LETTERS TO THE EDITOR

A simple method to assess hand performance

Sir, – Hemispheric asymmetry is currently the subject of intensive and extensive clinical and experimental research, not only in relation to cognition but also to the regulation of affective behaviour.[1] Your readers, therefore, may be interested to learn the details of a simple method[2] of determining handedness, one particular instance of asymmetry.

Tapley and Bryden have devised a dot-tapping task in which dots are placed within circles on a type-written page as rapidly as possible. The authors compared this performance task with a preference inventory in which subjects rated, on a 5-point scale, each of the following activities: writing, drawing, throwing, using scissors, a toothbrush, a knife without a fork, a spoon, and striking a match. The performance test showed a high correlation with the inventory score ($r=0.75$; $P<0.001$). And only 8 of 1,556 subjects indicted a disparity between preference and performance.[2]

To examine the utility of the performace task it has been administered[3] to 105 male and 154 female medical, science and physiotherapy students tested in groups of 8, 25 and 65.

Methods

A page on which "circles" were typed in four similar patterns (Figure 1) was given to each individual. After filling in details of name, age, sex and hand preferred for writing, the subjects were told to "make a dot in each circle" following the pattern as quickly as possible in the 20 seconds after the signal to "START". After the instruction to "STOP" at 20 seconds the subjects were instructed to prepare to fill the circles in the next pattern in like manner. The preferred hand was used for the first and fourth trials and the other hand for the second and third trials. Before beginning it was emphasised that the dot must be placed in the "circle", not on the edge or outside it in order to be scored.

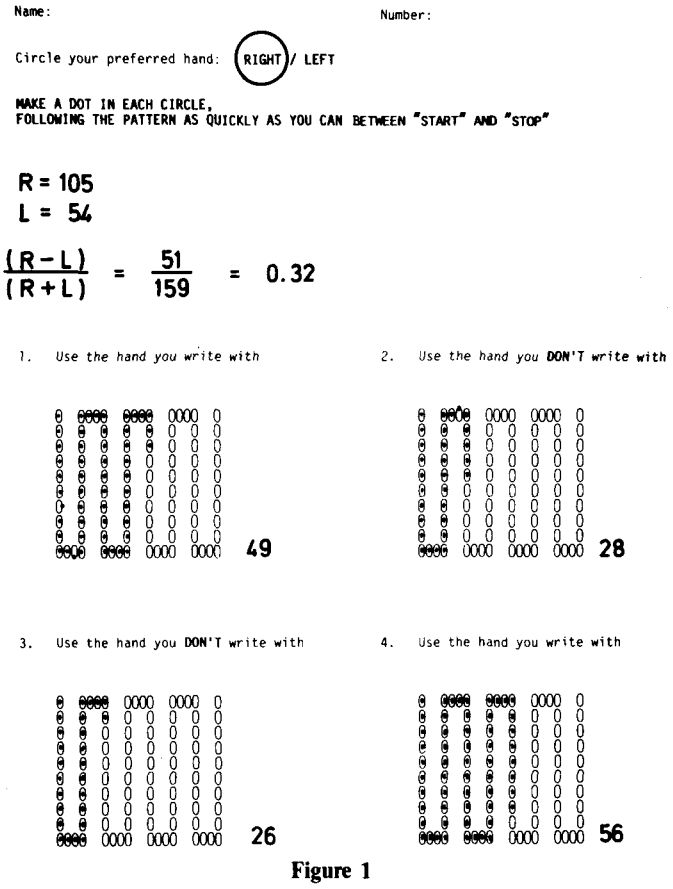

Figure 1

The number of circles properly dotted (*or* "filled") was counted for each trial – a process made more tractable by asking the subjects to use a coloured ink or pencil. The differences were then expressed as the difference between right- and left-handed scores, [R−L], divided by the total score, [R+L]. This ratio [R−L]/[R+L] represents the difference in rates expressed as a proportion of the overall rate. Right-handers are those who obtained positive scores and negative scores identify left-handers.

Results

Scores in the 259 subjects are displayed in Figure 2. The 154 females were significantly more strongly handed (0.255) than the 105 males (0.163); probability>F=0.0018. But when the subgroups made up of 145 female dextrals and 9 sinstrals and 86 males destrals and 19 sinstrals are examined, the females are only slightly more extreme in individual handedness than the males: dextrality in females 0.287 as against 0.253 in males (probability>F=0.5964); sinstrality −0.260 in females and −0.248 in males (0.6265); in no instance is the difference statistically significant. That sinstrals account for 10.8 per cent of the total is in accord with common experience.

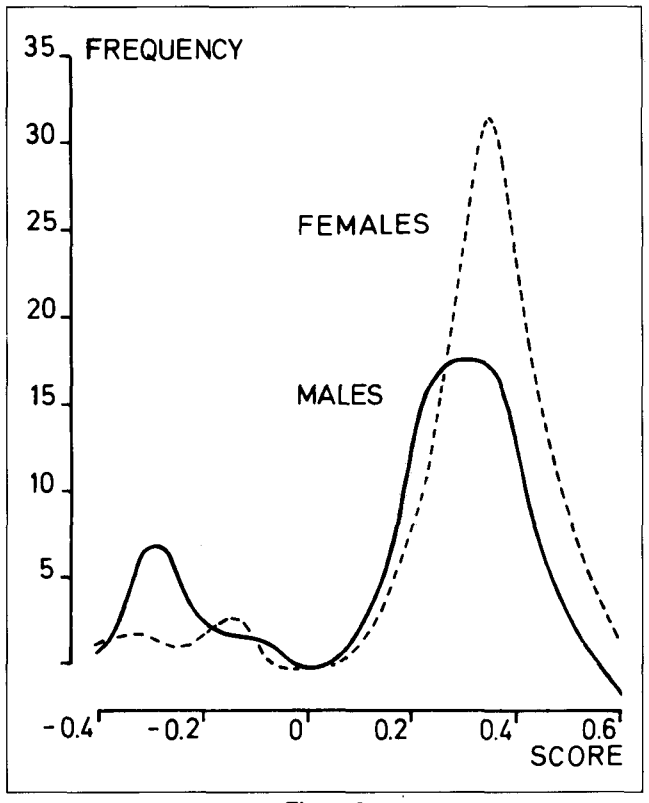

Figure 2

Comment

The beauty of the test lies not so much in its procedural simplicity as in the ingenuity of expressing the difference in rate, [R−L], as a proportion of the overall rate, [R+L]. As a result there is clear segregation into two readily distinguishable groups of right-handed and left-handed subjects (Figure 2), male and female.

More important, the usefulness of handedness as an expression of hemispheric asymmetry has recently been validated employing *in vivo* computerised imaging techniques[3] in the correlation of structure and function. Hand Preference, Hand Performance (as described here), Dichotic Listening and Visual Field Preference were concurrently measured and correlated with anatomically superior magnetic resonance images of normal brain in 20 young adults (9 males, 11 females; 10 right- and 10 left-handed). The hand performance task was the most significant in linear regression analysis, showing a correlation between the composite and anatomical measures and hand performance scores that could not be demonstrated for either dichotic listening or visual field preference.[4] Furthermore, these composite anatomical measures classified the subjects for handedness with better than 95 per cent confidence on a discriminant function analysis.

The simple measure of tapping speed as described here has been shown[2,4] to be a valid test of handedness and of cerebral hemispheric asymmetry.

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References

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