The role of verbal working memory in gesture/speech integration: The need of taking individual differences into account

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Iconic gestures (IG) are characterized by a formal relationship between the gesture and the speech it accompanies. It is now known that presenting semantically congruent (SG) IG (i.e. that match the spoken utterance) compared to semantically incongruent (SI) ones improves comprehension. Since they occur concurrently to speech and are subject to on-line processing, Wu and Coulson (2014) suggested that verbal working memory (vWM) may play a role in gesture/speech integration (GSI). In a first study, participants were asked to complete a gender classification task (GCT), imbedded in a vWM task where they were asked to remember words. Participants were presented with one or four words to remember (vWM task). The GCT consisted of videos of a gesture enacted by a man or a woman accompanied by a SC or SI audio from a man or woman's voice. Participants were asked to discriminate, as fast as possible, the gender of the voice. They then saw a list of words and had to click on the ones previously seen. This study failed to demonstrate an involvement of the vWM on GSI. We suggest that this may be due to not taking individual differences (ID) in vWM into account. We hence conducted a second study where we individualized the vWM task. We expect a main effect of SC shown by reduced reaction times for the SC condition compared to SI, and an interaction between vWM load and SC. 27 healthy French speaking participants (6 men; M_{age} = 22.85; SD=0,79) completed the Digit Span Task, determining the span for the vWM. In the vWM, participants were here presented with one (low) or several (high load, matching their span) words. The GCT remained unchanged. A 3-way repeated-measures ANOVA (load(2)x semantics(2)xgender(2)) yielded significant main effect for semantics ($F_{1,26}$ = 4,26; p = 0.04) with a faster processing of SC pairs, and an interaction effect load x semantic ($F_{1,26}$ = 4,45; p = 0.04). These results suggest that vWM is indeed involved in GSI, but only when ID are taken into account.