# Temporal transition enhances the consonance of color arrangements

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#### Summary



We found a similarity between effects of – temporal chord transition in music, and – temporal color transition in visual perception.

Smooth color transition preserving a parameter enhances the consonance, similarily to smooth chord transition preserving a note in music.

## Examples of temporal color transition



### Methods

Static (1S - 5S) and transitonal (1T - 5T) arrangements were presented to respondents in random order, and the impressions were measured by sensory tests. Respondents were 36 Japanese university students.



#### Item pairs of the sensory tests. (in Japanese in the experiment) - + calm lively poor color arrangement good color arrangement

_	Ŧ
calm	lively
poor color arrangement	good color arrangement
artificial	natural
inelegant	elegant
usual	strange
hard	soft

## **Results and discussion**

Average observer differences of the scores of the sensory test. ( = "-" items. = "+" items)

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-	+	1S/1T	2S/2T	3S/3T	4S/4T	5S/5T
cal.	liv.	0.139	- 0.250	-0.417	- 0.528	0.500
poor	good	- 0.750	0.750	0.472	- 0.667	0.583
art.	nat.	- 0.778	0.528	- 0.194	- 0.250	0.194
inel.	el.	- 0.694	0.611	0.083	- 0.056	0.444
usu.	str.	0.944	0.194	- 0.500	0.139	- 0.722
hard	soft	- 1.083	0.528	- 0.167	- 0.306	0.556

#### p-values in the double-sided t-tests. ( $\square$ : p < 0.05)

-	+	1S/1T	2S/2T	3S/3T	4S/4T	5S/5T
cal.	liv.	0.571	0.378	0.153	0.045	0.141
poor	good	0.017	0.002	0.167	0.002	0.045
art.	nat.	0.038	0.057	0.450	0.409	0.455
inel.	el.	0.036	0.022	0.083	0.840	0.147
usu.	str.	0.004	0.539	0.133	0.599	0.022
hard	soft	0.001	0.011	0.422	0.270	0.029

#### Poor / Good - impressions

**2S / 2T, 5S / 5T – better** impressions in transitional arrangements **1S / 1T, 4S / 4T – worse** impressions in transitional arrangements

Transition yielding better impressions: 2T: hue is preserved and only tone is modified 5T: tone is preserved and only hue is modified



The idea of "**tone**" in PCCS, color system provided by Nlhon Shikiken Co., Japan.

Tone symbols are indicated on the hue circles in the examples.

#### Similarity to code transition (resolution) in music



One or more notes are preserved in a smooth transition ('pivot').

Transition yielding worse impressions:
1T: both tone and hue are modified
4T: consonance is unchanged (originally consonant)

## Conclusion

The experimental results suggest that the color transition emphasizing the consonance when a character is preserved.

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