

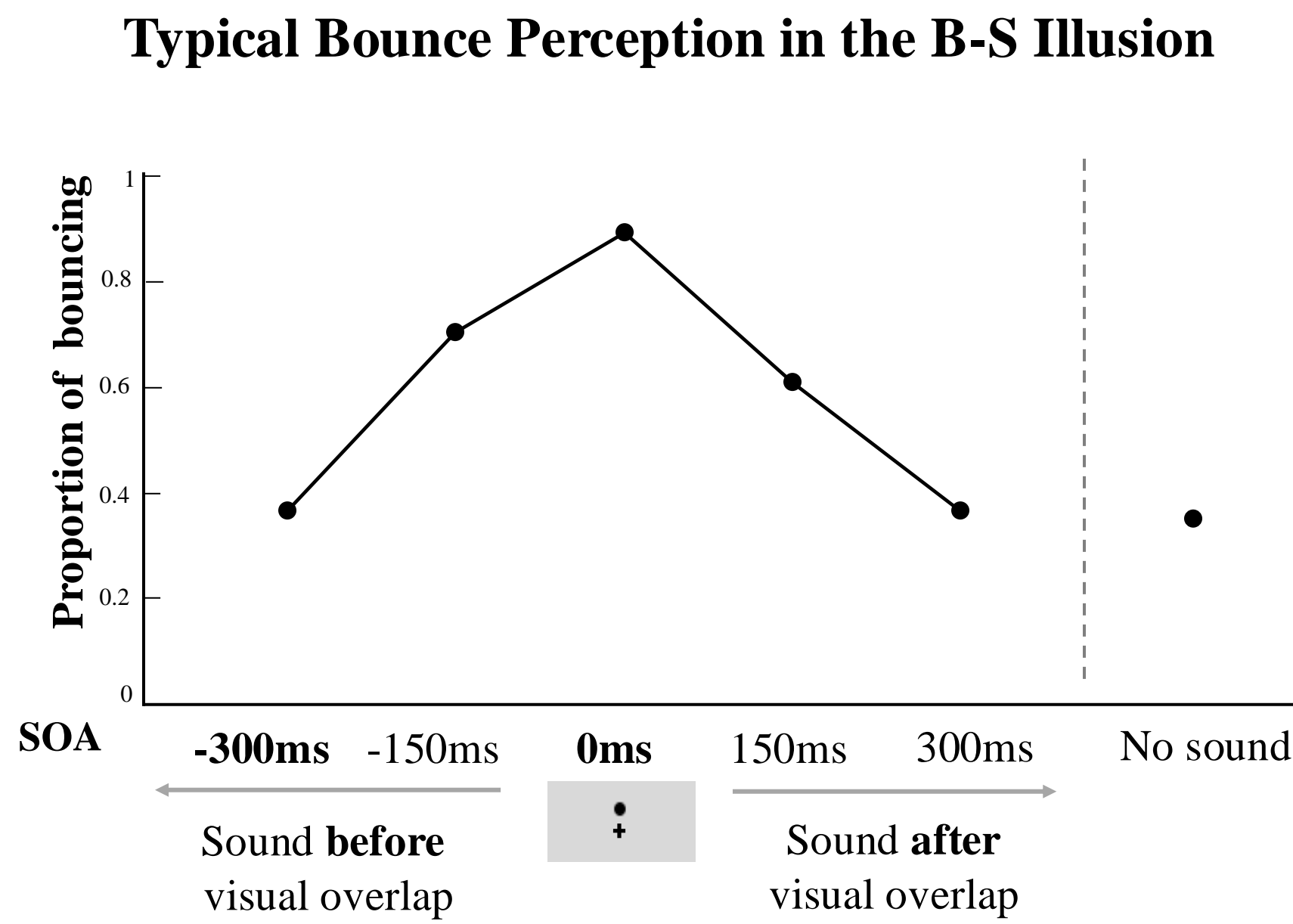
Predicted timing of sound influences ambiguous perception in the bounce/stream illusion

Yuyeon Jung, Seyoon Song, Chai-Youn Kim School of Psychology, Korea University

Introduction

Effects of predictive cues without sound in the bounce/stream illusion

In the bounce/stream illusion, where two moving discs are perceived as either streaming through or bouncing off each other, a sound near visual coincidence increases bounce perception [1]. However, it remains unclear whether only the prediction of sound timing would modulate this perception, despite the physical sound being a critical factor in the illusion. Therefore, we tested whether a predictive cue alone, without sound, can influence bounce perception.



Experiment1

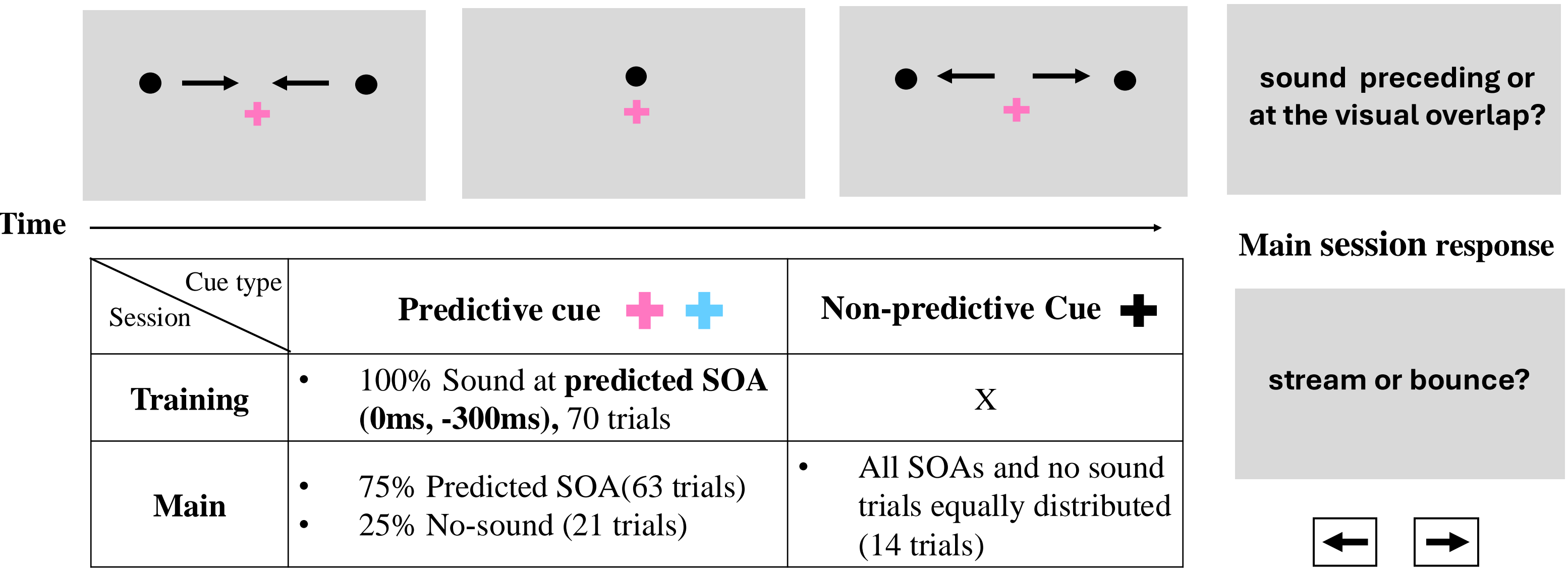
Participants

- 28 (12males)
- All right - handed

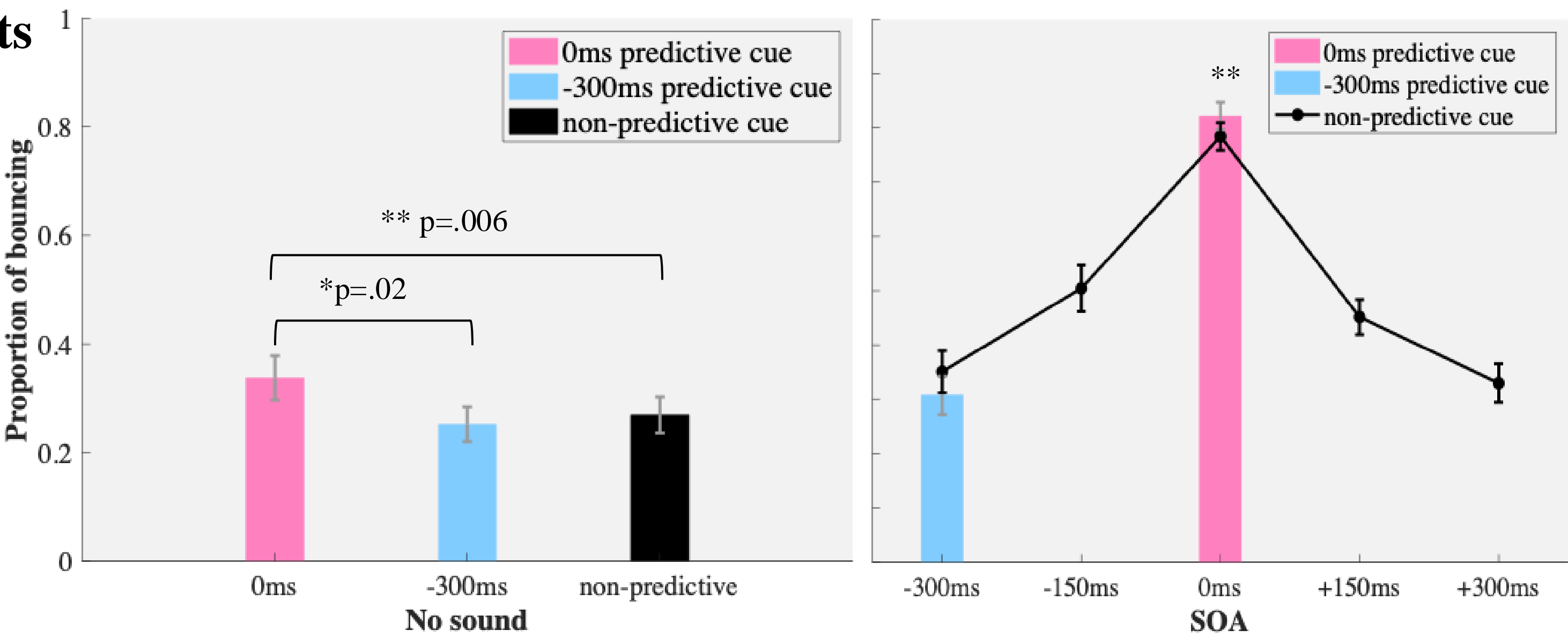
Stimuli

- Visual stimulus : two black discs, 8° in diameter
- Auditory stimulus : beep sound, 10ms duration, 440 Hz
- Fixation color : **pink**, **blue** (predictive cue) & **black** (non-predictive cue)

Procedures



Results



- In the **no-sound trials**, there was a main effect of cue condition ($p=.002$), with higher bounce perception for the 0ms predictive cue.
- In the sound-present trials, the main effect of cue condition at 0ms SOA was also significant ($p=.004$), but the -300ms predictive cue had no effect.

Experiment2

To examine the effect of predictive cues on **untrained SOAs**, each fixation color was paired with all SOAs and no-sound trials

Participants

- 16 (6 males)
- All right - handed

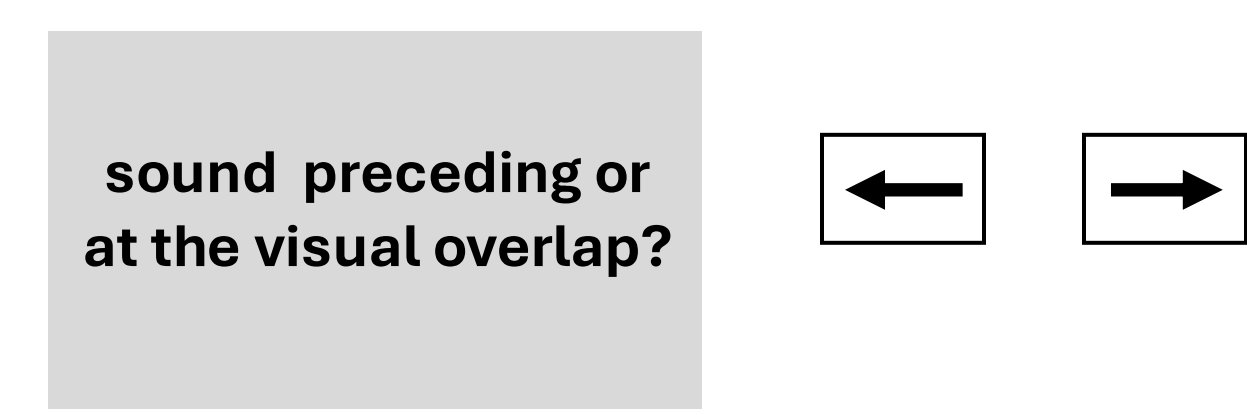
Stimuli

- Identical to Ex1

Procedures

Session	Cue type	Predictive cue +	Non-predictive Cue +
Training		100% Sound at predicted SOA (0ms, -300ms) , 100 trials	X
Main		50% Predicted SOA (30 trials) 50% Other SOAs / No-sound (5 trials each)	All SOAs and no sound trials equally distributed (10 trials)

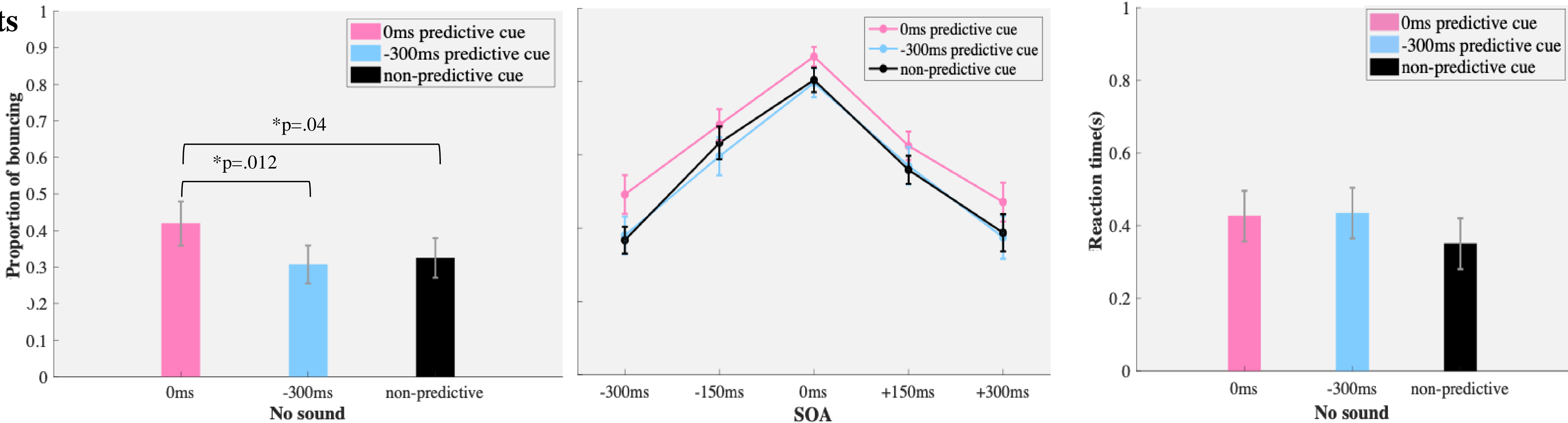
Training session response



Main session response



Results



- In the **no-sound trials**, there was a main effect of cue condition ($p=.008$), with higher bounce perception for the 0ms predictive cue.
- In the sound-present trials, bounce perception was higher with the 0ms cue than with -300ms ($p=.004$) and non-predictive cues ($p=.008$).

- For reaction time (RT), in the **no-sound trials**, there was a main effect of cue condition ($p=.017$), with slower RT for predictive cues compared to non-predictive cue.

Discussion

The 0ms predictive cue increased bounce perception even without physical sound, suggesting that the only prediction of sound is sufficient to bias illusory perception. In contrast, the -300ms cue had no effect, indicating that only cue aligned with the visual coincidence (i.e., near 0ms SOA) influences perceptual ambiguity. Additionally, slower reaction times following predictive cues suggest the effect is not simply due to cue-response mapping, hinting that predictive processes may play a role in this effect.

Reference

[1] Sekuler, R., Sekuler, A. B., & Lau, R. (1997). Sound alters visual motion perception. *Nature*, 385(6614).