Verbal working memory capacity affects gesture/speech integration : preliminary results

Kandana Arachchige, K.G., Simoes Loureiro, I., Blekic, W., Rossignol, M., & Lefebvre, L.

Department of Cognitive Psychology and Neuropsychology, University of Mons, Belgium

Introduction. Iconic gestures (IG) occur in daily conversations and are considered as nonverbal communication. Because they convey information semantically associated with the co-uttered speech [1], numerous authors agree on their impact on language comprehension [2]. Given their semantic content, an involvement of the verbal working memory (vWM) has been suggested [3]. The authors asked participants to remember a series of digits (secondary task, ST) before presenting a gesture/speech integration task (primary task, PT) [3]. Participants then had to recognize the number(s) previously presented among others. This paradigm allows to observe a potential interference effect of the ST on the PT performances suggesting an involvement of the cognitive processes in play in the secondary task on the primary task. The authors failed to show such effect. However, given the nature of IG, we decided to conduct a similar study by modifying two variables. **Methodology**. Twenty-five healthy French-speaking participants were recruited. Two participants had to be excluded. The remaining 23 participants (4 men; M_{age} = 22,74; SD = 0,80) were asked to complete the Digit Span Task, determining the span for a Gender Classification Task. Here, participants were presented with one (low) or several (high load, matching their span) words that they had to remember (ST). They then saw a video of a gesture enacted either by a man or a woman accompanied by a semantically congruent (SC) or incongruent (SI) audio stemming from the voice of a man or a woman. Participants were asked to discriminate, as fast as possible, the gender of the voice (PT). They then were presented with a list of words and had to click on the ones previously seen. **Results**. A 3-way repeated-measures ANOVA (load (2) x semantic congruency (2) x gender (2)) with the span as inter-subjects factor yielded a borderline significant main effect for semantics ($F_{1,20}$ = 4,401; p = 0.05) where SC pairs were processed faster than SI ones (M_{si-sc} = 13,36; SD = 6.37), and an interaction effect load x semantic ($F_{1,20}$ = 4,872; p = 0.04). Diagram analysis suggests that the interaction is supported by span 6, 7 and 8 and doesn't appear to be present for span 5 and less. **Discussion**. Our results suggest a load effect on vWM. More precisely, participants with a high vWM (span 6-8) are slower when confronted with SC pairs, compared to SI pairs in the high load condition. Furthermore, participants with a span of 6 or 7 appear slower when presented with SI pairs in the low load condition compared to high load condition. This effect wasn't found at span 5 or 8. Finally, participants with a lower vWM show the classical pattern of slower RTs when presented with SI pairs compared to SC. This suggests a stronger interference effect for the high span

participants when faced with incongruent information while already having to process data in vWM. **Conclusion**. Verbal working memory seems to play a role in gesture/speech integration with a particular effect on participants with a high vWM capacity.

References

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