



Effects of Handedness on Verbal and Written Language Memory

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Introduction

- The purpose of this study was to evaluate any procedural differences in the way left handed and right handed individuals process verbal and written language memory.
- The left hemisphere is thought to control language, math, and logic, while the right hemisphere is responsible for spatial abilities, visual imagery, music and your ability to recognize faces. The left hemisphere of the brain also controls the movement on the right side of your body. Broca's area and Wernicke's area are located in the left cerebral hemisphere for about 95 % of right handers and about 70% of left handers. This could effect how left handed individuals process different forms of information (Chaudhary et al, 2009; Price, 2010)
- Though there isn't much existing research on this topic, a significant positive correlation was found between the laterality and the performances in the California Verbal Learning Test (Catani et al, 2007). Other studies have evaluated relationships between different variables that are included in our study, most of which present a need for further investigation, as this is a complex topic (Peeverly et al, 2013).
- Hypothesis: We expect to see differences in memory between left-handed and right-handed individuals.

Methods

Participants:

- We recruited participants from the university (i.e students, faculty, staff) and the community. We are presenting on data found from 18 left handed participants and 41 right handed participants.

Measures:

- We measured for differences in memory by administering the California Verbal Learning Test-short form (CVLT II), a 3-back working memory task, and a reading comprehension task. Participants also completed a demographics form which also assessed handedness using the Edinburgh Handedness Inventory.

Procedure:

- Participants were randomly assigned to one of 8 conditions that varied how they received and reported information. The possible conditions are as follows:
 - Verbal recall of verbally presented material
 - Verbal recall of written material
 - Written recall of verbally presented material
 - Written recall of written material
 - Verbal recall of hand written material that is presented verbally
 - Verbal recall of hand written recall that is presented in written form
 - Written recall of hand written material presented verbally
 - Written recall of hand written material that is presented in written form.
- Administration of CVLT II
- 3-back working memory task
- Administration of reading comprehension passage
- Demographics form with handedness inventory
- Administration of memory task via questions from passage

Results and Discussion

- There were no significant differences in memory between right-handed and left-handed participants, $t(57) = -.610, p = .55$.
 - Power was low, so it would be difficult to detect any differences
 - There were twice as many right-handed participants, which makes comparison difficult
- Left-handed participants were slightly, but not significantly, more likely to provide false positive responses on the CVLT, $t(57) = 1.65, p = .18$.
 - Power was low, so a real difference may exist and could not yet be detected
 - This could suggest a difference in language processing between left-handed and right-handed individuals, but would have to be further examined.
- General Discussion
 - This study has not detected any significant differences at this time. However, this may be due to having twice the number of right handed participants as left handed participants.
 - Lack of significant findings is still relevant and important because it would allow for inclusivity of left-handed individuals in future studies on memory without potential error or confound.
- Future Directions
 - This is an ongoing study. We plan to complete the study by continuing with data collection to ultimately reach an equal number of participants in each group. This will increase the power of these measures and thus will allow us to evaluate these future findings and make more supported conclusions.

References

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