

Individual Differences Analysis of Affective Traits for Chord Listening –Study of Tetrads–

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Introduction

•Background

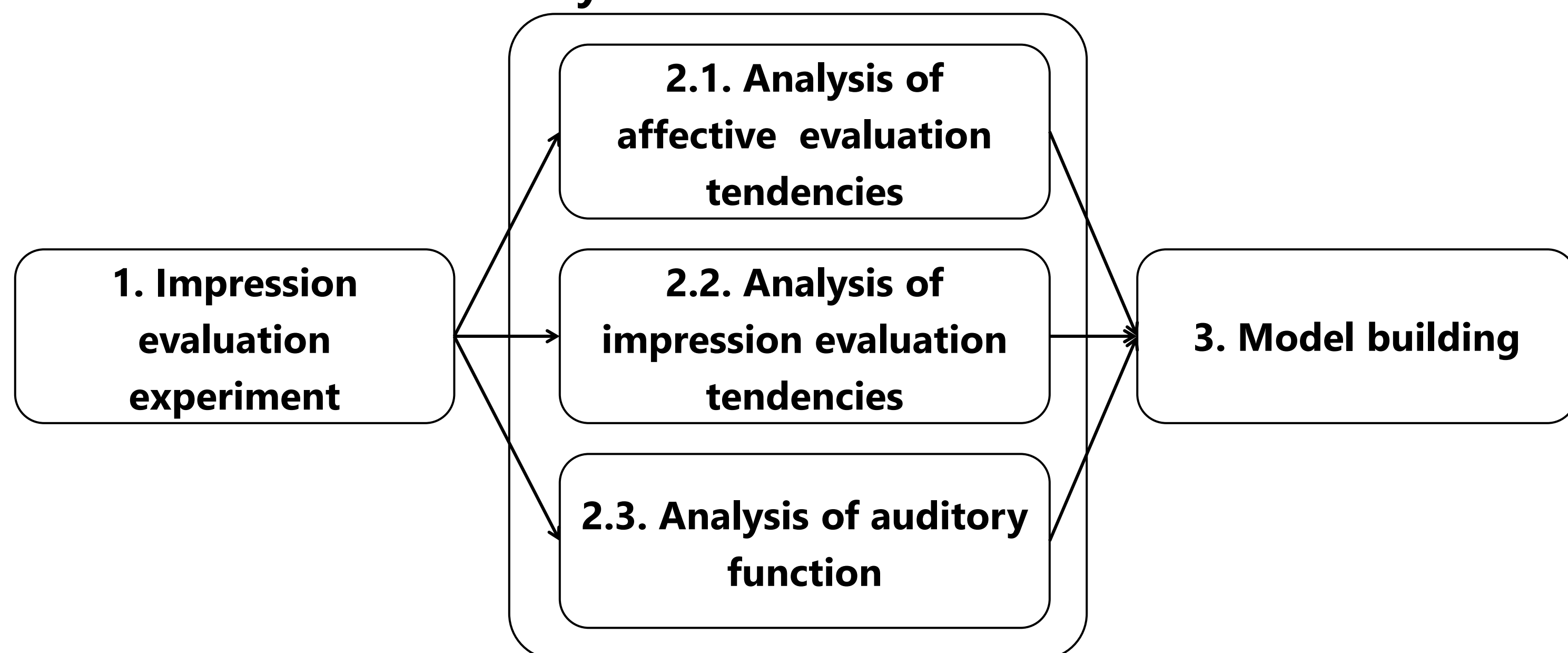
- Realize a sustainable society
 - Promote design that takes individual differences into account
 - Enhance well-being and reduce social loss
- Previous research on chords
 - Many studies have evaluated the impression and emotion of chords
 - Most of them focus on triads
 - Even those studies on tetrads do not take individual differences into account

•Purpose

- Analysis of individual differences in affective evaluation characteristics when listening to tetrads, and model building

Proposed Method

2. Analysis of individual differences



1. Impression evaluation experiment

•Stimuli

- 13 tetrads (Fig.1)
- 2 tones (piano, trumpet)

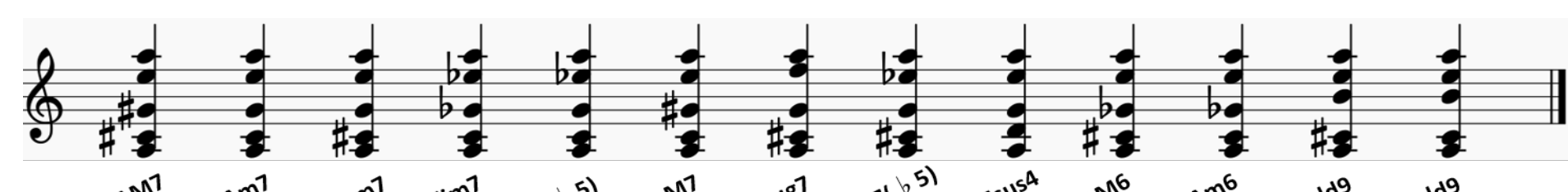


Fig. 1 Chord stimuli used in the experiment

•Participants

- 41 Japanese college students

•Procedure

- Rated each stimulus using 56 evaluation words on a seven-point scale

•Results

- The following factors were extracted from the factor analysis
 - Lower impression layer : 3 factors (bright, beautiful, active)
 - Higher impression layer : 4 factors (harmony, gloomy, deep, stimulating)
 - Affective layer : 3 factors (pleasure, energy arousal(-), tension arousal)

2.1. Analysis of affective evaluation tendencies

•Methods

- 1.Calculated the variance of the factor scores for the energy arousal (-) factor and the tension arousal factor, and then standardized
 - 2.Hierarchical cluster analysis (Ward method) using standardized values (Fig. 2)
- Tension arousal group (10 participants)
 - Intermediate group (12 participants)
 - Energy arousal group (19 participants)

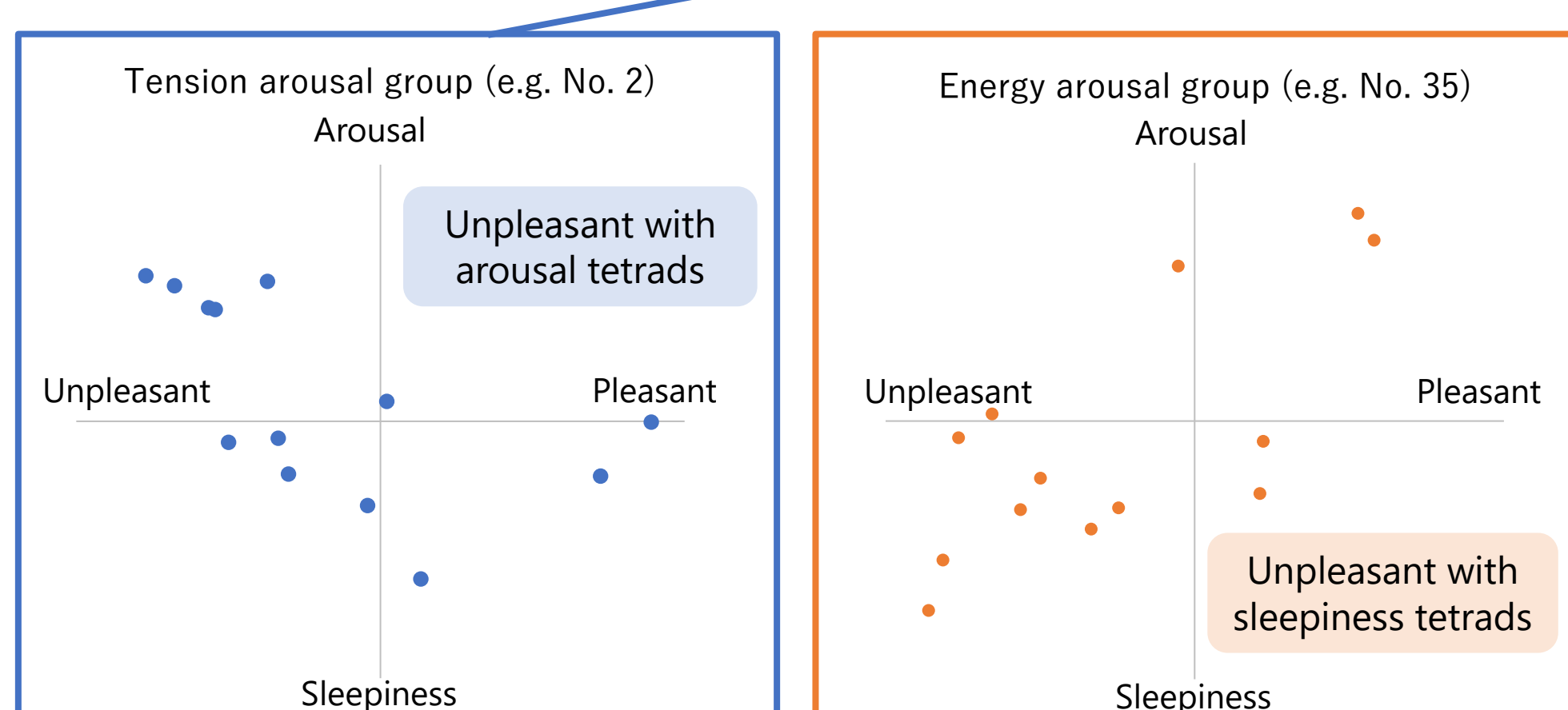


Fig. 3 Affective evaluation tendencies of each type

Participant ID	Energy arousal(-)	Tension arousal
1	0.24	0.76
2	0.22	0.78
3	0.16	0.84
4	0.13	0.87
7	0.30	0.70
9	0.36	0.64
31	0.24	0.76
36	0.31	0.69
39	0.22	0.78
40	0.19	0.81
6	0.53	0.47
11	0.46	0.54
13	0.53	0.47
15	0.51	0.49
16	0.49	0.51
18	0.49	0.51
21	0.51	0.49
29	0.49	0.51
30	0.50	0.50
32	0.51	0.49
34	0.43	0.57
41	0.47	0.53
5	0.59	0.41
8	0.71	0.29
10	0.65	0.35
12	0.69	0.31
14	0.77	0.23
17	0.63	0.37
19	0.64	0.36
20	0.68	0.32
22	0.65	0.35
23	0.57	0.43
24	0.75	0.25
25	0.82	0.18
26	0.72	0.28
27	0.66	0.34
28	0.58	0.42
33	0.72	0.28
35	0.86	0.14
37	0.73	0.27
38	0.73	0.27

Fig. 2 Result of cluster analysis

2.2. Analysis of impression evaluation tendencies

•Methods

- Calculated correlations of factor scores between participants for each factor in the impression layer

•Results

- Observed factors with high consistency and low consistency in evaluation trends among participants

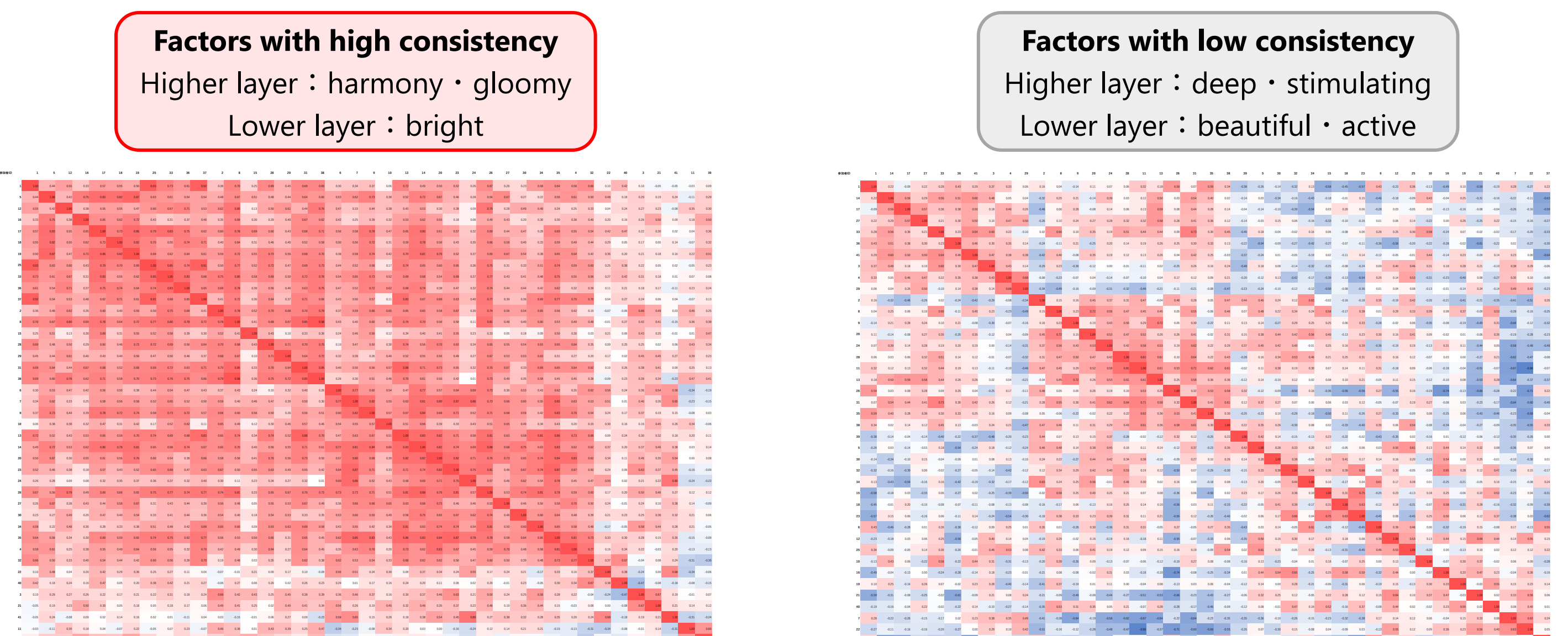


Fig. 4 Correlation table of factor scores among participants in the impression layer

2.3. Analysis of auditory function

•Purpose

- Investigating the relationship between auditory function and affective evaluation tendencies

•Methods

- Five-point rating of 10 items in the questionnaire on *kikoe* (Suzuki et al., 2002)
- One-dimensional ANOVA and t-test for each question

Questionnaire items	
Better condition	1 Can hear when having a one-on-one conversation with a family member or friend in a quiet place
	2 Can hear when having a conversation outside the home in a less noisy place
	3 Can hear when talking while shopping or at a restaurant
Environmental noise	4 Can hear cars approaching from behind
	5 Can hear small electronic sounds, such as the "ding" of a microwave oven
	6 Can hear when someone calls out to them from behind
Worse condition	7 Can hear conversations in a crowd
	8 Can hear speech in a group of 4 or 5 people
	9 Can hear when someone speaks in a whisper
	10 Can hear TV dramas when people around you are listening at a comfortable volume

Scoring system of response items	
Can't always hear	5
Can't hear well most of the time	4
Half and half	3
Can hear well most of the time	2
Can always hear	1
No experience	0

•Results

- The energy arousal group was less audible on all items
- Significant difference of 5% for question 2, and significant trend for items 3, 6, and 8

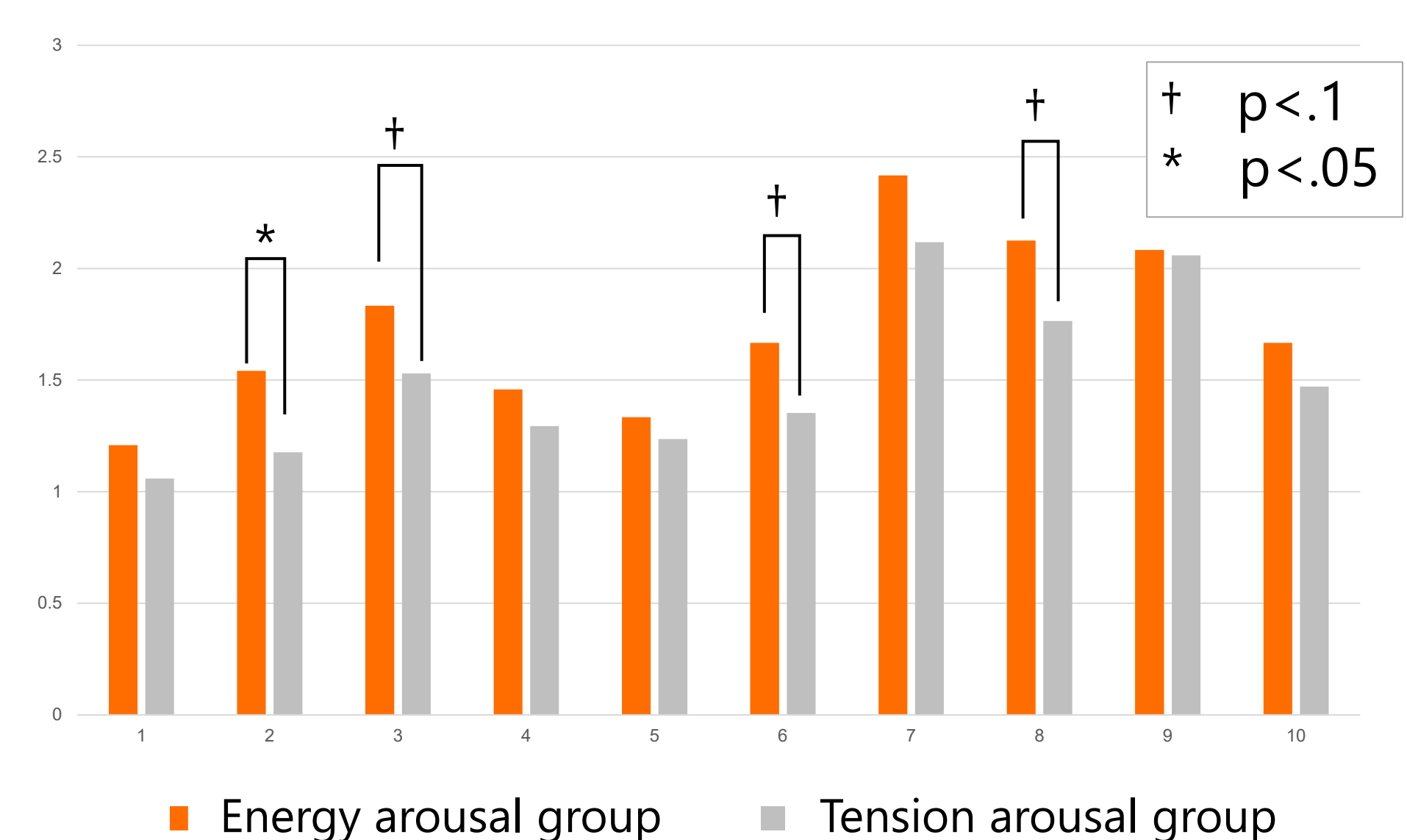


Fig.5 Results of t-test

Conclusion

•Analysis of individual differences

- Classified into three groups
 - The tension arousal group feels unpleasant, with arousal tetrads
 - The energy arousal group feels unpleasant, with sleepiness tetrads
 - The immediate group that is neutral

- Found individual differences in the impression evaluation tendencies
- Determined a relationship between differences in auditory function and affective evaluation tendencies

•Future study

- Type classification based on differences in the structure of affective evaluation tendency and impression evaluation tendency
- Model building for each type