

## Differences in the Visual Motor Development in Children: A Cross-Cultural Study

Carlo A Pruneti\* and Chiara Cosentino

Department of Clinical and Experimental Medicine, Clinical Psychology Unit, University of Parma, Via Gramsci, 14, 43126, Parma, Italy

### Abstract

Since existing data on school frequently show disparity between indigenous and non-native students in academic achievement this research aims to face this problem monitoring objective and measurable differences between these groups in a cross cultural perspective. 177 children from different schools in Parma and La Spezia were recruited. The sample was divided into three subgroups: Italians; Italians with foreign parents; Immigrants.

Children completed the performance test Bender Visual Motor Gestalt Test. The "cultural context" seems to influence the results in the BVMGT. Results suggest that immigrants are grown in contexts culturally less stimulating visual-perceptual abilities and being unable to attend preschool and primary education in this country, may have affected their performance at the test. The comparison between Italians and Italians\* is not significant: children born and grown in the same cultural context faced a similar training path.

Regardless of intelligence or other individual characteristics, not all components of a multicultural classroom stem from the same level of skills and competencies. A simple test such as the Bender can become a useful predictive tool to identify gaps and differences between people from different cultures in order to create focused interventions.

**Keywords:** Bender visual motor gestalt test; Immigrant children; Cross-cultural psychology

### Introduction

Cross-cultural psychology aims comparing the behavior of different ethnic and cultural groups, on the basis of psychological, social, cultural, ecological and biological variables [1] in order to:

- Check the possibility to transpose "western" existing theories and hypotheses in other cultural contexts,
- Explore other cultures to find variables not known or not taken into account;
- Integrate data collected in different contexts, to arrive at a more universal characterization of psychological and human sciences [2,3].

Cross-cultural psychology tends to eliminate all forms of ethnocentrism, political, scientific, applying rigorous and standardized methods aiming to avoid cross-cultural differences being considered as deficiencies [4]. Cross-cultural theoretical perspective is Universalism [5]. This approach reflects the complexity of the different cultural contexts in which individuals develop, so it is known as "biocultural": basic psychological processes would be common to all humans (and then "universal"), while their expression would be mediated by culture [6]. These considerations are extremely relevant today, given the increasing flow of migration, which affects most industrialized countries. In Italy ISTAT ratio [7] shows that immigration, is a group and families phenomenon; the raising number of births from foreign residents demonstrates the expansion of long period migration projects and, in many cases, the final settlement, particularly among populations of the central and northern Africa, and eastern Europe.

The latest analysis of the state school education undertaken by the Court of Auditors has shown that the presence of foreign pupils in Italian schools has by now become a phenomenon of considerable size. Students without Italian citizenship in the national school

system accounted for 6.4 % of all pupils [8]. It is evident that teachers commitment and responsibilities addressing a multiethnic reality are many and heavy [9]. Immigrant pupils' issue requires the school to renew educational models, curriculum content and teaching tools, but should also care for the optimal student coexistence [10]. This research aims providing further contribution, however limited, to cross-cultural psychology. Since the data collected around the world denounce school's disparity between indigenous and non-native students in academic achievement [11], it seems appropriate to face this problem monitoring objective and measurable differences between pupils with Italian citizenship and immigrant in their school context [12], with the ultimate goal to provide the opportunity to remedy eventual deficiencies of intercultural education. According to literature data [13-17], Bender Visual Motor Gestalt Test (BVMGT), for its "culture fair" characteristics, was used to underline how visual-motor and graph-perceptual skills develop in children raised in different cultural contexts [18,19]. The main hypothesis is that environmental stimuli more or less wealthy would affect cognitive abilities measured with BVMGT.

### Materials and Methods

#### Sample

We recruited 177 children from four different schools in Parma:

\*Corresponding author: Pruneti C, Department of Clinical and Experimental Medicine, Clinical Psychology Unit, University of Parma, Via Gramsci, 14, 43126, Parma, Italy, Tel: +39 0521 034829; E-mail: [carlo.pruneti@unipr.it](mailto:carlo.pruneti@unipr.it)

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(Racagni, n=68; Fognano, n=9; S. Vitale, n=28; after-school center Villa Ghidini, n=4) in Parma, and three schools in La Spezia (Piazza Verdi, n=9; Via Napoli, n=27; G. Carducci, n=32) in La Spezia. The entire sample was divided into three subgroups:

- Children born from Italian parents in Italy (Italian)
- Children born from foreign parents in Italy (Italian\*)
- Immigrant children (Immigrants)

Data owned about the examined sample are:

- First name and last name initial
- Birth date and birth place
- Attended class
- Parents' nationality of Italians ;
- Italy staying for immigrant children.

Sample was further subdivided basing on age, since the performance test varies according to cognitive development. Were thus identified three age groups: 7-8 years, 9-10 years, 11-12 years.

Italian children are 64, 34 males and 30 females, mean age 8.8 years, SD=1.35. Italian\* children, defined in literature as second-generation immigrants, since they are as suspended between two worlds and two cultures, are 33, 16 males and 17 females, mean age 8.74 years and SD=1.37. Immigrants children are 80, 37 males and 43 females, mean age 9.25, SD=1.66.

Immigrants origin areas are quite varied. According to the "six cultural areas" identified by Murdock (1967), the various ethnic groups of the sample were grouped into 5 macro – groups:

- Albania, Bosnia, Serbia, Romania, Poland, Ukraine and Moldova were clustered in the Eastern countries, including 28 subjects, mean age 9.56 years;
- India, China and the Philippines were clustered in Asia, including 10 children, mean age 9.4 years;
- Morocco, Tunisia, Ghana and Ivory Coast, were clustered in Africa, including 17 children, mean age 9.24 years;
- Cuba, S. Domingo, Colombia, Ecuador and Peru were clustered in the Central and South America, including 20 children mean age 8.85 years;
- Rom group, not highly represented (5 children, mean age 9.2 years).

According to the main hypothesis of this research, the sample was also distributed basing on immigrant childrens' staying in Italy, more or less than two years.

## Material

Figure 1 shows the five geometric figures, part of the Santucci-Pecheux (1969) reduced version of the Bender Visual Motor Gestalt Test, best suited for the psychological examination of school aged children, particularly in identifying graph-perceptual organization deficits.

Five cards containing one of more picture that have to be copied possibly of the same size as the original (14×9 cm) with a pencil on A4 size white paper.

## Procedure of administration

First, headmasters and teachers were informed and the informed

consent was signed by children's parents. The test was administered individually to each subject and always by the same operator.

The regular procedure for BVMGT was followed:

- no use either rubber or ruler;
- a single sheet of paper available for each picture;
- no time limits;
- pictures must be as faithfully as possible;
- it is not allowed to rotate the figure stimulus.

The method Santucci-Pecheux (1969) provides a total score ranging from 0 to 80, and a partial score for each table: higher the score, better the test. The scores assigned to different items are weighted, according to the subjects' age and degree of difficulty [20].

## Statistical Analysis

- Descriptive statistics and comparative analyses through nonparametric were made on collected data.
- Kruskal-Wallis test was made on three groups of subjects divided by age, looking for statistically significant differences.
- The same statistical test was applied immigrants subgroups to investigate any differences in test results depending on areas of origin.
- Mann-Whitney test for two independent samples was used for different groups of subjects, divided by age.
- Finally, Spearman Rho correlation coefficient was calculated, to assess whether there was an association between the time taken to complete the test and total scores [21].

## Results

Before applying statistical analysis, we observed the trend of the total scores of different groups of subjects (Italian, Italian \*, immigrants in Italy for less or more than two years) (Figure 2). Kruskal-Wallis test was used in order to verify if subsamples are mutually consistent. Results revealed a significance of  $p=.014$  for total score,  $p<.005$  and  $p<.05$  respectively for the stimulus Figure 3 (Table 1). All possible comparisons among the four subsamples stratified by age, with the

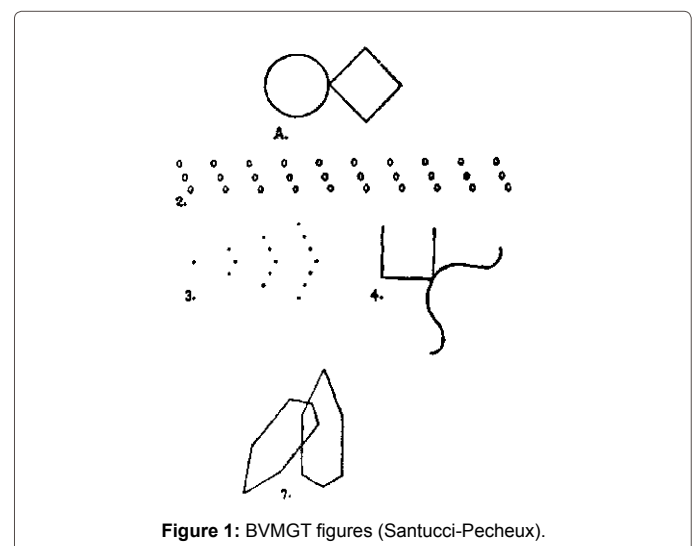


Figure 1: BVMGT figures (Santucci-Pecheux).

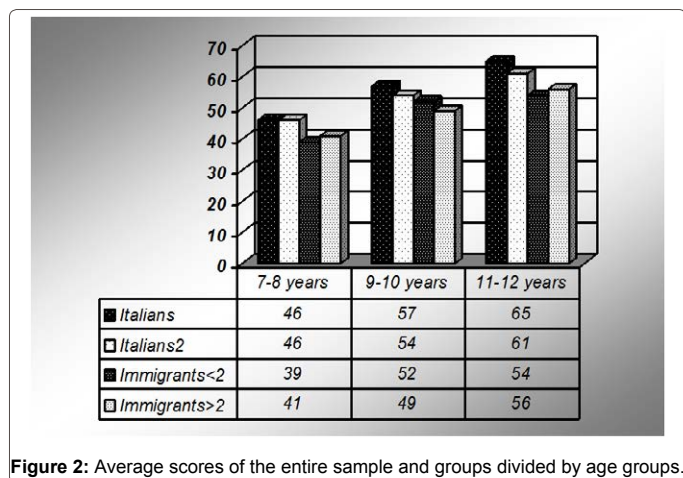


Figure 2: Average scores of the entire sample and groups divided by age groups.

Mann-Whitney test, were made and are showed in Table 2.

Significance was reached only in specific subgroups and ages; in particular:

1. Italians and Immigrants in Italy for less than two years, in age groups 7-8 and 11-12 years;
2. Italians and Immigrants in Italy for more than two years, in the ages between 9-10 years and 11-12 years;
3. Italians with foreign parents (\*) and Immigrants in Italy for less than two years in the age group 7-8 years.

Subsequently, the focus of investigation has been moved on the sample of immigrants, in order to verify the homogeneity, given the wide variety of nationalities[22-25].

The only statistically significant difference emerges in the total score of children aged between 9 and 10 years.

Figure 3 shows the trend of the average values obtained from the various subgroups, in order to observe any differences between different ethnic groups.

Applying the Spearman Rho correlation coefficient between the total score and the time taken by subjects to complete the test shows no significant correlation was found ( $rs = -.32$ ).

## Discussion and Conclusions

The statistical data analysis confirms the main hypothesis: the variable “cultural context” seems to influence the results in the Bender test, in which perceptual-motor skills are required. In the descriptive statistics, the scores of the immigrants are lower. The Mann-Whitney test confirmed these first impressions, showing that children born abroad and moved to Italy in less than two years differ from children born in Italy with Italian parents ( $p < .05$ ) in the age groups 7-8 years and 11-12 years [26-32]. Even immigrants in Italy for more than two years, compared with the Italians, report significantly lower scores in the age groups 9-10 years ( $p < .005$ ) and 11-12 years ( $p < .05$ ), while there are no significant differences with younger children (7-8 years). This fact may suggest that younger children had the opportunity to make an educational path similar to indigenous children’s one. These results also suggest that immigrants are grown in contexts culturally less stimulating visual-perceptual abilities and being unable to attend preschool and primary education in this country, may have affected their performance at the test[33].

To further confirm this, the comparison between Italians and Italians\* is not significant: these children were born and grown in the same cultural context or, at least, have faced a similar training path. However, comparing Italians\* and children in Italy for less than two there was only one significant difference ( $p < .05$ ), in children aged between 7 and 8 years.

Another confirmation of the original hypothesis is the fact that the average age of Italian children is about 6 months lower than that of Immigrants, and Italians\* is a little more of 7 months. This finding may be relevant, because it is well known how age and development can affect cognitive performance on the Bender test.

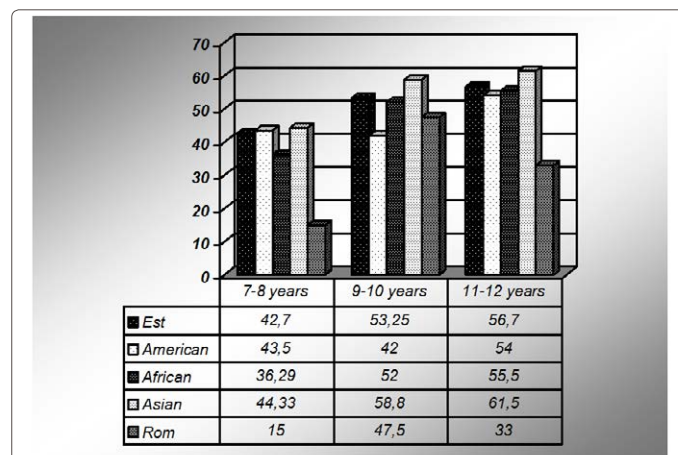


Figure 3: Trend in mean scores of the sample of immigrants divided by geographical areas and age groups.

	H.	P.
TOT	8.6	.014
TAV. A	1.5	N.S.
TAV. 2	1.5	N.S.
TAV. 3	10.7	.005
TAV. 4	5.6	.05
TAV. 7	4.5	N.S.

Table 1: Results of the Kruskal-Wallis test on the entire sample.

	7-8 Years		9-10 Years		11-12 Years	
	U.	P.	U.	P.	U.	P.
ITA VS ITA*	224.5	N.S.	132	N.S.	13	N.S.
ITA VS IMM<2	197	.05	123	N.S.	12	.05
ITA VS IMM>2	151.5	N.S.	70.5	.005	22.5	.05
ITA* VS IMM<2	94	.05	85.5	N.S.	11	N.S.
ITA* VS IMM>2	75	N.S.	56	N.S.	17	N.S.
IMM<2 VS IMM>2	93	N.S.	75.5	N.S.	44	N.S.

Table 2: Comparisons of the total scores of all groups of subjects with Mann-Whitney.

The lower average age could be a “handicap” for the two Italians groups, yet these children obtained higher average scores. Looking at the ethnic origin, at a descriptive level, it would seem that Asians group (Chinese, Filipinos, Indians) have better results in the test, followed by Eastern Europe (Ex-Yugoslavia, Albania, Romania, Ukraine)[34-36]. It could be hypothesized that the two aforementioned regions represent industrialized countries, more than Africa (Ghana, Cote d'Ivoire, but also Morocco and Tunisia) and Central and South America (Cuba, S. Domingo, Colombia, Ecuador, Peru); however there are no final evidence confirming this assertion. This research is meant to emphasize the need to take into account the ethnic variability in settings like the school; this variable is often a source of inconvenience and problems, often difficult to tackle and solve[37]. Regardless of intelligence or other individual characteristics, not all components of a multicultural classroom stem from the same level of skills and competencies. A simple test such as the Bender can become a useful predictive tool to identify gaps and differences between people from different cultures in order to create focused interventions and ad hoc trainings[38].

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