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INFLUENCIA DEL SIGNIFICADO DE LA ESCRITURA Y DE LA PRÁCTICA DEPORTIVA SOBRE LAS ASIMETRÍAS VISOESPACIAL

INFLUENCE OF THE MEANING OF WRITING AND SPORTS PRACTICE ON VISUOSPATIAL ASYMMETRIES

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RESUMEN (ESPAÑOL)

Estamos tratando de estudiar la influencia de la dirección de la escritura, así como la experiencia en la tendencia direccional. Hemos utilizado el protocolo de la bisección para medir esta tendencia. Nuestros resultados han mostrado diferencias de rendimiento entre grupos con dirección de escritura opuesta. Los sujetos, que solo escriben árabe, tienden a dividirse a la derecha del punto medio objetivo, mientras que los que escriben de izquierda a derecha o en ambas direcciones muestran un patrón inverso. La experiencia, en sí misma, influye en las asimetrías visual-espacial. El entrenamiento en voleibol para los sujetos de ambas direcciones da como resultado una desviación a la derecha del punto medio objetivo. también hemos encontrado un efecto de mano en el rendimiento de bisección. Nuestro hallazgo indicó una desviación a la derecha del punto medio objetivo con la mano derecha, y hacia la izquierda con la mano izquierda. Nuestras observaciones, en este proyecto, han demostrado que las asimetrías tienen un origen cultural

PALABRAS CLAVE:
Lateralidad, Bisección de línea, Dirección de escritura, Experiencia

ABSTRACT (ENGLISH)

We are trying to study the influence of writing direction as well as the expertise on the directional tendency. We have used the protocol of the bisection to measure this tendency. Our results have shown performance differences between groups with opposite writing direction. Subjects, who write only Arabic, tend to bisect to the right of the objective midpoint, whereas those who write from left to right or in both directions show an inverse pattern. Expertise, itself, influences visual-spatial asymmetries. Training in volley-ball for the subjects of both directions results in a deviation to the right of the objective midpoint. we have also found a hand effect on bisection performances. Our finding indicated a deviation to the right of the objective midpoint with the right hand, and to the left with the left hand. Our observations, in this project, have then shown that asymmetries have a cultural origin

KEYWORDS:
Laterality, Line bisection, Direction of writing, Expertise

INTRODUCTION

Our study will focus on the effect of the meaning of writing on visuo-spatial asymmetries. that is how we began to compare adults; of two sexes, Tunisians (writing from right to left only), Europeans (writing only from left to right) and Tunisian teachers (both writing well in both directions) in the bisection spot. We also sought to study the effect of sports practice on these asymmetries. For this purpose we have compared, in the same spot, high-level volleyball players and novices, of two sexes and of the same age, all writing in both directions.

METHOD

Population:

The present study is based on a total population of 190 participants, all of whom are right-handed and split into two groups. A first group of 110 adults between 40 and 52 years old, which includes 40 Tunisian adults (20 men and 20 women) who can write only in Arabic (from right to left), 30 European adults (15 men and 15 women) who know to write only the French, English or Russian language (from left to right) and finally 40 Tunisian teachers (20 men and 20 women) able to write well in both directions. The second group consists of 80 subjects aged between 23 and 30 years old: 40 volleyball players (20 boys and 20 girls) belonged to clubs in the region and 40 novices (20 girls and 20 boys).

Procedure:

The laterality of manual preference was evaluated by a questionnaire containing 10 items preferably manual: Write, brush your teeth, eat, throw a Valle, rub a match, sew, distribute cards, open a bottle, pick up and Dribble.

Visual-spatial directional trends were evaluated from the bisection task. The test consisted of four white leaves each containing a horizontal black line centered in the middle of the leaf. The lines were all 1 millimetre thick, their length was 20 centimetres (sheet 1 and 2) and 28 centimetres (sheets 3 and 4). The subjects were asked to cut each of the lines in their midst, drawing a line with the Crayón, so as to divide them most precisely posible into two equal parts with each of the two hands in a counterbalanced order. The bisection estimation error of each line was measured in centimeters from the center point. The errors to the right of the center point were recorded in positive values and those on the left of this point in negative values.

RESULTS

All subjects are right-handed in the task of scripture. The manual preference analysis for the ten Ítems showed that the frequency of right-handed depending on the ítems ranged from 48.8% to 92.5%. Our data shows no homogeneous right-handed.

The right-handed frequency is 19.5%, the ambidextrous right-handed frequency is 75.3% and the ambidextrous leftrs frequency is 5.3%. We did not observe a sex-related difference in the manual preference. The frequencies of right-

handed, ambidextrous and left-handed ambidextrous for women are comparable to those observed in men (Table 1).

	Right ward	Ambi-dex-trous right-ward	Ambi-dex-trous Left-ward
Man	17.9	76.8	5.3
Woman	21.1	73.7	5.3

Table 1: Frequency of Right-handed and Ambidextrous Right-handed and Ambidextrous Left- handed by Gender.

Our results show no difference between the expert group and the Novice group. The frequencies of right-handed, ambidextrous and left-handed ambidextrous for experts are also comparable to those observed in the novice group (Table 2).

	Right ward	Ambi-dex-trous right-ward	Ambi-dex-trous Left-ward
No-vices	17.5	77.5	5
Ex-perts	27.5	65	7.5

Table 2: Frequency of Right-handed and Ambidextrous Right-handed and Ambidextrous Left- handed according to the expertise of the sporting practice.

An ANOVA, with group (5) and hand (2) as independent variables, calculated on the mean deviation, showed a group effect ($f(4.370) = 20.5$, $p < 0.0001$), a hand effect ($f(1.370) = 62.6$, $p < 0.0001$) and an interaction group X main ($f(4.37.) = 605$, $p < 0.0001$). The group effect indicates that the subjects writing from left to right or in both directions show a deviation to the left of the objective medium. On the other hand, subjects writing only from right to left show an inverse pattern (deviation to the right of the objective medium). The planned comparisons showed that this group effect also indicates that the novice subjects show a deviation similar to that observed in the group of subjects writing from left right and that the expert subjects show an inverse pattern ($F(1,370) = 4.15$, $p < 0.05$ (Table 3).

	Ave-rage	Standard deviation
Writing from Right to Left	0.043	0.365
Writing from left to right	-0.321	0.261
Writing in both direc-tions	-0.189	0.294
Novices	-0.087	0.260
Experts	0.000	0.316

Table 3: Averages and standard deviations of the deviation in the line bisection spot in group functions.

The hand effect indicates a left deflection with the left hand and a right deflection with the right hand. The group X main interaction indicates that the direction of deviation (right or left) varies according to the group when the subjects bissectent with the right hand. On the other hand, when the subjects bissectent with the left hand, they show a deviation to the left.

DISCUSSION

Our results show an influence of the usual meaning of the writing

on the mean deviations. The Tunisian adults, writing from right to left, bissectent the lines to the right of the middle objective contrary to the European adults, who bissectent these lines to the left of the middle objective. The absence of a left bias in Tunisian adults may be due to the fact that the sense of árabe writing induces bias in the opposite direction from that caused by neuronal factors. On the other hand, the meaning of European adult writing induces a bias in the same sense as that of these factors.

We also found that Tunisian teachers and novice bissectent the lines to the left of the middle objective. This result can be explained by the fact that these subjects have the habit of writing from left to right in addition to the Árabe writing.

These results are consistent with the results showing a left-to-right deviation pattern for adults writing from left (Bradshaw, 1988). They also agree with studies showing that the sense of writing induces different deviation patterns from the objective medium (Fairbrother & Dahmen, 2003; Dahmen, 2004; Chokron & De Agostini, 1995).

On the other hand, our results are in contradiction with other studies showing that the deviation from the objective medium is still observed on the left regardless of the direction of visual Exploration (Nicholls & Roberts, 2002; Bradshaw et al., 1987; Reuter-Lorenz & Posner, 1990; Barrett et al., 2002; Hjaltson et al., 1993).

We also observed an influence of sports practice on visual-spatial asymmetries in the task of bisection of lines, carried out with the right hand. The experts bissectent the lines to the right of the middle objective while the novices bissectent these lines to the left of the middle objective. This result is in line with the work of Carlstedt (2004).

Our results showed an influence of the main factor on the average deviations. A deviation to the right of the objective medium with the right hand and a left deviation of the objective medium with the left hand were observed. This opportunities agrees with the work of Halligan et al. (1991) and Schenkenburg and Bradford (1980).

An interaction group X main was also observed. For the performances obtained with the left hand, we did not find a significant effect neither of the meaning of the writing nor of the sports practice. The influence of these factors is observed at the level of the performance obtained with the right hand. Our results indicate a left deviation with the left and right hand with the right hand in adults writing from right to left and from the experts. However, we found that the other three groups tended to bissecter the lines to the left of the objective medium with both hands. This result is consistent with the majority of studies on right-handed people (Brodie & Pettigrew, 1996; Milner, 1992; Scarisbrick, 1987; Bradshaw et al., 1986). Our results also showed that in the latter the left-hand deviation is stronger with the left arm than with the right hand. What has already been observed by Hausmann et al. (2002).

Finally, we did not find a sex effect on the performation in bisection. Most studies devoted to gender differences in visual space tasks have found the same result (Bradshaw et al., 1986; Brodie & Pettigrew, 1996; Yogesh & Iglesias, 1993; Luh, 1995; Mefferd et al., 1969; Milner et al., 1992; Scarisbrick et al., 1987; Shuren et al., 1994) Contrary to the observations of Roig and Cicero (1994) and Wolfe (1923), which found differences between the two sexes at the level of deviation to the left.

In conclusion, visual-spatial asymmetries are strongly influenced by the usual senses of writing. Subjects with an opposite meaning of writing (from left to right for Europeans and from right to left for Tunisians) have an opposite pattern of deviation. Volleyball expertise Also present a factor that can influence these asymmetries. The intervention of these two factors at the level of visual-spatial asymmetries implies a cultural rather than a genetic influence on the process of laterality.

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