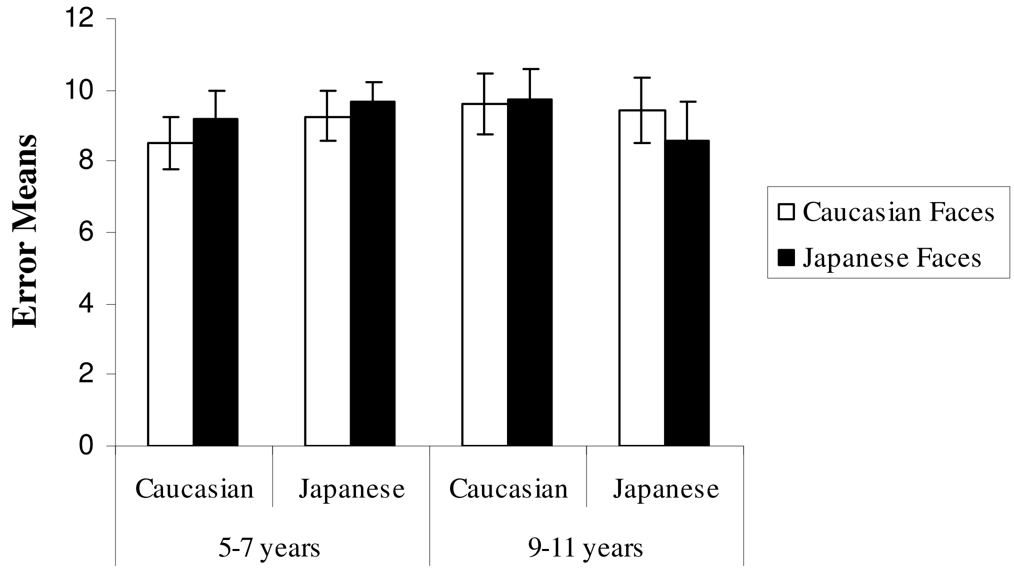

Figure 4 Error means of Caucasian and Japanese children in the Face Recognition task. The children are split by age range. The white bar represents the error mean for Caucasian faces. The black bar represents the error mean for Japanese faces.

Objects recognition analyses

The figure 5 presents the differences in reaction time mean on the task of Object Recognition obtained by the Caucasian and Japanese participants in two age groups. In the first age group (5-7 years) Japanese children obtained a reaction time mean = 947.73 SEM: 36.43 and Caucasian children showed reaction time mean = 956.73 SEM: 59.66 In the second age group (9 -11 years) Japanese children's reaction time mean = 558.20 SEM: 38.27 Caucasian´s children reaction time mean= 652.46 SEM: 52.65. An ANOVA of reaction time revealed a significant difference between the two age groups, $F (3.73) = 9.962$, $p <0.001$, Post-Hoc demonstrated no difference from Caucasian a Japanese children within age range 5-7; p=0.90 and age range 9-11; p=0.137. This effect can be explained by differences in cognitive development for both age groups

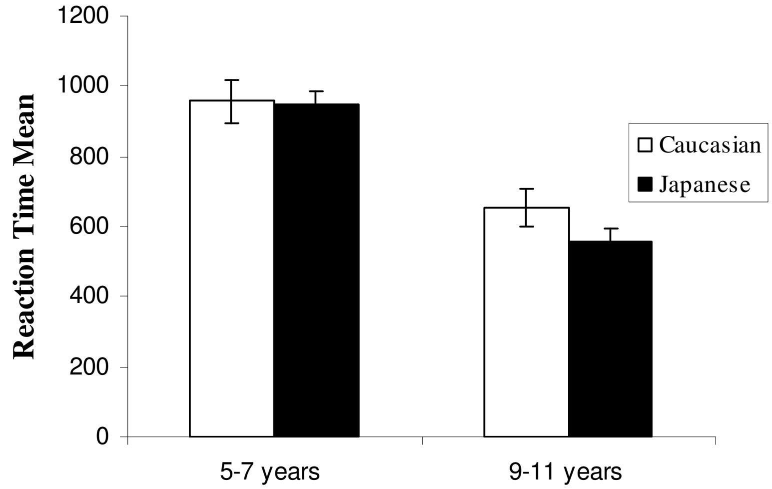

Figure 5 Reaction-Time Means for Caucasian and Japanese children for an Object Recognition Task. The children are split by two age ranges.

NEUPSILIN recognition analyses

The figure 6 presents the mean differences in the score on the NEUPSILIN face memory task, obtained by the Caucasian and Japanese participants in two age groups. In the first age group (5-7 years) Japanese children obtained a score mean = 4.16 SEM: 0.16 and Caucasian children showed a score mean = 4.37 SEM: 0.14 In the second age group (9-11 years) Japanese children showed a score mean = 4.50, SEM 0.15 and Caucasian children = 4.28 SEM: 0.16 An ANOVA of the correct answers mean did not show significant differences between the two age groups, $F\ (3,\ 73) = 1.158$, $p = 0.431$ demonstrating no differences in face recognition memory between Japanese and Caucasian children of both age groups. Post-Hoc demonstrated no difference from Caucasian a Japanese children within age range 5-7 years; $p=0.408$ and age range 9-11 .$p=0.298$. This effect can be explained by the early maturity of face recognition skills, when other races faces are not included. (Crookes and McKrone, 2009)

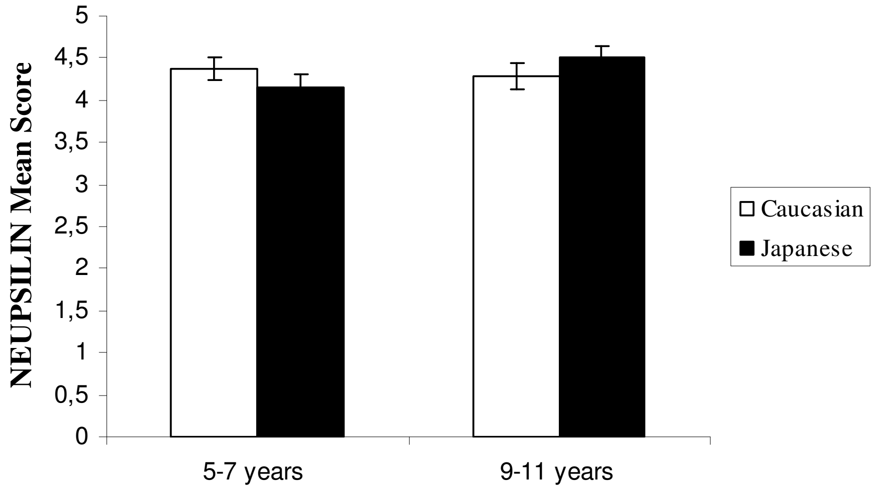

Figure 6 Mean Scores for Caucasian and Japanese children for Neupsilin task. The children are split by two age ranges

Finger Window Subtest analyses

The figure 7 presents the differences in the score mean at Finger Window task obtained by the Caucasian and Japanese participants in two age groups. In the first age group (5-7 years) Japanese children obtained a score mean = 9.42, SEM 0.43 and Caucasian children showed score mean= = 9.32 SEM = 0.40. In the second age group (9-11 years) Japanese children the average time of correct answer's mean= 12.89 SEM: 0.39 and Caucasian children = 12.22 SEM: 0.42 An ANOVA of the score means revealed a significant difference between the two age groups, $F(3.73) = 20.386$, $p < 0.001$. Demonstrating an advantage in the general cognitive of the second age group compared to the first.

Post-Hoc demonstrated no difference from Caucasian a Japanese children within age range 5-7 years; $p=0.884$ and age range 9-11 .$p=0.215$. What shows no cognitive differences between Caucasian and Japanese children.

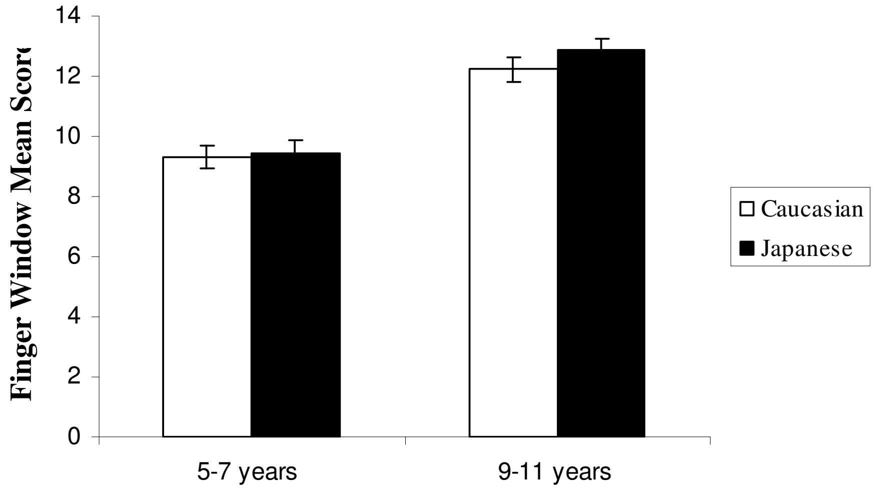

Figure 7 Mean Scores for Caucasian and Japanese children for Wraml - Finger Window Subtest - The children are split by two age ranges

3.9
Study 2: The implicit association with the race:

The Implicit Association Test (IAT) is a general procedure for verifying the strength of automatic association between concepts (Greenwald and Farnham, 2000). It is considered a "concept" a categorically group in with the subject classifies various stimuli (Greenwald and Banaji, 1995). The TAI has a simple procedure: the subject is asked to classify stimuli according to pairs of concepts presented on the screen of a computer, so as soon as possible, the reaction time is obtained and the result suggests that an association between the concepts is bigger than the other if the response time of the individual is less for a couple of concepts than for its reverse combination. The implicit association, therefore, is very strong and is an automatic cognitive process, since, during the implementation of the TAI, the voluntary attention of the individual is directed to the correct execution of the task and not directed to concerns about the response time for each classification (Greenwald et al. 1998).

Based on the Theory of Implicit Associations, presented in the introduction to this study, Greenwald and Farnham (2000) conducted a study to demonstrate that implicit measures of self-concept are valances that can have different results from their explicit measures. Through a TAI programmed to self-concept of gender, men and women showed a tendency to self-triple combination with the concepts of femininity and masculinity. However, the trend disappeared in a explicit measure, keeping the duality of gender. This results can be explained due to the strong social pressure by the culture, that the man must be manly masculine and woman must be more feminine.(Greenwald and Farnham, 2000).

The Implicit Association Test (IAT) is then, a measure of spontaneous self-concept, which avoids the processing and conscious control of information and has been extensively used in researches, because it avoids problems external to the assessment, observed in traditional scales, where the individual can change the results for various reasons, as concern the situation assessment and unmasking of emotional state.

Thus, we used the IAT self-concept of race, because by a explicit measure, the child will certainly be associated with phenotypic race. However, there is the risk of cognitive style of Japanese children to be more strongly associated with culture and the Caucasian race, and therefore its Implicit association with the Caucasian concept would be stronger, like the men who were associated with the concept of femininity in the study Greenwald and Farnham (2000). The objective of this work, then, was to develop a procedure to assess the implicit association self-concept of race in children 9-11 years. Japanese children live with the Caucasian culture, and therefore may have association with Caucasian implicit self-concept in detriment to the Japanese.

3.10

Method – Study 2

Participants

Because the IAT is a test that requires reading, only the second age range of the participants were able to respond to task. The second age group that participate of the study 2 were the same sample used in study 1 including 36 Caucasian and Japanese children, from 9-11 years old. Table 2 presents the age and gender distribution of the sample used in the study 2

Group	Age Range 2			
	Age	Female	Male	Total
Japanese	10.3 (0.19)	50.00%	50.00%	18
Caucasian	10.11 (0.19)	50.00%	50.00%	18
Total	10.19 (0.14)	50.00%	50.00%	36

Table 2 Age and gender distrubuition of Japanese and Caucasian children from age range 2 (from 9-11 years old)

Stimuli:

We used the same 12 photographs of Caucasian children faces (6 male and 6 female photographs) and 12 photographs of Japanese children faces (6 male and 6 female photographs) with the same picture treatment used on study 1.

Procedure:

As soon as finished the Finger Window task, the participants were tested individually in a match to sample task programmed on the software Inquisit (Millesecond Software). We used a version of the Implicit Association Test (IAT) for Self-Concept evaluation to investigate the child's affiliation with his own race. This procedure was conducted only on the older children group (ages between 9 and 11) due to the reading part of the test. The same Inquisit script controlled the presentation of IAT and recorded responses. Two categories were programmed: self-concept (Me vs. Not-Me) and racial stimuli (Caucasian Faces vs. Japanese Faces). The stimuli for racial classification were 24 faces (12 for each racial group) from the previous task. Figure 8 presents the Categorization task with five steps to the Implicit Associations Test (IAT) of the Race. The dots indicate the correct response filled. The IAT effect is the difference of averages in the subject's reaction times in step 3 and step 5. We calculated the TAI for the association of the categories "I + Japanese". Positive results indicate a stronger association for this condition, while negative results indicate a stronger association between the condition "I + Caucasian." The order of steps 2-3 and steps 4-5 was alternated for each different participant

Category Labels	Sample Items	Category Labels

Step 1:
Practice Block (20 trials)

Me		Not Me
●	Self	○
○	Other	●

Step 2:
Practice Block (20 trials)

Caucasian		Japanese
●	Caucasian Face	○
○	Japanese Face	●

Step 3:
Practice Block (20 trials)
Critical Block (40 trials)

Caucasian or Me		Japanese or Not Me
●	Self	○
●	Caucasian Face	○
○	Other	●
○	Japanese Face	●

Step 4:
Practice Block (20 trials)

Japanese		Caucasian
○	Caucasian Face	●
●	Japanese Face	○

Step 5:
Practice Block (20 trials)
Critical Block (40 trials)

Japanese or Me		Caucasian or Not Me
●	Self	○
●	Japanese Face	○
○	Other	●
○	Caucasian Face	●

Figure 8 Categorization task to the Implicit Associations Test (IAT) of the Race split in five steps. Spet 3 and step 5 are split into Practice Block and Critical Block. The black ball within each step represents the right association between the word and the concept (Me+Self). The white ball within each step represents the wrong association between the word and the concept (Not Me+Self).

Statistical analysis

The purpose of the first study was to investigate the implicit association with the race between two age groups of Caucasian and Japanese children. To this end, we used the D algorithm for data reduction (Greenwald, Nosek and Banaji, 2003). The new D algorithm replaced the old correction algorithm to obtain more consistent data from IAT procedures. Studies, since the new D algorithm, have shown more cohesive results (Lane, Banaji, Nosek and Greenwald, 2007). It is a simple procedure to data reduction that consists on the following steps: (1) Delete trials greater than 10000 ms., (2) Delete subjects with more than 10% of the trials with times lowers than 300 ms., (3) Compute the Standard Deviations for Steps 3 and 5, including Practice Blocks, (4) Compute the Mean Latency for responses for Steps 3 and 5, (5) Compute two Mean Differences (Step 3 Practice Block – Step 5 Practice Block and Step 3 Critical Block – Step 5 Critical Block), (6) Divide it Mean Difference by its associated Standard Deviation, (7) Average the two resulting ratios (Lane et al., 2007).

3.11
Results:

The figure 9 presents the Mean Differences between Step 3 and Step 5 for both groups: Caucasian children obtained a Mean Difference of MD=-145,93 ms., EPM=35,68, showing that those children presented lower Response Time for the Step 3 (Me+Caucasian Block) in face of Step 5 (Me+Japanese Block). However, Japanese children obtained a Mean Difference of MD=333,47, EPM=101,63 that represents higher Response Time for Step 3 (Me+Caucasian Block) than Step 5 (Me+Japanese), remembering that the a lower Response Time means more implicit association with categories. The results demonstrated significant differences between groups $t(34)=-4,616$; $p<0,001$ what represents that even having been born in Brazil, the Japanese descendent children feel affiliated with their culture.

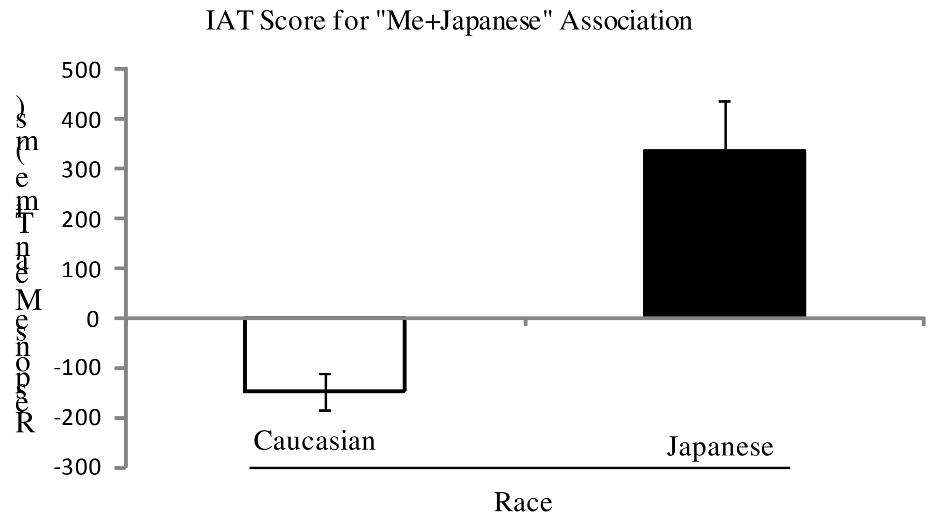

Figure 9 Response means time in milliseconds from Caucasian and Japanese children for the IAT Race. This figure represents the Me + Japanese implicit association.

3.12
General discussion

According to some preview studies (Pedzek et al, 2003, Sangrigoli & Schonen, 2004, De Heering, 2009) and inconsistent with others, (Chance et al, 1982 Feinman & Entwisle, 1976) the results from Study 1 demonstrated that Caucasian children, in both age groups, recognized more accurately their own race faces, than faces from the other race, supporting the emergence of the Other Race Effect in early childhood. This prediction shows that the facial selectivity based on differences of race emerges very early in life, with 5 years old or less. When exposed to faces of races that the children had little contact during life time, the recognition performance will be poorer, since those faces were not included at the prototype raising .

According to Kelly et al, (2007), infants have a large facial processing system that is capable of processing faces from different race groups. Moreover, between 3 and 9 months old this system is becoming gradually more sensitive to faces of the same race group of children as a result of increased exposure to these faces. This change in sensitivity reflects the emergence of a deficit in accurate recognition of faces from unfamiliar groups. This prediction is the basic explanation for the presence of the ORE in our Caucasian children.

Interesting to notice that Japanese descendent children, from both age range, did not presented differences in their performances when recognizing Caucasian and Asian faces. This results are consistent with Quin et al, (2002) assumption that faces observed in the children's visual raising context, influences the face perception preferences that emerge since early childhood. Another theory that may explain our result is the Differentiated Experience Theory (Cross et al, 1971) that posits that the experience with subjects from other races influences the Other Race Effect toward better performances when recognizing faces from other race group . (Chiroro & Valentine, 1995, Feinman & Entwisle, 1976 Galper, 1973 Malpass & Kravitz, 1969) Valentine (1991) demonstrated that contact with faces of other races expands the prototype toward these new faces, ie, the prototype is still under development and therefore has greater plasticity, being able to withhold information, through contact, from faces of other races. This theory explains the absence of the ORE in Japanese descendent children in our study. These children were born and living at Brazil, so the plasticity of the prototype allows the inclusion of Caucasian and Japanese faces is its direction. What lead us to the conclusion that living with other race faces since birth, influences in the prototype formation. Our findings demonstrate that in fact, Japanese descendent children, born and raised at Brazil has some copies of Japanese and Caucasian faces in the training of its prototype, generating greater accuracy in recognition for both race faces.

We also found that when faces from other race group are presented in the task, younger participants showed slower reaction time in face recognition task, demonstrating that face recognition memory for other race faces improves with age,.

The same pattern were presented at the Objects Recognition Task and at the Finger Window task - children form the second age range (9-11 years old) performed better than children form the first age range (5-7 years old). But it is interesting to notice that at NEUPSILIN face recognition task – in witch there is no discrimination between races – we found no differences between both age ranges in face recognition.

The differences between the age ranges demonstrated at Finger Window and object recognition task, support the theory of the General Cognitive factors Development that posits that the narrowing of visual attention focus, visual acuity and sustained attention, contribute for poor performances of explicit memory in a task (Diamond & Carey 1997,) The results presented at NEUPSILIN corroborated with Crookes & McKone, (2009) findings that quantitative maturity of the face perception system is already present between 5 and 7 years old and determine any effect from increased experience with faces in the development face perception after infancy.

These findings disagree with traditional studies (Carey 1992, Carey et al. 1980; Diamond & Carey, 1986) that postulate an important role for more that 10 year of experience in discriminating faces as a class o stimuli, in the foundation of face recognition process and its maturation to the adults level. We also disagree with Pedzek (2003), results that demonstrated that face memory is less accurate in younger children than in older children and adults, but the size of the ORE is similar for both groups.

With the exception of discrimination between different races, our results are consistent with a vision that experience with faces is important to improve the abilities of face recognition in infancy, and continued experience with faces as a class of stimuli beyond infancy is important to the development improvement in the accuracy of face perception, but the development of a face recognition system's skills are present even at birth, and the quantitative maturity of these skills occurs earlier. (Crookes & McKone, 2009)

Inconsistent with De Heering et al., (2010), our results demonstrated that children from the second age range (9-11 years old) performed better than children form the first age range (5 -7 years old) in a face recognition task with other race faces. Such evidence can be explained by the fact that in face recognition tasks, when the children has to discriminate faces of different races of their own, their performance on the task is influenced by both, the general cognitive process and the prototype function.

Our results corroborates with Sangrigoli et al., (2005) and De Heering et al., (2010) in the sense that we also demonstrated that the prototype is well formed at early childhood, and its plasticity is still present at 5-7 year old. So we can also conclude that the advantage at processing own-race faces can be modulated by experience with other-race faces if exposure starts early during development. The greater the contact with individuals of different races, the greater the ability to recognize these faces. (Chiroro & Valentine, 1995).

However, our findings do not entirely fit with Sangrigoli et all (2005) observations. As discussed earlier, and as the opposite of these authors findings, our

Japanese descendent children did not reversed the ORE, i.e, they did not performed better with other-race faces. This difference in results can be explained by the age of the children used in the experiment. While we tested children from 5 – 11 years, with the plasticity of the prototype, Sangrigoli et all (2005) tested adults (23 years on average) with long experience with other-race faces and with the development of face processing and the prototype matured

Our results fits better with De Heering et al.,(2010) findings of no reverse of the ORE, but only it´s annulations. De Heering et al., (2010) also tested children, (with 6 – 14 years old) still with the plasticity of the prototype. However, these authors didn’t find differences in the magnitude of the ORE with the age, while we found a strong ORE in the second age range children when comparing with the fist age range. These findings corroborates with the assumption that the prototype begins to loose the plasticity and will becoming hardening, and could even possibly reverse the effect in the future, as in Sangrigoli et al., (2005).

Maybe the discrepancy between Sangrigoli (2005) and De Heering et al., (2010) studies is justified by the fact that the De Herring (2010) found no difference in the magnitude of the effect, or has not demonstrated that the prototype will stiffen, which opens the possibility to agree on Sangrigoli et al., (2005) reversal of the effect. Our findings about the difference of the strength of the ORE in older children, open the possibility of a vision of continuity between the two studies cited.

Our findings agree with the two studies Sangrigoli et al.(2005) and De Heering et al., (2010) in the sense that it indicates that visual experience is crucial during the period of maturation of the face recognition system. Also, face recognition system is plastic enough during early childhood, and social interaction can modificate other race effect. Therefore, the early experience with other races is an important factor in determining the magnitude of the ORE. These results also emphasize the importance of the length of exposure to the new face race to stabilize recently acquired face representations, despite the strong cultural influences present in Japanese children.

According to Gombrich's (1961/2000), the different cultural experience exposes people to different dominant modes of visual images, creating an internalization of these standards. Some evidence supports the premise that the cultural environment affects the perception of the world. (Masuda & Nisbett, 2001). Our results from Study 2 showed that Japanese descent children, feel affiliated with Japanese culture, even when born and raised in Brazil. It is very important to highlight the current trend in most studies in developmental psychology, to use as research subjects only Americans, Europeans, Australians and New Zealanders (Tomlinson & Swartz , 2004), when 135 million babies born worldwide. 90% of this babies are from countries that are outside this western axis.

Seidl-de-Moura (2011) points out that characteristic as a serious problem for the science of human development in general and developmental psychology

Heinrich et al (2010) point to the erroneous generalization of research results, since their samples consist of WEIRD (western, educated, industrialized, rich and Democratic groups.) If, according to Masuda & Nisbett (2001), cultural patterns in which the individual was raised, affect the perception processes (eg eastern tend to perceive in a more holistic view, paying more attention in background standards; while westerns tend to focus more on their perception of the salient object), we can not generalize the results of weirds in researches of cognitive basic processes. Because the patterns of attention - influenced by cultural contexts - are the basis of cultural variation of social-cognitive process

Some data mentioned by Heinrich et al, (2010) are impressive. They demonstrated, in a recent analysis of the major journals in six subfields of psychology in the period 2003-2007 that 68% subjects were from the United States, and a total of 96% were from western industrialized nations, specifically North America, Europe, Australia and Israel. In summary, 96% were psychological samples from countries with only 12% of world population.

Seidl-de-Moura (2011) points to the fact that development of evolutionary psychology is a psychology based on the relationship between biology and culture. The main goal are universal psychological processes, actualized in specific socio-cultural and ecological contexts. Thus, it can not be a psychology which presupposes universality from studies of limited groups and even a minority. In these paper we presented an advance in the field, for the sense that we demonstrated the influence of association to cultural contexts is an experiment with two cultures.

To summarize, our findings demonstrated that face representations are plastic enough during early childhood, to be modified or incorporate other race faces, when the exposure to this faces begins during the development of the face processing system. The years of experience with other race faces modulates the accuracy in their recognition, but yet, 5 -11 years of exposure to Caucasian faces are not sufficient to erase fully the own-race face representations acquired during infancy (Kelly et al., 2007b; Sangrigoli & Schonen, 2004b). The beginning of the experience with other races is an important factor in determining the magnitude of the Effect of Race, even when the culture plays an important role in the development of the individual.

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