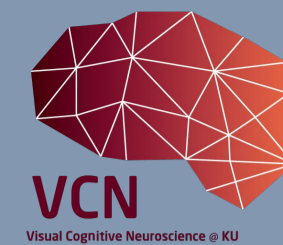
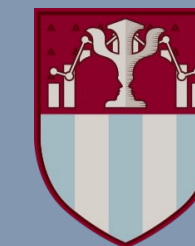


Perceptual selection of a musical score during binocular rivalry reported by a relevant action with or without auditory feedback

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Introduction

Visual ambiguity might be resolved by information of other sensory modalities [1]. Previously, our group has shown audio-visual interactions when a score was accompanied by a matching melody during binocular rivalry [2, 3]. In the present study, we investigated whether relevant action with/without auditory feedback would affect perceptual selection of matching score during binocular rivalry.

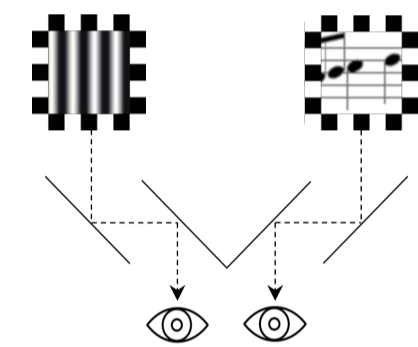
Methods

Participants 33 participants (26 females)

	N	Age	Musical training
Experts	16	23.56 (SD=3.27)	15.44 (SD=3.85)
Non-experts	17	24.06 (SD=1.85)	4.28 (SD=1.98)

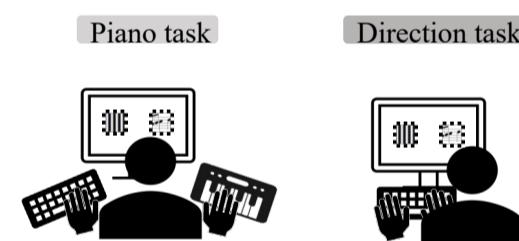
Rival targets

- Vertical sinusoidal grating
- One of five musical scores



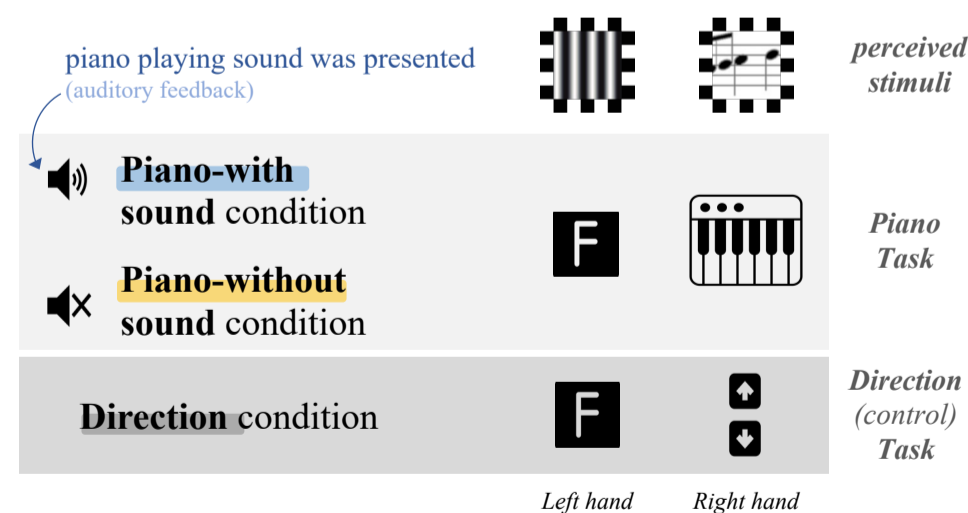
Tasks

- Rivalry tracking (grating, score, or mixture)
- Piano playing or Note stem direction discrimination for score dominance; F key press for grating dominance

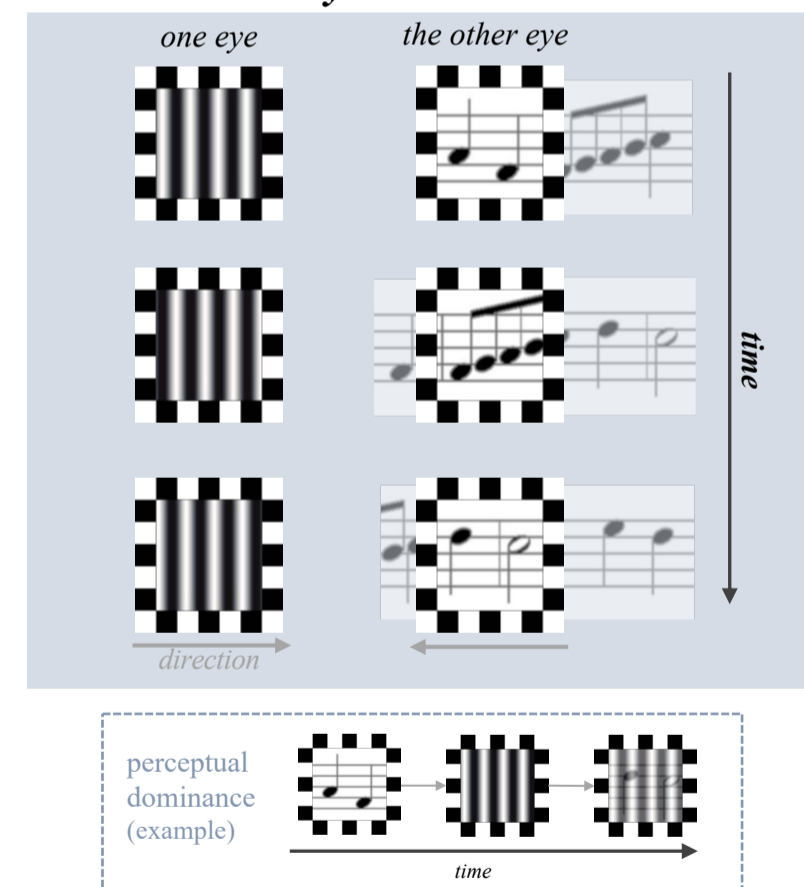


Conditions

- Within-subject design: 40 trials per each condition



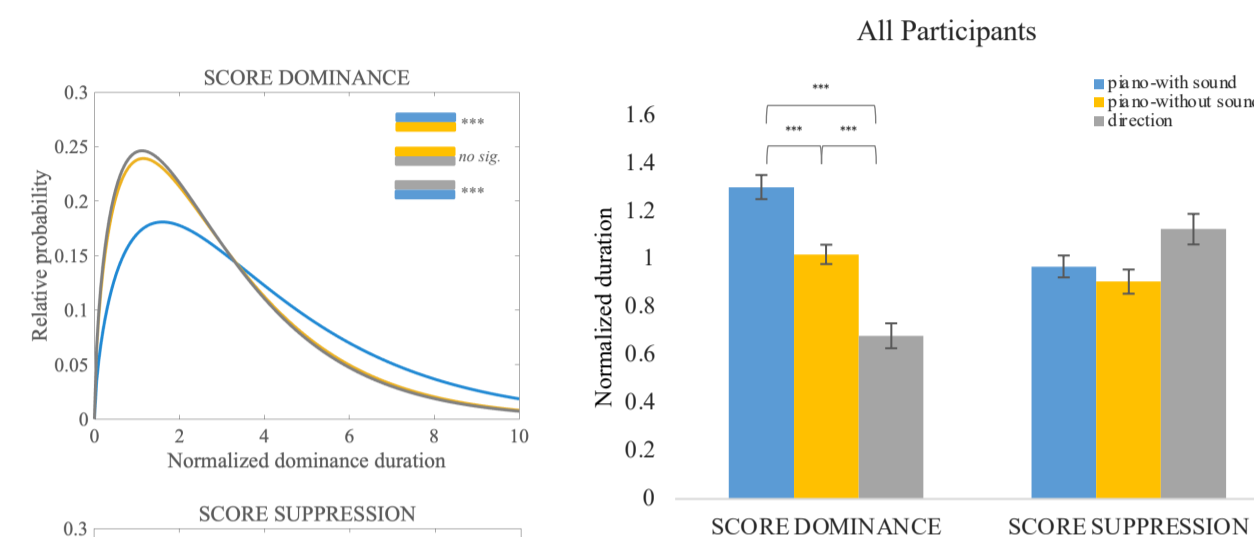
Binocular Rivalry



You can experience visual dynamics using the google cardboard now! Please tell me if you want to see the stimuli.

Results

Normalized score dominance/suppression durations

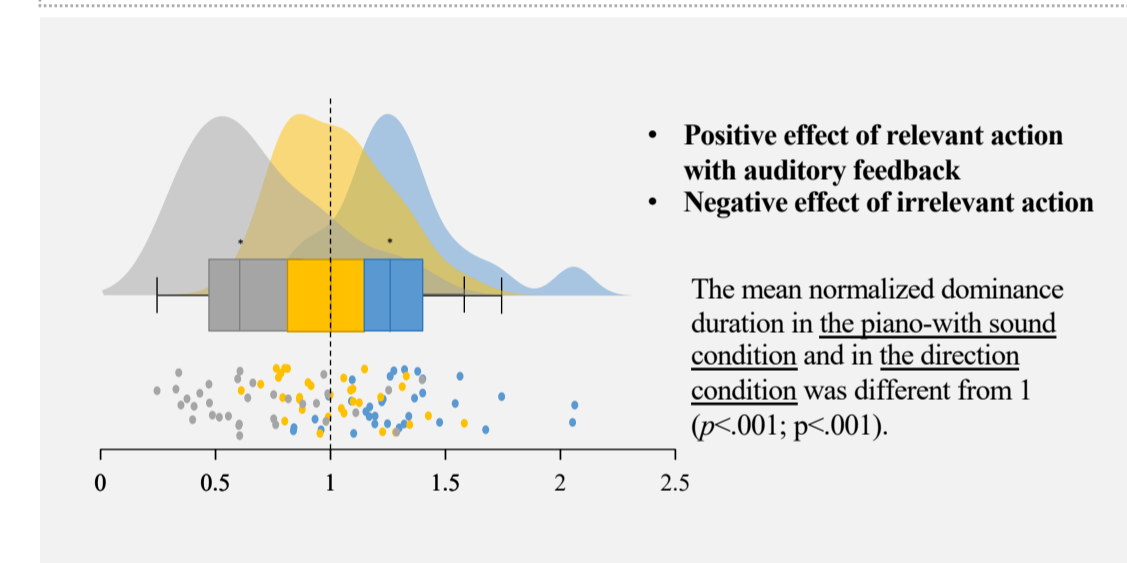
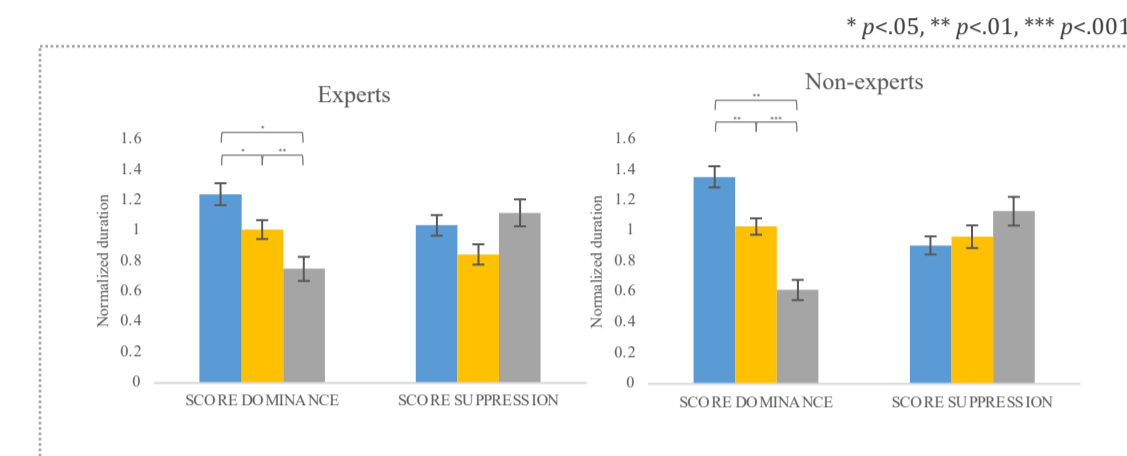


Differences across the three conditions

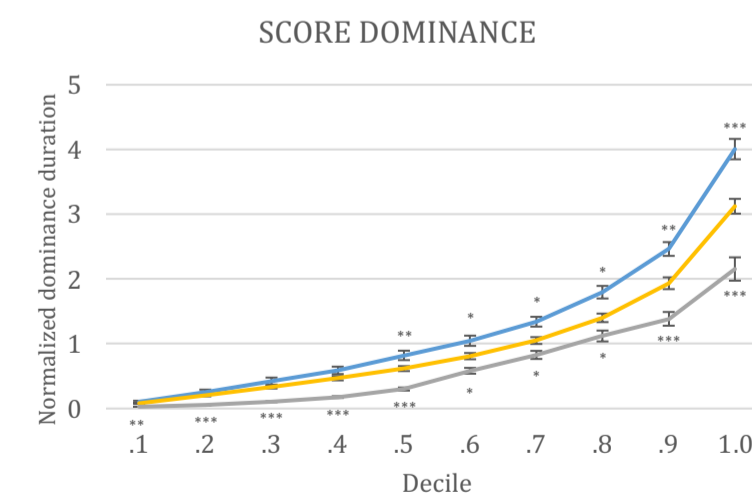
Differences across the three conditions were observed independently of expertise. For the normalized dominance duration, the main effect of the condition was significant statistically ($p < .001$).

- Normalized dominance durations in the piano-with sound condition were significantly longer than those in the other conditions ($p = .001$).
- Normalized dominance durations in the direction condition were shorter than the piano conditions ($p < .001$).

For the normalized suppression durations, there were no differences across the three conditions.



Normalized score dominance/suppression durations for each decile level

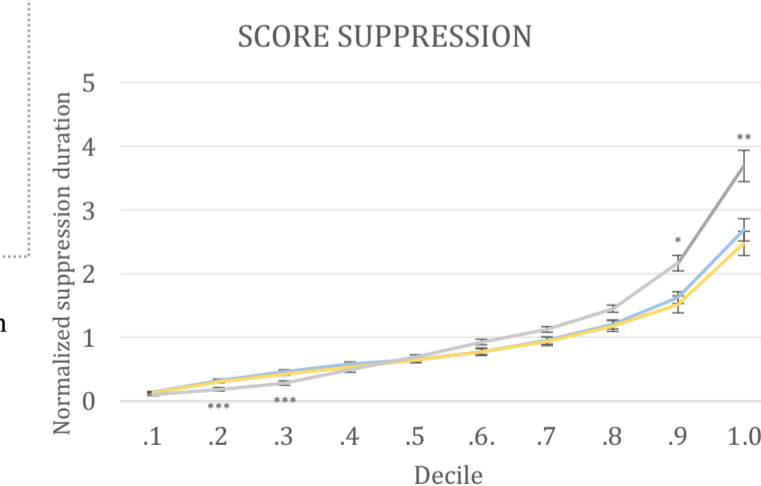


Decile analysis

- The normalized dominance/suppression durations for each participant were sorted from the shortest to the longest.
- The set of durations were divided into 10 bins.
- The means of each decile were compared across the three conditions.

The normalized dominance durations in the piano-with sound condition were significantly differed from those in the piano-without sound condition beginning from .5 decile and thereafter.

Direction condition showed shorter the normalized dominance durations than piano conditions in all decile levels.



In score suppression, there were differences between the piano condition and the direction only in the early and the late deciles (2nd, 3rd, 9th, 10th decile).

The normalized suppression durations between the piano conditions (with/without sound) were indistinguishable across all decile levels.

Conclusion

- These results were consistent with the previous findings showing audio-visual interactions during binocular rivalry.
- The novel finding from the current study is that perceptual selection of a musical score during binocular rivalry is boosted up only when the action was accompanied by auditory feedback.

References & Acknowledgment

- [1] Deroy, O., Chen, Y. C., & Spence, C. (2014). *Phil. Trans. R. Soc.*, 369(1641), 20130207.
- [2] Lee, M., Blake, R., Kim, S., & Kim, C. Y. (2015) *PNAS*, 112(27), 8493-8498.
- [3] Kim, S., Blake, R., Lee, M., & Kim, C. Y. (2017). *PLoS One*, 12(4), e0175103.

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