

## Brief Report: The Effect of Verbalising and Voluntary Movements on Left Hemisphere

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**Abstract.** The aim of this study was to examine the interference effect of a verbal task and a tap task (voluntary movement) on the left hemisphere. The participants ( $N = 6$ ; 4 females and 2 males) are psychology students. This present study excluded the left-handed. As part of a between subject design, the participants were randomly assigned into two groups and each group did the experiment twice. The hypothesis that right-handed students who were only tapping (the control group) would have higher overall mean than when students were tapping and at the same time verbalising (the experimental group) is not reflected by the results. It was concluded that verbal and voluntary movement tasks did not have interference effects on the left hemisphere, though the overall mean gained for the experimental group were slightly higher than the control group, i.e. 8.333 and 8.167, respectively.

Key words: left hemisphere, interference effect, verbal task, tap task

**Abstrak.** Tujuan studi ini adalah mencermati akibat interferensi tugas verbal dan tugas tepukan (gerakan volunter) terhadap hemisfer kiri. Para peserta ( $N = 6$ ; 4 perempuan dan 2 pria) berasal dari kelas laboratorium psikologi, Universitas Massey. Studi ini tidak mengikutsertakan yang kidal. Sebagai bagian dari desain antar-subjek, para partisipan dipilih secara acak dan dikelompokkan menjadi kelompok eksperimen dan kelompok kontrol, dan setiap kelompok melakukan percobaan dua kali. Hipotesis bahwa mahasiswa bukan kidal yang hanya menepuk (kelompok kontrol) mempunyai rerata menyeluruh yang lebih tinggi daripada mahasiswa yang melakukan keduanya, yaitu tugas menepuk dan tugas verbal sekaligus, tidak didukung oleh hasil studi. Disimpulkan tugas verbal dan tugas gerakan volunter tidak mengakibatkan interferensi pada hemisfer kiri, sekalipun rerata menyeluruh kelompok eksperimen agak lebih tinggi daripada kelompok kontrol, berturut-turut 8.333 dan 8.167

Kata kunci: hemisfer kiri, efek interferensi, tugas verbal, tugas ketukan

The cerebrum is the largest region of the human brain and is divided into right and left hemispheres. These two hemispheres are not functionally identical and carrying out particular functions. Speech and language are mainly attributed to left-hemisphere. According to Weiten (2007), the left hemisphere is implicated in the control of language and speech, and it usually characterized as the “dominant” hemisphere; controlling the mental processes, such as reasoning, remembering, planning, and problem solving. The right hemisphere usually is better on tasks involving nonverbal processing, such as spatial, musical, and visual recognition tasks (Wei-

ten, 2004). The perceptual information from the eyes, ears, and the rest of the body is sent to the opposite hemisphere, and the motor information sent out the body also comes from the opposite hemisphere (Corballis, 2003; Gazzaniga, 2000). Thus, the left hemisphere controls and works with right hand, right forearm, right eyebrow, right leg, and right arm, while the right hemisphere controls and works with all the left side of the body.

According to Springer and Deutsch (1998) and based on a classic research (Gazzaniga, Bogen, & Sperry, 1965), handedness is related in complex ways to the distribution of functions between the left brain and the right brain. The brain asymmetry must deal with this handedness problem. Handedness reflects the undisputed uneven distribution of functional behaviour (Hellige, 1993a, 1993b). The

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sodium amobarbital testing showed that over 95 percent of right-handed and 70 percent of left-handed have speech localized to the left hemisphere (Springer & Deutsch, 1998). The remaining 30 percent of left-handed may have bilateral speech representation. Mostly, the left hemisphere is dominant for hand control.

The experiment in the present study excluded left-handed participants because they could interfere this experiment due to inconsistent lateralization, and also to minimize extraneous variables. All the right-handed participants were divided into 2 groups. The first group (the experimenter group) were tapping with each hand (right and left) and singing "happy birthday," while the second group (the control group) were only tapping with each hand. All participants were tested exactly the same experiment twice in 10 seconds, and the experimenter counted the mean from these two experiments.

This present study hypothesised that right-handed students who were only tapping would have higher overall mean on their number of dots than when students were tapping at the same time verbalising. This is because verbalising and voluntary movement (tapping with right hand) would have interference effects on left hemisphere, while tapping without any verbalising would not affect the left hemisphere.

## Method

### *Participants*

Participants were 6 (4 females and 2 males) undergraduate right-handed psychology students, selected from the introduction to psychological research students. Participants were in the age between 18 and 25 years old.

### *Apparatus*

A watch or stopwatch, pen, and paper.

### *Design*

The current study apply a between subject de-

sign meaning that participants cannot use their own controls. These participants were randomly assigned to both experimental and control groups. The control group were only tapping and the experimental group were tapping at the same time as singing "happy birthday." The dependent variable was the number of dots, and the independent variable was doing things that affected left-hemisphere, such as verbal and any voluntary movements with right-sides of the body. The instructor made counter-balance between two groups in order to control carry-over and order effects. In the first group (experimental group), the first and the second participants started with left hand first, and the third participant began with right hand first. In the second group (the control group), the first and the second participants started with right hand first, and the third participant began with left hand first.

### *Procedure*

All students in the class were divided into two groups. Six students in each group were randomly allocated to pairs. The students sitting at the left side became experimenters and the rest of students became participants. All participants were right-handed. There were three participants in each condition. The first group (experimental group) were instructed to tap while singing "happy birthday" at the same time in 10 seconds; the first and second participants were instructed to begin with left hand first, while the third participant started with right hand first. The second group (control group) were told that they had only to tap without singing in 10 seconds; the first and second participants were told to start with right hand first, and the third participant began with left hand first. Both groups did the experiment twice. The experimenter counted how many dots that participants produce in each experiment, and then calculated the mean.

## Results

The mean of participants in the experimental group were 8.5, 14.5, and 2. On the other hand, the participants' mean in the control group was 15.5, 3, and 6. The overall mean for the experimental group was

$(8.5+14.5+2)/3 = 8.333$  and the control group was  $(15.5+3+6)/3 = 8.167$ , while the standard deviation for the experimenter and the control groups were, 6.25 and 6.53, respectively. There was no statistically significance difference between the two groups.

## Discussion

The hypothesis predicted that participants who only tapped would be having higher mean on the number of dots than the participants who tapped and sang at the same time. The results of the present study fail to support the hypothesis because the overall mean in the experimental group (tap and sing) were slightly higher than in the control group (tap only).

Ivry and Robertson (1998) found that language defects accompany right sides paralysis. It indicated that the left hemisphere administer everything in the right-sided body, including handedness. If speech and language are controlled by the left hemisphere, the participants who were tapping with right hand, while singing "happy birthday" would have lower overall mean than the participants who were only tapping, as talking interfere with left hemisphere. Both participants in the experimental and control groups that were tapping with left hand will not have any effects, as speech is not controlled by right hemisphere. Interestingly, there was only slightly difference in the overall mean between "tap and talk" and "tap only". This present study show that handedness is quite complicated to explain the distribution functions between left brain and right brain. It was also difficult to explain the brain asymmetry.

There were certain limitations in this present study. Although the result show a right-handed person who performing a tap task and verbalising at the same time did not have interference effects on the left hemisphere, it was not adequate to represent any serious conclusions. Regarding to this present study, it would not be representative of the general population of interest because of not sufficient samples and only represented by three psychology students in each group without knowing their backgrounds. For instance, even though all participants said that they are right-handed, this current study might include participants who were tennis players who are capable to smash with a racket with their

left-hand. Furthermore, both experimental and control groups were in the same class and the instructor still kept talking while all participants began this experiment. So, the noise of the class might become an extraneous variable as this noise cannot be controlled and affected all participants in each group.

In future experiments, there should be more students from different faculties, wide ranges of ages, and equal number of each gender; the experimental and the control should be in separate rooms. Clear information that participants always do best with their right-hand are also needed to draw more adequate conclusions.

In summary, this present study indicated that a person who talked and tapped at the same time would not affect left hemisphere, and had slightly higher mean than a person who only tapped. Therefore, an interference effect on the left-hemisphere did not occur when right-handed persons verbalise and at the same time tapping (voluntary movement).

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