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A Look at the Effect of Hand Dominance on Learning

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Abstract: Hand dominance or handedness has been associated with a lot of other conditions; in the case of left handedness, most of them deleterious. Left handedness was also thought to adversely affect learning. In this study, self-assessment questionnaires were filled by 606 primary school pupils. Their ages ranged between 6 and 16 years, with a mean age of 11.1 and a mode of 12 years. The questionnaires were analysed using Chi-square test on SPSS. The handedness of the respondents was associated with learning, using their graded performance in class. There were 537 (94.9%) right-handers, thirty (5.1%) non-right handed children. A significant proportion of the non-right handed respondents performed above their class average. Handedness was thus found to significantly affect learning ($p < 0.05$).

Key words: Handedness, right handed, non-right handed, graded performance

INTRODUCTION

Interest in the dominant hands of individuals is not a modern phenomenon. It arose during the nineteenth century when the views on the functional localization in the cerebral cortex were developing (Dax, 1865). Determining the hand preferences of an individual is important to psychologists, clinical neurologists and research scientists because hand preference is considered a marker for cerebral hemispheric dominance for speech and language. It is also an inexpensive, non-invasive way for physicians and scientists to reliably identify the hemisphere controlling a person's speech ability; this information is useful both for treatment and basic research into the brain (Springer and Deutsch, 1997).

Hand dominance has been associated with many conditions; in the case of left handedness, most of them deleterious. And in Nigeria, most cultures associate left handedness with numerous myths and consider it disrespectful, or even a taboo to carry out certain tasks with the left hand-such as giving or collecting things from elders, pointing, eating, etc. It is thus common practice for parents or relatives of left handed children to teach them to stop this apparently abnormal behaviour (Adeyemi-Doro, 1993).

This attitude is not surprising, for even scientific studies still attempt to link left-handers with socially undesirable behaviours, such as psychosis or criminal activity. Left-handedness has been associated with developmental disorders including dyslexia, stuttering, mental retardation and autism (Geschwind and Behan, 1982; Batheja and McManus, 1985; Porac *et al.*, 1980). It

also has a high association with disease and disease risk factors (Stellman *et al.*, 1997); shortened life span (Ashton, 1981; Coren and Halpern, 1991; Fleminger *et al.*, 1977; Kuhlemeier, 1991; Lalumière *et al.*, 2000; Lansky, 1988; Porac *et al.*, 1980; Tan, 1983) and even increased risk of breast cancer (Anonymous, 2005).

Throughout the ages, left-handers have been regarded with a certain amount of suspicion by society as a whole and are viewed as rather unsavoury, educationally backward and anti-social characters by psychologists (Dacey, 1989). They have also been considered as obstinate introverts, who declined to use their right hand to write with, not because they could not, but because they would not! (Burt, 1937) who provided the greatest insight into the position of left-handers during the first part of the twentieth century. This link with educational backwardness and nonconformity possibly contributed to the inflexible attitude adopted by both parents and teachers at that time, towards forcing their children to use their right hand for writing and other manual tasks.

While some studies have suggested an unusually high proportion of developmental problems and mental retardation, left-handedness is also notorious among the most gifted of humans. Although left-handedness is associated with many unpleasant things, it has its advantages. That is, left-handedness may not be good or bad in the final analysis, rather simply different (Geschwind and Galaburda, 1985).

The Incas thought that to be left-handed was lucky and one of their great chiefs was Lloque Yupan Qui, which translates as left-handed (DeKay, 1979). Certainly

the modern human is predominantly right-handed. Also, no significant difference between gifted and non-gifted children in distribution of left and right handed writing has been determined (Szeszko *et al.*, 1997).

Most people working with children are interested in the development of the hand preferences because of both its impact on hand skill and its possible relationship to brain function. Better understanding how handedness relates to brain function is relevant to many people, such as academic researchers, medical clinicians, neurological patients, educators and left-handers themselves.

This study thus tries to find out the effect of handedness on learning using children from Delta State, Nigeria, in an attempt to clarify the relationship between handedness and functional brain specializations such as learning. Learning more about the mechanisms that underlie these relationships, may help lead to better understanding of a wide range of seemingly unrelated issues such as dyslexia, stuttering, human variation, comparative brain research, developmental neurobiology of the brain and the origins of human language.

MATERIALS AND METHODS

The sample consists of six hundred and six (301 males and 305 females) primary school children. They were randomly selected from six primary schools in Abraka, Delta state, with an age range of between 6 and 16 years. The study was carried out in 2005 over the months of May, June and July. Handedness was determined using a questionnaire incorporating questions on the preferred hand for 13 habitual activities (Chapman and Chapman, 1987). Subjects were scored for each activity and classified into right-handers and non-right handers, depending on their total score.

The effect of handedness on learning was determined by assessing their graded performance. This was got by asking the class teachers for the class results of the previous term, which was used to classify the children as above average, average and below average (Didia and Igbigbi, 2004). The results were analysed using Chi-square test on the Statistical Package for Social Sciences (SPSS).

RESULTS AND DISCUSSION

Table 1 shows the handedness of the respondents by gender. The overall percentage of right-handedness in the study was 94.9% compared to 5.1% non-right handed respondents. This difference is statistically significant ($\chi^2 = 7.359$, $df = 2$, $p = 0.025$).

Table 1: Handedness of respondents

Handedness	Gender		Total
	Male	Female	
Right handed	282 (93.7%)	293 (96.1%)	575 (94.9%)
Non-right handed	19 (6.3%)	12 (3.9%)	31 (5.1%)
Total	301	305	606

Table 2: Graded performances of respondents

Graded performance	Handedness		Total
	Right-handed	Non-right handed	
Above average	120 (20.9%)	11 (35.5%)*	131 (21.6%)
Average	354 (61.6%)	19 (61.3%)	373 (61.6%)
Below average	101 (16.8%)	1 (3.2%)	102 (16.8%)
Total	575	31	606

*: $p < 0.039$

Approximately one-third (35.5%) of the non-right handed respondents performed above their class average- this was statistically significant ($p < 0.039$); with most of the right-handed (61.6%) respondents falling within their class average in graded performance (Table 2).

In the studied population, 94.9% were right handed, while 5.1% were non-right handed. This percentage was consistent with findings from other studies which indicated that the upper limb was often laterally dominant on the right side (Adeyemi-Doro, 1993; Bentley and Stainthorpe, 1993; McCartney and Hepper, 1999; Didia and Igbigbi, 2004).

In this study, non-right handers performed significantly better than the right handers as 35% ($p < 0.039$) had a graded performance above their class average when compared to 20.9% of right handers; with more right handers (16.8%) below their class average than non-right handers (3.2%). This finding is similar to that of Randerson (2001) who found that those with non-right handed tendencies have better memory.

This result shows that non-right handedness (including left handedness) is not all bad. The result is comparable to the recently emerging belief that suggests that left-handed people were more intelligent or creative than right-handed people. Although the theory is as yet largely unfounded, proponents were convinced that non-right handers' brains were structured differently in a way that widens their range of abilities.

Although being left-handed is a common trait among children with specific learning requirements, this may well be a by-product of their preference for right-brain thinking. Just as studies have shown that there are an unexpectedly high number of left-handers in certain groups of extremely bright individuals, they also show a disproportionately high number with learning handicaps such as dyslexia, stuttering and child autism. It is

important to stress, however, that left-handedness is not the cause of any of these conditions, but may occur in addition to them. Also, no significant difference was determined between gifted and non-gifted children in the distribution of left and right handed writing with the use of chi square comparison (Szeszko *et al.*, 1997).

The findings from this study will be useful, especially in the psychological and educational research which started in the mid-nineteen-fifties, where the educational implications and causes of left-handedness (Clark, 1957; Annett, 1983) and cognitive differences between right and left-handers (Newland, 1981; Sunseri, 1982; Bower, 1985) are being investigated. This will aid in dispelling such uncompromising attitudes towards non-right handedness, especially in Nigeria where most cultures associate them with sinister myths. Western society today no longer discourages left-handedness (Bentley and Stainthorp, 1993).

CONCLUSION

In conclusion, although non-right-handedness is associated with many unpleasant things, it has some advantages. Being right-handedness or non-right handed should not be considered as good or bad, but rather simply different (Geschwind and Galaburda, 1985).

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