

Supplementary Material S1

The omnibus mixed-factorial ANOVA revealed an unexpected interaction effect between Temporal Offset and Spatial Offset, $F_{9.72, 388.73} = 3.03$, $p = 0.001$. Further investigation of the interaction effects was conducted using five separate analyses. Specifically, a one-way ANOVA with Spatial Offset as the within-subjects factor was conducted separately for each Temporal Offset. When examining the -400 -ms temporal-offset trials, the ANOVA revealed a significant effect of Spatial Offset, $F_{3.39, 138.18} = 4.19$, $p < 0.01$. Post-hoc analyses revealed significant differences in temporal order judgements (TOJs) between -90° and 28° ($p < 0.05$), and -90° and 90° ($p < 0.05$) spatial offsets of audio-visual stimuli. When examining the -200 -ms temporal-offset trials, the ANOVA revealed a significant effect of Spatial Offset, $F_{2.78, 113.81} = 4.54$, $p < 0.01$. Post-hoc analyses revealed significant differences in TOJs between 0° and 28° ($p < 0.05$), and 0° and 90° ($p < 0.01$) spatial offsets of audio-visual stimuli. When examining the 0 -ms temporal-offset trials, the ANOVA revealed a significant effect of Spatial Offset, $F_{3.58, 146.63} = 9.52$, $p < 0.0001$. Post-hoc analyses revealed significant differences in TOJs between -90° and 90° ($p < 0.001$), -28° and 28° ($p < 0.001$), -28° and 90° ($p < 0.0001$), and 0° and 90° ($p < 0.01$) spatial offsets of audio-visual stimuli. When examining the 200 -ms temporal-offset trials, the ANOVA revealed a significant effect of Spatial Offset, $F_{3.60, 147.75} = 9.91$, $p < 0.0001$. Post-hoc analyses revealed significant differences in TOJs between -90° and 28° ($p < 0.01$), -90° and 90° ($p < 0.0001$), -28° and 28° ($p < 0.01$), and -28° and 90° ($p < 0.001$) spatial offsets of audio-visual stimuli. Lastly, examining the 400 -ms temporal-offset trials, the ANOVA revealed a significant effect of Spatial Offset, $F_{3.31, 135.85} = 3.07$, $p < 0.05$. Post-hoc analyses revealed significant differences in TOJs only between -90° and 90° ($p < 0.05$) spatial offsets of audio-visual stimuli.

An interesting but unpredicted finding revealed through the omnibus mixed-factorial ANOVA was a significant interaction effect between Age Group and Visual Gesture for TOJ responses, $F_{1,40} = 4.22$, $p = 0.05$. Further investigation of the interaction effects was conducted using two separate analyses. Specifically, independent samples t -tests were conducted between Visual Gesture for each Age Group separately. Older adults' TOJs did

not differ significantly between the short (0.60) and long (0.59) gesture types, ($p > 0.05$). However, younger adults TOJs were significantly different when presented with either a short or long gesture, with the tone judged to come before the visual stimulus more often when presented with a long gesture (0.56), compared to when presented with the short gesture (0.47; $p < 0.0001$).