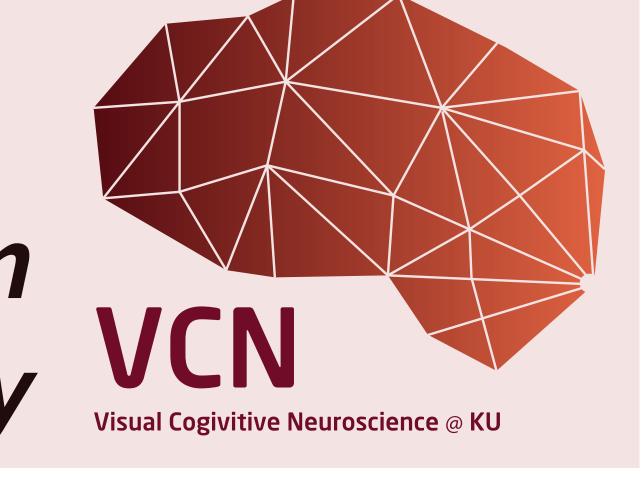


Absolute pitch impacts values during binocular rivalry Absolute pitch impacts visual awareness of musical scores accompanied by auditory melodies

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grating

pitch-congruent

incongruent

melody-congruent

Introduction

Individuals with absolute pitch (AP) are able to identify or reproduce a given musical note without the benefit of a reference tone [1]. Previously, we found that high-level audio-visual congruence based on auditory melody and visual musical score affects perceptual dominance during rivalry [2]. In the current study, we further investigated whether audio-visual congruence between auditory pitch and visual notes can modulate rivalry dynamics by testing individuals with AP who can register the low-level acoustic feature.

Methods

Rival targets one of 6 scores & vertical grating

scrolling down in the opposite direction

Participants people with AP (N=9)

people without AP (N=10) (all capable of reading a musical score)

Task tracking rivalry while listening to melody



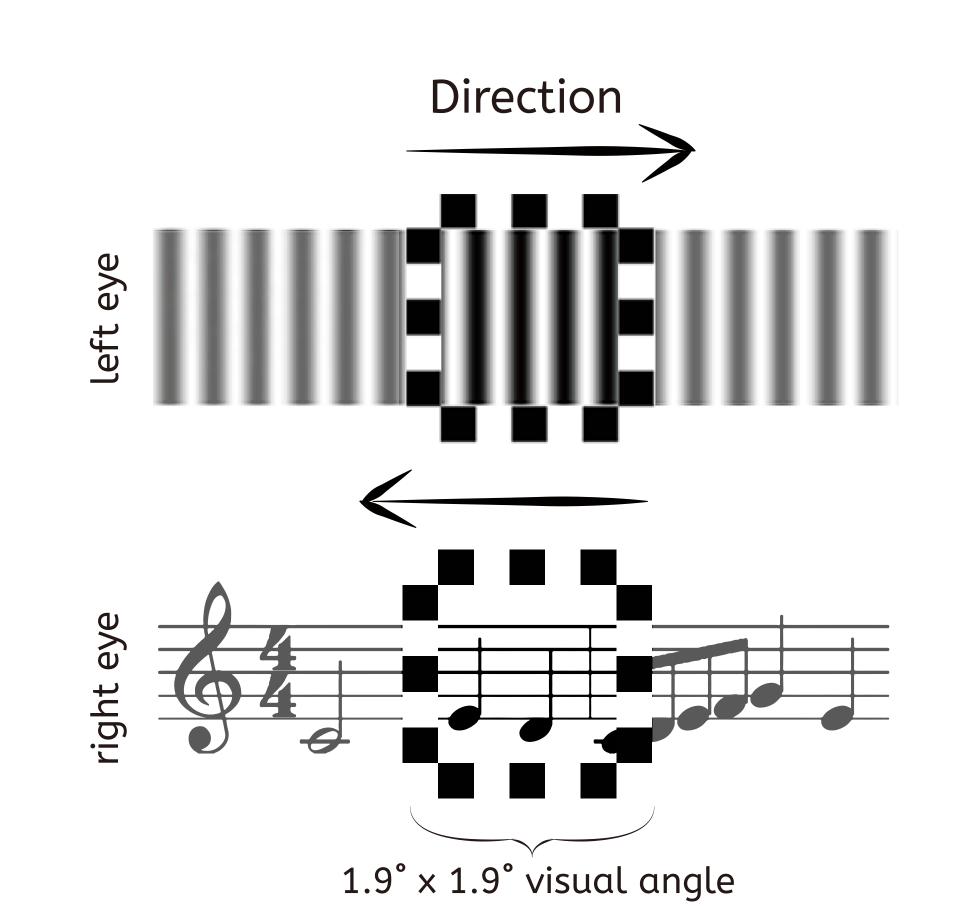
Auditory stimuli

A. pitch-congruent : melody congruent to the notated melody

B. melody-congruent : one of the two transposed melodies (one semitone lower or higher)

C. incongruent

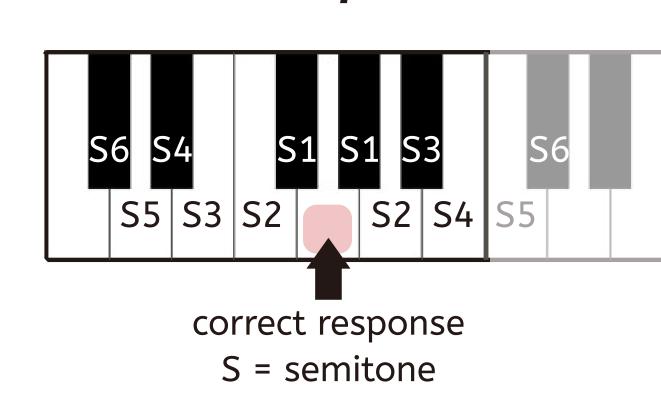
: melody of one of the other 5 scores







Absolute pitch test



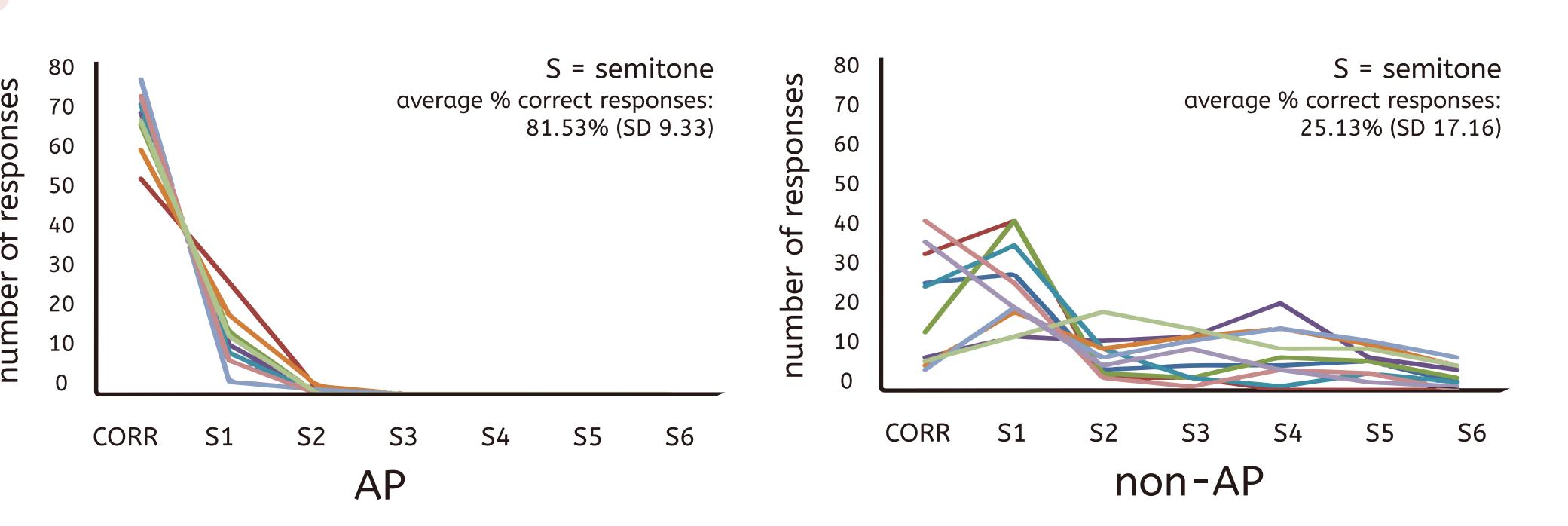
Stimuli a total of 80 pure tones frequency ranging from 110.5 Hz to 3150.22Hz

Procedure a single tone presentation (2sec)

- → response by clicking on piano keys presented on the monitor screen (no time pressure)
- \rightarrow a brief white noise (1sec)

Results

AP test



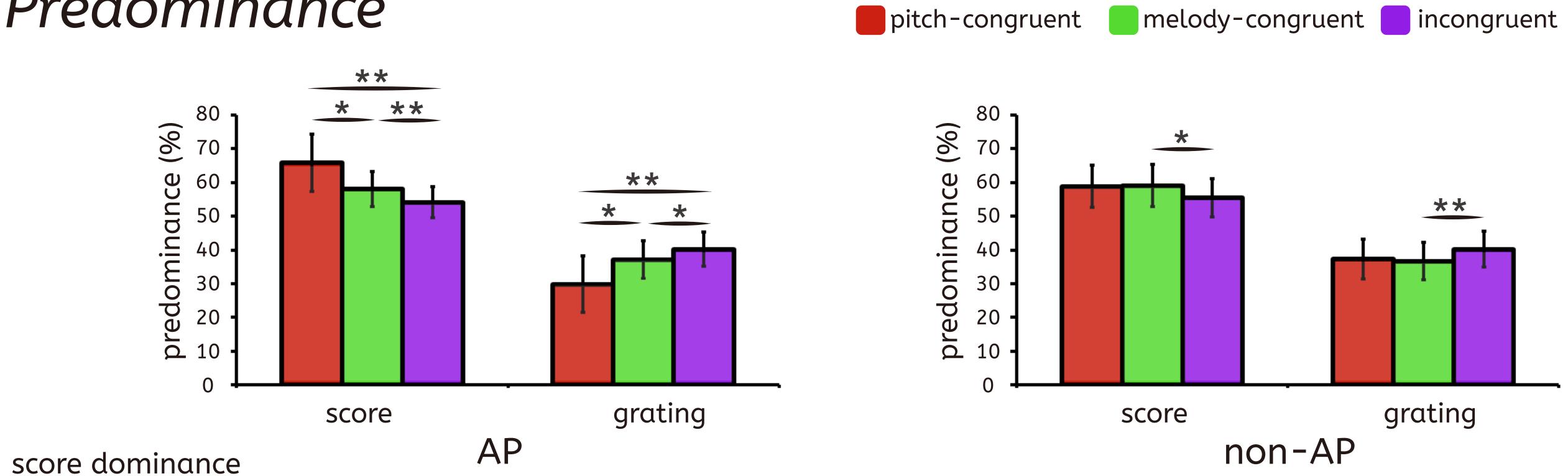
* both % correct responses and semitone error variance were considered in grouping

Non-AP

Normalized duration

Normalized duration

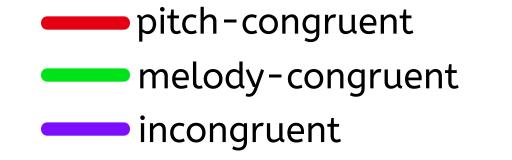
Predominance

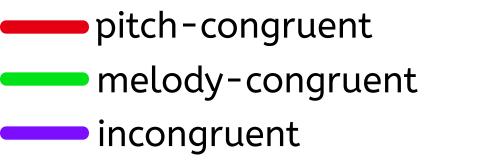


- * pitch-congruent & melody-congruent: significantly different only in AP group (t(8) = 2.773, p<.05) * congruent & incongruent: significantly differed in both AP and non-AP groups (pitch-congruent & incongruent: AP t(8) = 3.857, p<.01; non-AP t(9) = 2.096, p = .066 // melody-congruent & incongruent: AP t(8) = 3.605, p<.01; non-AP t(9) = 2.422, p<.05)
- 🗱 score predominance and grating predominance don't necessarily add up to 100% due to the incidences of mixture perception.

Normalized dominance durations

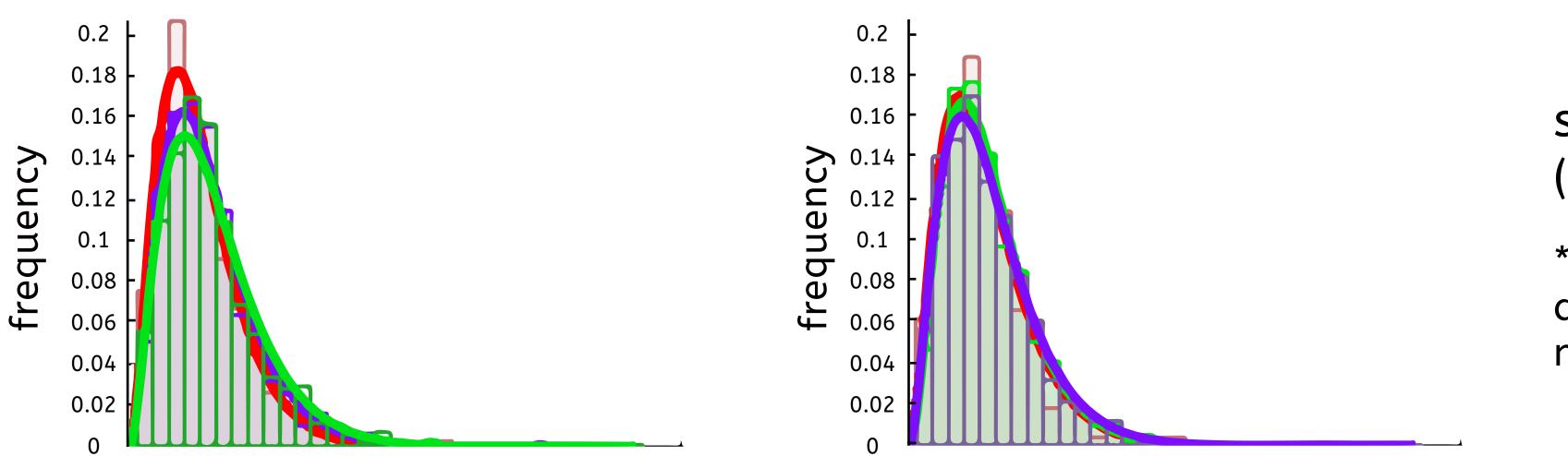
individual normalized durations fit to the gamma distribution, the signature distribution for rivalry data.





score dominance

- * higher frequency of longer dominance durations in congruent (pitch or melody) trials than in incongruent trials
- * higher frequency of longer dominance durations in pitch-congruent trials than in melody-congruent trials only in AP group

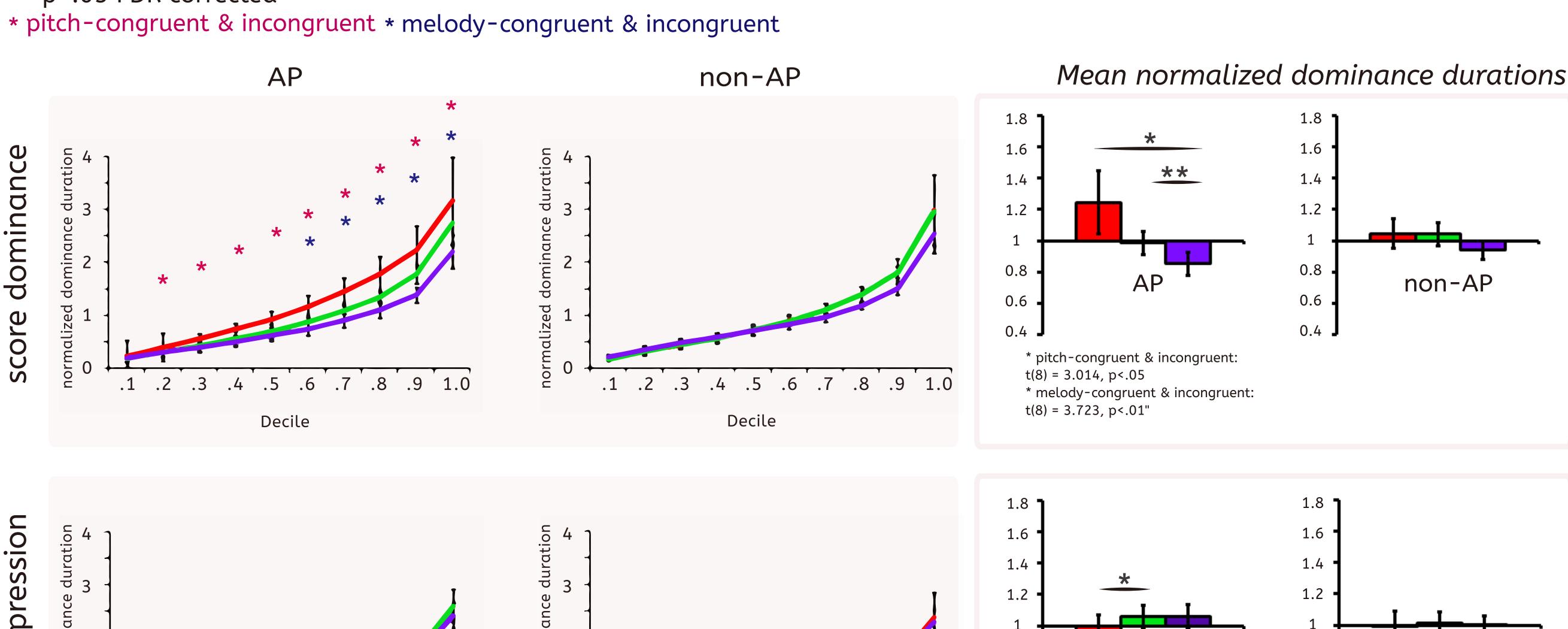


score suppression (grating dominance)

* higher frequency of shorter suppression duration in pitch-congruent trials than in melody-congruent trials only in AP group



* = p<.05 FDR corrected





Normalized duration

Normalized duration

The melodic congruence accompanied by a low-level auditory-feature-based congruence ("pitch-congruece") influences both perceptual dominance and suppression of visual musical score during binocular rivalry. This effect was observed only in individuals who can register the low-level auditory feature with AP.



References
[1] Deutsch, D. (2013). Absolute pitch In D. Deutsch (Ed.), Psychology of Music (pp.431-451). London, Elsevier.
[2] Lee, M., Kim, S., & Kim, C.-Y. (2014). Hearing melody modulates perceptual dominance of musical scores during binocular rivalry. Journal of Vision, 14(10), 1248–1248.



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