S1 Appendix. Detailed information of distributional RT analyses for Experiment 1 and 2.

It has been discussed elsewhere that SCEs differ in their temporal dynamics depending on task modality (for an overview see [37]). Therefore, we conducted a distributional reaction time (RT) analysis to gain insight whether temporal dynamics contribute to the differences in our results pattern. A delta plot was calculated per task modality [38, 39, 40], that reveals the magnitude of SCEs at five RT bins (quintiles). More specifically, it depicts the difference between two RT distributions across RT bins on the y-axis (i.e., the difference of RT distributions of compatible and incompatible trials, thus revealing joint SCE), as a function of the average of both RT distributions across RT bins (on the x-axis). The slope of the delta plot accounts for RT differences between compatible and incompatible trials (i.e. joint SCE) across response time. A positive slope indicates the joint SCE to be larger for slower responses, whereas a negative slope indicates joint SCE to be larger for faster responses. As can be seen in Fig 2 below, mean RTs differ between both experiments with a slow response speed for the auditory joint go/no-go Simon task (Fig 2A, upper panel) compared to fast responses in the visual joint go/no-go Simon task (Fig 2B, lower panel). This difference in reaction times depending on task modality was likewise reported by Lien, Pedersen, and Proctor [29] (averaged reaction times reported for go/ no-go conditions with the cat being present: M_{auditory} = 468 ms, SD_{auditory} = 26; M_{visual} = 371 ms, SD_{visual} = 22), indicating that processing and/or response reaction is slower for auditory Simon stimulus material compared to visual stimuli.

Descriptively, a flat positive slope occurred for both task modalities. However, there was no evidence for a significant effect of RT bins on the magnitude of the joint SCE in neither auditory joint go/no-go task, F (1.406, 125.136) = .35, p = .627, ε = .35, nor the visual go/no-go task, F (1.507, 137.159) = .93, p = .373, ε = .38. These results diverge from the typical pattern discussed in the literature (see [37] for more details). As such, SCEs in auditory joint go/no-go Simon tasks increase with increasing response reactions, whereas SCEs in visual joint go/no-go Simon tasks usually decrease with increasing reaction times. Note however, that our joint SCEs as a function of mean RT only ranged between 2 ms and 5 ms (Experiment 1, see Fig 2A) and -2 ms and 1 ms (Experiment 2; see Fig 2B), and so it is not surprising that there is no effect of RT bins on these relatively small SCEs.

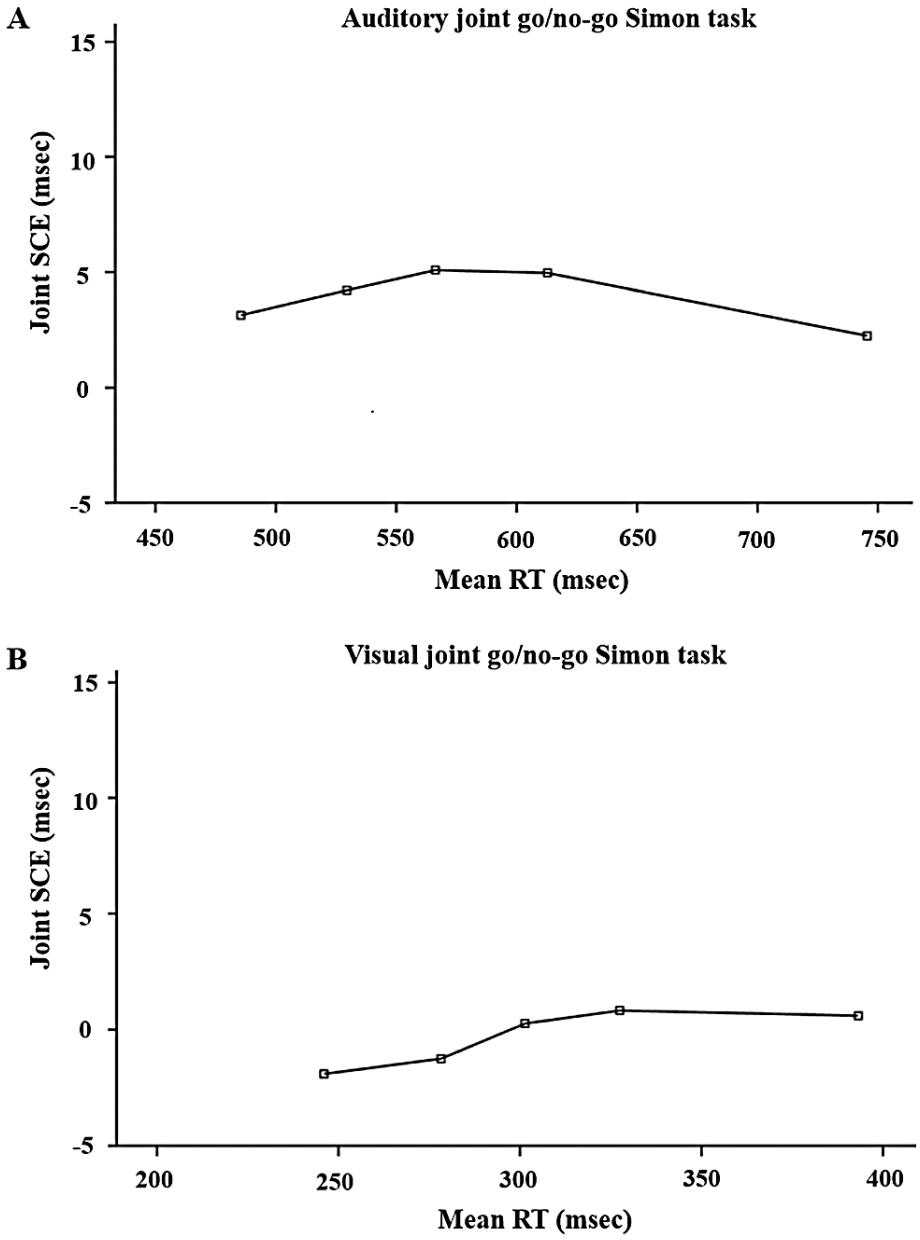

Fig 2. Delta plot for the auditory and visual joint go/no-go Simon task modality. Joint SCEs are depicted as a function of mean reaction times per RT bins (quintiles) in A (upper panel) for the auditory joint go/no-go Simon task (Experiment 1) and in B (lower panel) for the visual joint go/no-go Simon task (Experiment 2).