

Auditory Capture of Visual Temporal Perception with a Focus on Spatial Congruence

-Actual Sound Source Condition-

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Background & Purpose

Auditory Enhancement of Visual Temporal Resolution

Auditory information enhances visual temporal resolution when stimuli were presented in the order of A-V-V-A.
(Shimojo et al., 2001; Morein-Zamir et al., 2003)

In these studies,

the visual stimuli were presented above and below a fixation point and the auditory stimuli were from one speaker.

→ **temporal aspect alone, with no spatial factor involved.**

Several studies have reported that spatial information of right & left affects temporal order judgment (TOJ).
(Yamamoto & Kitazawa, 2001; Teramoto et al., in preparing)

How does auditory information affect visual TOJ when spatial factor is involved?

We examined the auditory capture of visual temporal perception with a focus on spatial congruence.

Hongoh & Kita, in press (Headset Condition)

Procedure

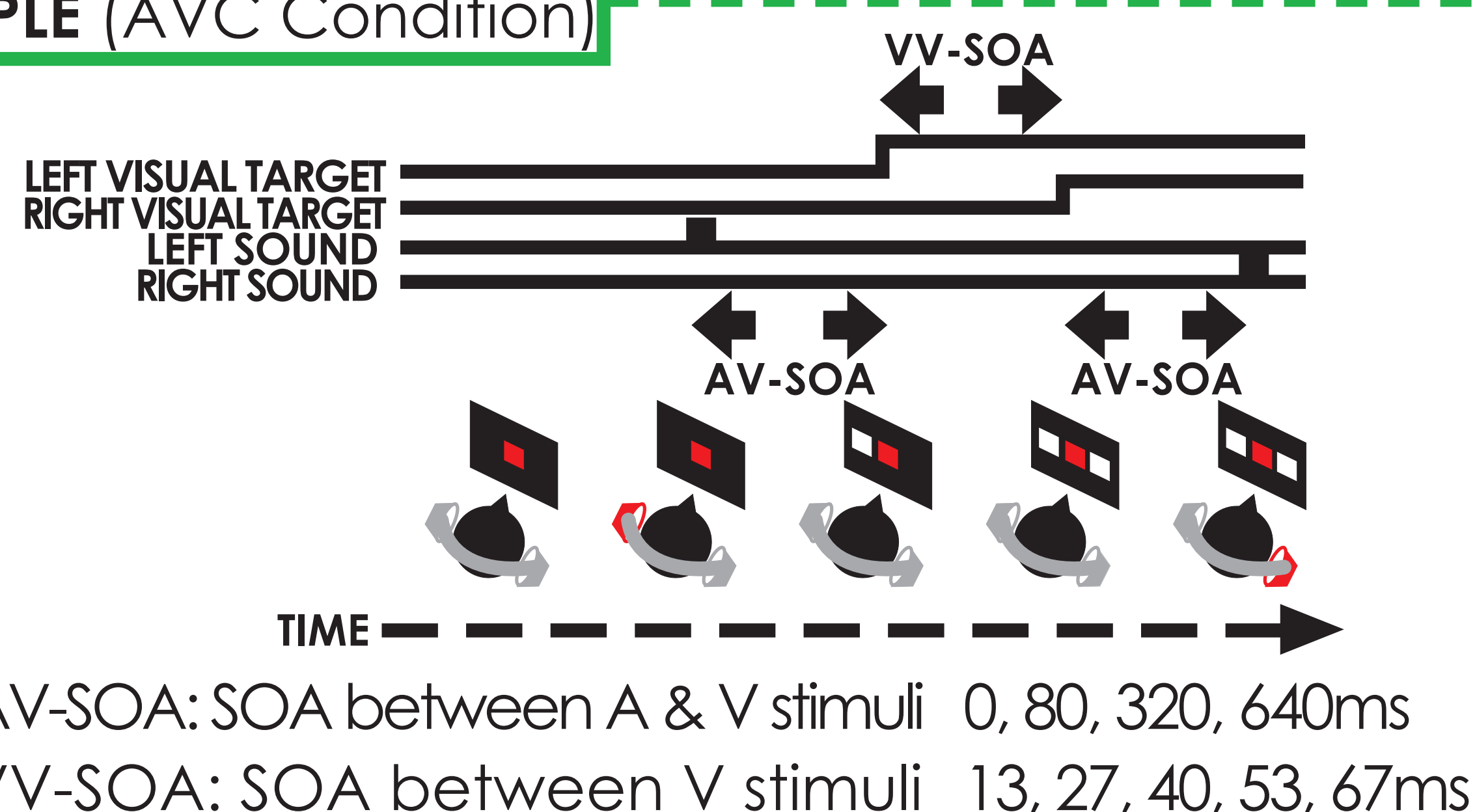
In order to examine spatial congruence, visual stimuli were presented right and left of fixation point, auditory stimuli were presented from right and left side of a headset.

TASK Which visual target was presented first?
(Visual Temporal Order Judgment)

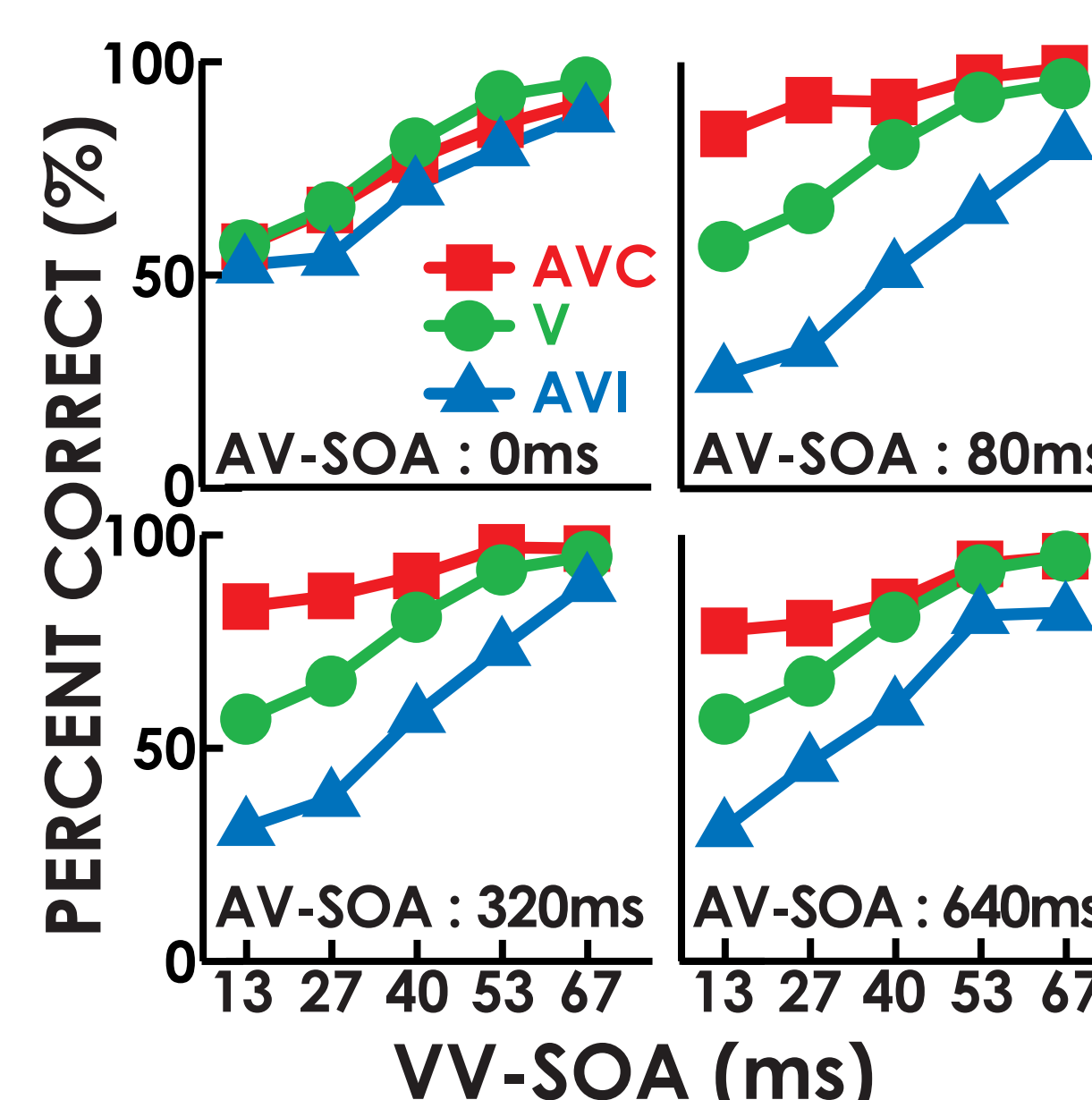
CONDITION

V: only visual targets (baseline)
AVC: A & V stimuli are spatially congruent
AVI: A & V stimuli are spatially incongruent

EXAMPLE (AVC Condition)



Experiment 1

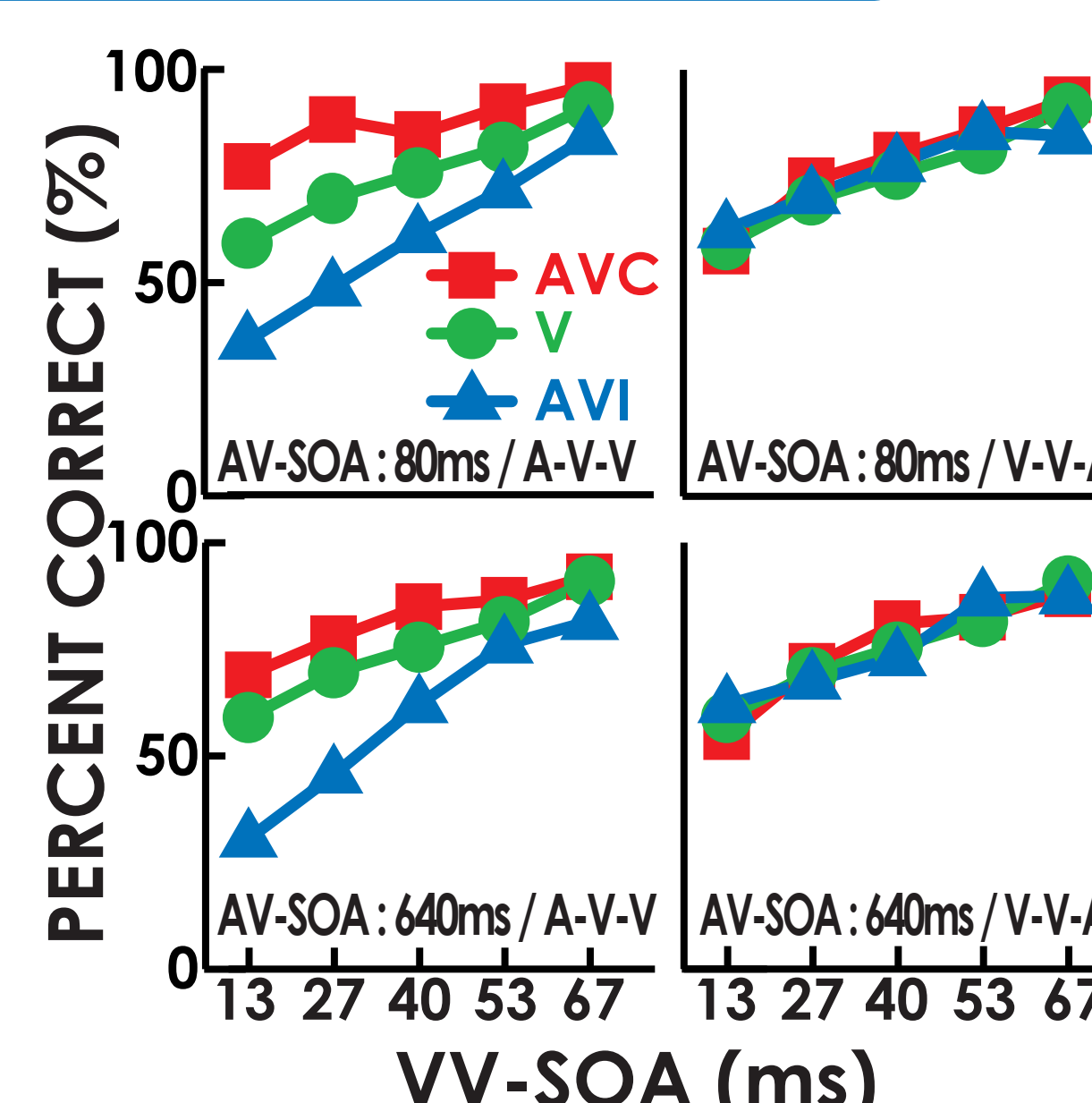


Spatially Congruent (AVC)
→ ENHANCEMENT
Spatially Incongruent (AVI)
→ REDUCTION

AV-SOA
0ms → No Effect
80ms → Strong Effect
320ms → Strong Effect
640ms → Effect Remains

Short VV-SOA
→ Strong Effect

Experiment 2



Which sound is more effective?

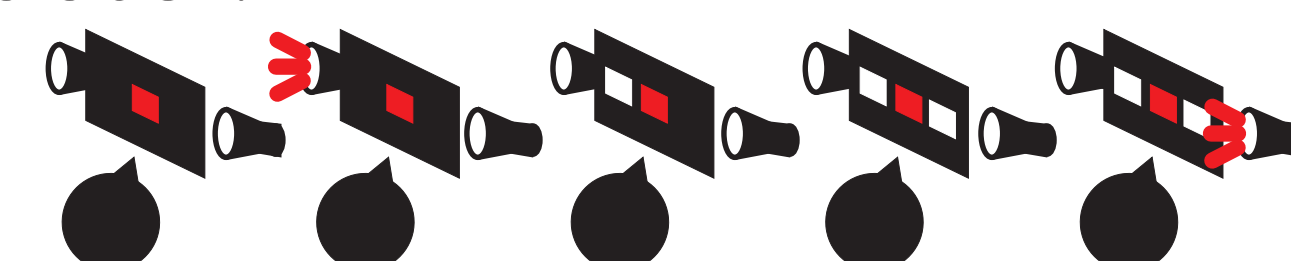
A-V-V: only preceding sound
V-V-A: only following sound
AV-SOA: 80, 640ms

Preceding sound is more effective.
≠ Morein-Zamir et al., 2003
(Following sound was more effective)

Would the same results be shown in a condition with actual sound source?

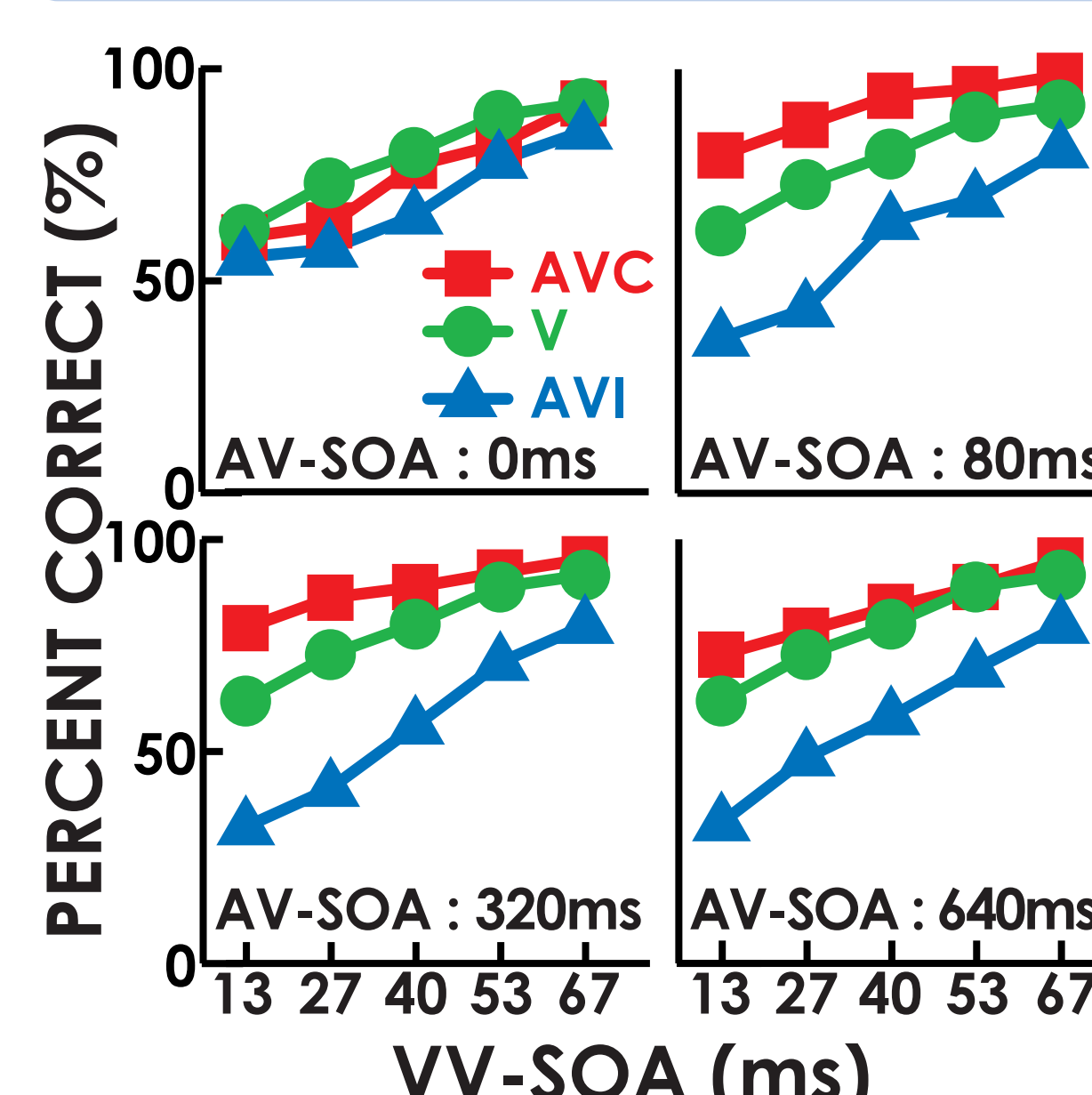
Actual Sound Source Condition

Same design as the headset condition except for using speakers instead of a headset.

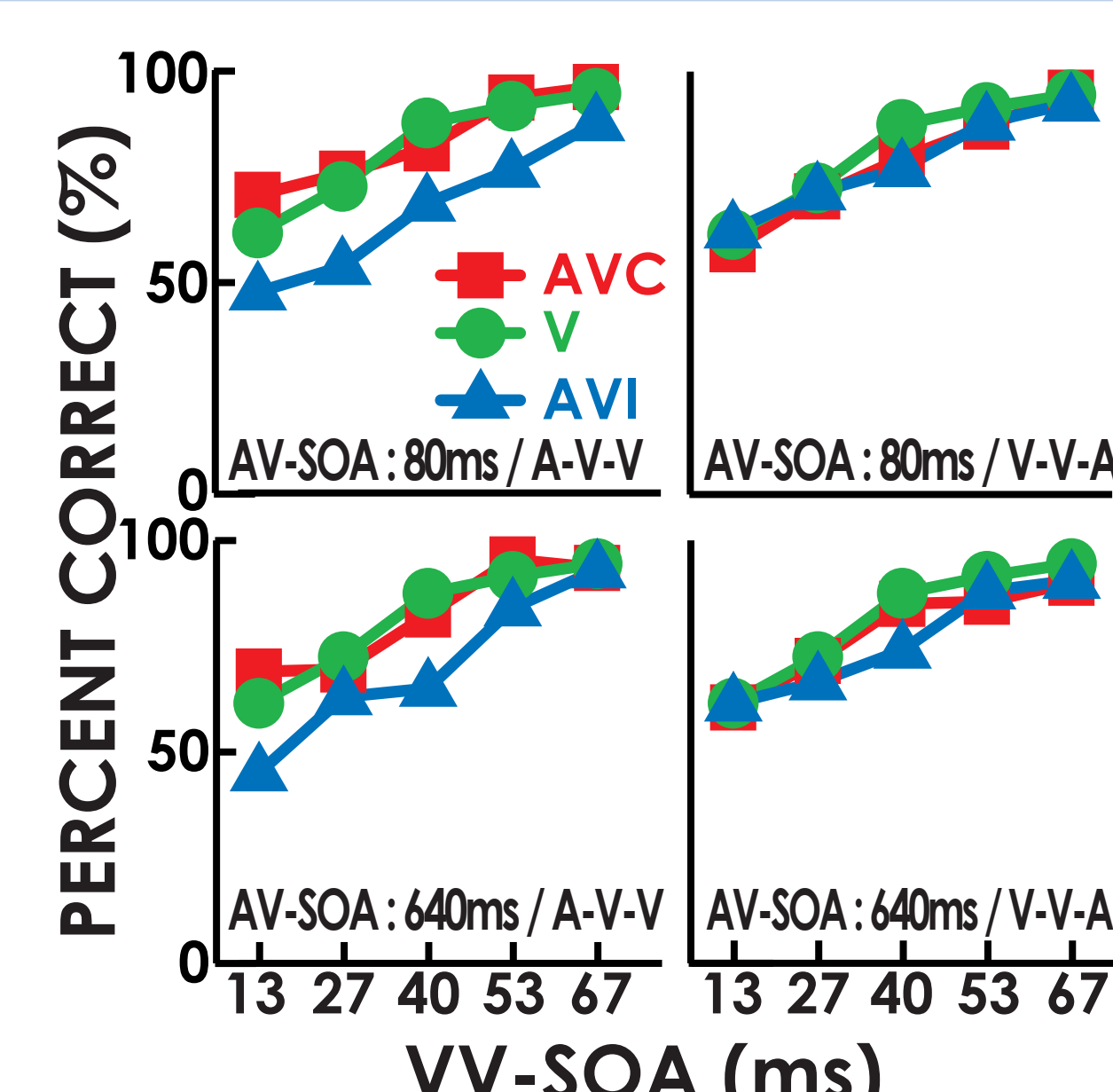


Experiment 1

Similar results are shown with a slight difference: weaker auditory effect, especially weaker enhancement in AVC.



Experiment 2



Conclusion

The important role of spatial congruence in the auditory capture of visual TOJ was confirmed. Spatial Congruence plays an important role in the Auditory Capture of Visual TOJ.

The auditory effect is more pronounced when A & V information are incongruent. However, in a previous A-V interaction study, incongruent information was shown to have no effect. (Kitagawa & Ichihara, 2002)

→ **The other type of A-V interaction?**

The auditory effect remains when AV-SOA is 640ms. Unlike previous studies in which most A-V interactions are considered by researchers as the result of the perception of A & V stimuli coming from the same event, → **our results indicates that A-V Interaction may occur when they are not from the same event.**