Kansei reaction in evaluation of film impression

Effects of audible information on the impression of short films

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Abstract: The purpose of this study is to clarify the characteristic of media which makes recipients who get to be pleased, and to support the media literacy of senders (who produce the video media) in the society. Most of all in media, it is known that the video resources give relatively strong influence to the recipients. Therefore, this study focused on the images and sounds which are representative component parts in video media. The main method of the study is to use an experimental process which is to present several visible and audible sources in four kinds of videos, and then the recipients selected the scale of feeling by their own emotion and evaluation of impression. A modified version of DES(Different Emotion Scale ; Izard,1971) and ten adjective pair scales of impression were also used in the study. As the result, the emotion of "Happiness" was related *Warm-Cool* of ten adjective scales by audible impression rather than visible impression. Namely, Factors that elicit the emotion of "pleasant (Happiness)" from recipients were deeply related to sound rather than image, furthermore, it has been affected by audible temperature.

Key words: Media literacy, Different emotion scale, Audible temperature

1. Introduction

People who live in the media society are tend to assume that things received through the media are all of information. Among them video media affect the emotional state of the person and elicit psychological state of pleasant and unpleasant (Lazarus, Speisman, Mordkoff & Davison, 1962; McHugo, Smith & Lanzetta, 1982; Philippot1993; Gross & Levenson, 1995; Noguchi, 2005). Philippot (1993) verified that six emotions were elicited (happiness, anger, disgust, fear, neutral, sadness) by showing twelve kinds of videos to French people. There are "Happiness was pleasant state, unpleasant state were Anger, Disgust, Fear and Sadness, the emotion of Neutral " when these six emotions were classified by the theory of Tomkins (1962). It indicates that to elicit unpleasant emotion of audience is easy as well as unpleasant feelings were more various than pleasant feelings by Philippot's. Moreover, There are similar results in other kinds of emotion study which was used video (Gross & Levenson, 1995; Noguchi, 2005; McHugo, Smith & Lanzetta, 1982; Hagemann, Naumann, Maier, Becker, Lurken and Bartussek, 1999).

In recent years, there are no limitation of place and time to contact with the media to get information because of development of the Internet, a laptop, smartphone. As the chance to get video media is getting more, possibility that psychological state of audience has been unknowingly led to unpleasant state is also getting higher. Especially, the children who have limitation of making judgment by themselves are more influenced. Yoshida (2000) had referred that unpleasant emotions such as surprise, fear, ponderousness and disgust could be felt through watching video were related to violence, also they could lead to social problems. In order to prevent social problems raised

through the video media, the producers (who produce the video media) need media literacy to understand audience with variety of emotional states when they watch the video media. To support the media literacy of the author, we have studied psychological and physiological reactions of the audience with respect to various parts (such as images, movement, stories) of the films (Kim, D.H, Yang, W.S, Kitajima,M, Iwamoto,Y & Lee, S.H, 2007; Kim, D.H & Lee, S.H, 2009). As the next step, in this study, it is focused on the relationship between audible sources in videos and the emotional state. Even though there are many studies about the relationship of visible and audible sources in the video, these audible sources were used as only back ground music for visible sources so far (Cohen, 1994; Mrks 1998; Prendergast, 1991; Hamamura, Yoshitaka, Hirakawa & Ichkawa, 2000). Consequently, we conducted an experiment to measure and analyze the impact of impression and emotional reaction of audience by using music as an independent element of the experiment not only as a supporting one of images.

2. Method

2.1 Subjects

It is targeted to a wide age ranges of subjects who contact to video in a daily life. A total of 70 subjects were recruited from Tsukuba city in Japan. There were 39 males and 31 females (mean age= 28.5 years, SD = 8.9, range = 18~70). The subjects were given a test about having abilities of normal hearing and watching before doing the experiment.

2.2 Stimulus material

Gross and Leveson (1995) used 78 frames in experiment from 25 kinds of films, and each frame was within ten minutes. It was selected for eliciting specific emotions intentionally. It was successful to elicit emotion targeted, however there were two problems. Firstly, it is the length of each frame that was from 8 to 1192 seconds. Secondly, there were too many frames so that it took long time to do experiment.

Therefore, we picked out stimulus material according to two standards. (1) Length (not too long) : playback time within a minute; (2) Intelligibility (not too complicate) : It should be simple sources so that the audience can understand contents easily.

In order to compare reactions of visible (image) source with audible one in same video, the visible and the audible sources were not from irrelative independent the videos but from the video with an image and a sound used as a unit. Moreover, the sources should be unfamiliar to the audiences. Therefore, four kinds of genre that have strong influence in terms of music were selected. They were commercial, dance movie, music video and motion graphic. We chose one video by one genre. It was edited playback time of each stimulus in about thirty-five seconds (range = 30 ~ 46 seconds) to make experiment time short in order to concentration of subject. Finally, the four videos were decomposed to four images and four sounds, then total eight stimulations used for the experiment.

Table 1. Description of the video segments.

Video segment (genre)	Duration (second)	BPM	Key	Description (*feature film title, company or producer, year*)
Eyebrow Dance (commercial)	30	76.8	Cm	A boy and a girl move their eyebrow to the music (from *Cadbury Eyebrows, Cadbury Plc, 2009*)
Ballet Dancer (dance movie)	38	105.1	B ♭	A ballerina dancing with a fan (from *Don Quixote - Kitri Variation, Pure Motion Dance - Choreography by Marius Petipa; Performed by Katya Preiser, 2009*)
Wave of Dot (music video)	31	70.1	C	Brilliantly colored dots moving slowly and gently (from *Calligram – Stars on the water, Seoul Records, 2002)*
Line Drawing (motion graphics)	46	90.1	Cm	Lines of various thickness drawn on the white screen (from *Game is over, created by Erik Natzke, 2009*)

2.3 Dependent measures

Japanese version of Differential Emotions Scales (DES; Izard, 1972) and Semantic Differential (SD; Osgood, 1964) that were mentioned in the previous study(Philippot,1993; McHugo, Smith, and Lanzetta, 1982) as useful materials were used in this work as well to measure how much impact to the emotion of audiences through the video segments. Subjects marked the degree of their feelings on the ten categories of emotion, which were described by the following adjective groups consisted of three-words : (1) interested, concentrated, alert; (2) amused, gleeful, merry; (3) sad, downhearted, blue; (4) angry, irritated, mad; (5) fearful, scared, afraid; (6) anxious, tense, nervous; (7) disgusted, tuned off, repulsed; (8) disdainful, scornful, contemptuous; (9) surprised, amazed, astonished; (10) Happiness, gleeful, elated. Rating of feeling in each category was made on a 5-point scale from “not at all” to “very strongly”.

Additionally, Semantic Differential was used to analyze the characteristics of video segments that elicited those emotional responses. It was modified that the ten adjectives pairs based on studies used to evaluate impression on music and images in movies (Hamamura, Yoshitaka, Hirakawa and Ichikawa, 2000; Kawasaki and Ideguchi, 2002). (1) beautiful – ugly; (2) fresh – old; (3) stiff – soft; (4) warm – cold; (5) dynamic – static; (6) wide – small; (7) heavy – light; (8) strong – weak; (9) joyful – sorrowful; (10) interesting – boring. Rating of impression was made on a 5-point pair scale.

2.4 Procedure

The four sounds and four images as stimuli were presented to the groups of subjects consisted from a person to three people through a speaker (harman/kardon CA 91329) and 24-inch monitor (Apple LED Cinema Display) in an exclusive room named of “Kansei measurement”. The speaker and monitor were connected to a laptop. The measurement room where could be blocked light was appropriate to show the videos. It had been explained to the subjects about the contents of the study, procedures, time and ethical considerations in advance. Those who were supposed to participate in the experiment were asked to sign by themselves on a document of agreement, which was, they understood and agreed to all rules of the experiment. The experiment was conducted with two sections, namely sound section and image section, and 5 minutes break time in between. The each segment was played twice. The subjects marked on the emotional rating scale and impression rating scale as DES and ten adjective pairs after being presented each sound and image segment. Duration of the experiment was about 15 to 20 minutes depending on the evaluation time of the subject.

4. Results

The means and standard deviations of all ratings are presented in Table2. In comparison of the DES averages of audible segment and visible segment, the average of audible segment category (m=1.96) was higher than visible segment category's (m=1.89). In the DES rating of each video, *Eyebrow Dance*; "interested", "amused" and "happiness" were higher rated than others in the audible segment. In the visible segment, "interested", "amused" "happiness" in addition "anxious", "surprised" were highly marked. *Ballet Dancer*; It was higher evaluated on "interested", "amused" and "happiness" in both segments. *Wave of dot*; "interested", "amused" and "happiness" were high in the audible segment. In the visible segment, "interested" and "anxious" were high. *Line Drawing*; Various emotions such as "interested", "amused", "angry", "anxious", "disgusted", "disdainful" and "surprised" were high in the audible segment. In the visible segment, "interested", "amused" and "anxious" were high. The emotions of "interested" and "amused" were found to be high rate in both segments according to the result. The emotion of "happiness" was high in common in audible segments of *Eyebrow Dance*, *Ballet Dancer* and *Wave of Dot*. It is "anxious" that was highly marked in visible segments of *Eyebrow Dance*, *Wave of Dot* and *Line Drawing* in common.

Table 2. Means and standard deviation of video ratings

	Video segments audible visible			
DES	Eyebrow Dance	Ballet Dancer	Wave of Dot	Line Drawing
Interested	3.24 (1.12) 3.76 (1.00)	3.33 (0.96) 3.14 (0.92)	3.04 (1.07) 2.33 (1.18)	2.84 (1.24) 2.89 (1.12)
Amused	3.60 (1.06) 3.81 (1.11)	3.66 (1.02) 3.17 (1.02)	2.77 (1.09) 1.66 (0.93)	2.56 (1.35) 2.01 (0.92)
Sad	1.37 (0.76) 1.33 (0.61)	1.36 (0.83) 1.33 (0.83)	1.93 (1.08) 1.59 (0.81)	1.50 (0.91) 1.99 (1.03)
Angry	1.56 (0.91) 1.37 (0.80)	1.14 (0.57) 1.21 (0.68)	1.19 (0.52) 1.79 (1.09)	2.27 (1.23) 1.73 (1.12)
Fearful	1.59 (0.89) 1.80 (1.12)	1.11 (0.36) 1.14 (0.57)	1.16 (0.61) 1.90 (1.14)	1.99 (1.10) 1.83 (1.18)
Anxious	1.86 (1.05) 2.01 (1.12)	1.26 (0.74) 1.34 (0.78)	1.37 (0.90) 2.30 (1.26)	2.23 (1.14) 2.24 (1.23)
Disgusted	1.64 (0.90) 1.64 (0.98)	1.24 (0.73) 1.24 (0.65)	1.24 (0.75) 1.83 (1.10)	2.21 (1.19) 1.91 (1.25)
Disdainful	1.44 (0.71) 1.50 (0.81)	1.14 (0.60) 1.24 (0.75)	1.26 (0.72) 1.53 (0.94)	2.00 (1.22) 1.49 (0.85)
Surprised	1.93 (1.01) 3.01 (1.31)	1.47 (0.88) 1.53 (0.94)	1.30 (0.69) 1.69 (0.86)	2.26 (1.21) 1.79 (0.98)
Happiness	2.26 (1.10) 2.26 (1.33)	3.63 (1.16) 2.64 (1.32)	3.09 (1.19) 1.31 (0.60)	1.59 (0.86) 1.66 (0.95)

N = 560, Means of all video segments = 1.91(sound segment = 1.96, image segment = 1.89)

4.1. Correlation and Factor analyses of video segments

The correlation analyses were conducted using the DES rating of all video segments. Audible and visible segments of *Eyebrow Dance* (r=.989, p<.001), *Ballet Dancer* (r=.978, p<.001), *Lin Drawing* (r=.638, p<.05) were significantly. However, *Wave of Dot* had no specific correlation between audible and visible segments. Even though the correlation between audible and visible segments in *Wave of Dot* could not be found, as more inspecting of the correlation between *Wave of Dot* and other segments, audible segment of *Wave of Dot* was significantly related to the visible segments of *Eyebrow Dance* (r=.786, p<.001) and *Ballet Dace*(r=.945, p<.001). The emotion of "happiness" seems like the cause of the correlation. The visible segment of *Wave of Dot* was related to the audible segment of *Line Drawing*(r=.679, p<.05). The emotions of "fearful" and "anxious" could be cause of the correlation. The results of "Pearson correlation analyses" are shown in Table 3.

Table 3. Correlations between DES rating of video segments

		1	2	3	4	5	6	7	8
1	Eyebrow Dance (a)	-							
2	Ballet Dancer (a)	.886**	-						
3	Wave of Dot (a)	.811**	.966**	-					
4	Line Drawing (a)	.663*	.304	.195	-				
5	Eyebrow Dance (v)	.989**	.851**	.786**	.694*	-			
6	Ballet Dancer (v)	.950**	.978**	.945**	.465	.930**	-		
7	Wave of Dot (v)	.263	-.064	-.048	.679*	.349	.079	-	
8	Line Drawing (v)	.609	.408	.484	.638*	.670*	.532	.813**	-

(a) = audible segment, (v) = visible segment, Pearson's r, *p < .05, **p < .001

"Factor analysis" on Table 4 was conducted to summarize the correlation structure of the DES ratings. The analysis was executed using SPSS for Mac version 21. Unrotated factor analysis was initially conducted to extract a factor followed: 2 factors were appropriate (allowing eigenvalues over 1.0). The respective eigenvalues were 4.05, 2.04, .86, .66, .58, .52, .40, .37, .29 and .23 for variables. Subsequently, an exploratory factor analysis (major factor method) using varimax rotation was conducted. Table 4 shows the results of the factor analysis. Factor 1 consisted of 7 variables: disgusted (.81), disdainful (.8), fearful (.78), anxious (.76), angry (.73), surprise (.53), sad (.45). The factor appeared to consist of variables that were measured as negative emotions, such as disgusted, disdainful and fearful so that factor 1 was labeled "unpleasant". Factor 2 consisted of 3 variables: amused (.86), interested (.64), happiness (.61). This factor appeared to consist of variables for positive emotions. Factor 2 was labeled "pleasant". It was calculated factor scores of the "unpleasant (factor 1) " and "pleasant (factor 2) " in each video segment and then eight segments were distributed as shown in Figure 1.

Table 4. Rotated factor analysis based on DES ratings of all video segments (Varimax rotation)

	Factor Ⅰ	Factor Ⅱ	Communalities
Disgusted	**.812**	-.187	.694
Disdainful	**.796**	-.015	.633
Fearful	**.778**	-.051	.608
Anxious	**.763**	-.120	.597
Angry	**.725**	-.161	.552
Surprise	**.526**	.291	.362
Sad	**.449**	-.097	.211
Amused	-.072	**.855**	.737
Interested	-.021	**.642**	.413
Happiness	-.145	**.605**	.387
contribution of factor	3.51	1.68	5.19
contribution ratio	35.12	16.82	51.84

N = 560, Boldface indicates factor loading more than .40.

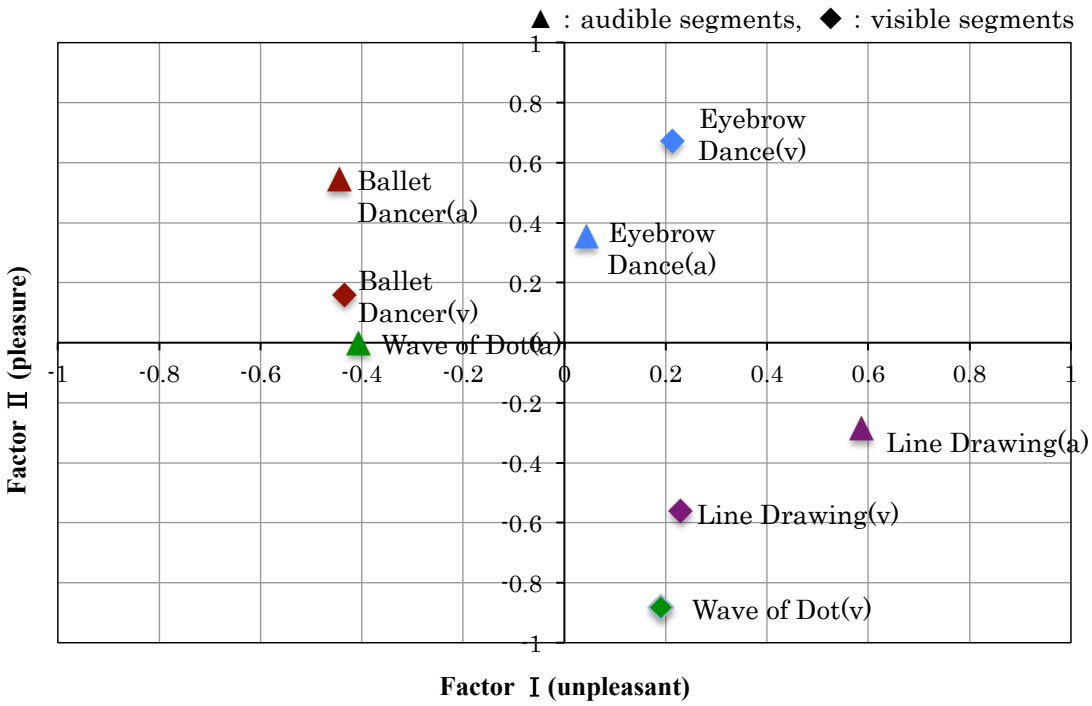

Fig. 1. Distribution of eight segments factor score on Factor 1 and Factor 2

A segment of the highest factor score of Factor 1 that is “unpleasant” was calculated on *Line Drawing*'s audible sources. *Line Drawing* was low in terms of a score of Factor 2, “pleasant”. It was revealed to elicit the most unpleasant emotions. *Eyebrow Dance*’s visible sources were the highest for a score of Factor 2. This video was also high in a factor score of Factor 1. Therefore, it was high in both factors. *Ballet Dancer* was low in Factor 1 but high in Factor 2 so that it was the most pleasant segment than others. There is a gap between the factor scores (Factor 1 and Factor 2) of audible and visible segments in *Wave of Dot* when it compares to other videos, *Eyebrow Dance, Ballet Dancer* and *Line Drawing* as shown in Fig. 1

4.2. Analyses of semantic differential related to happiness

“Correlation analysis” was conducted using the DES rating between emotions. The results are shown in Table 5. The pleasant emotions of “interested” and “amused” (r=.92, p<.001) were shown as having positive correlation each other significantly. The unpleasant emotions, “anger”, “fearful”, “anxious”, “disgusted” and “surprised” were shown as having positive correlation one another. As investigating the correlation between the pleasant and the unpleasant, the emotions of “interested” and “amused” were not shown any correlations positively as well as negatively with the unpleasant emotions. However, “happiness” was unique to have significantly negative correlation with unpleasant emotions. Therefore, the emotion of “happiness” is a main source of this study to reveal pleasant state from the videos.

We investigated the characteristics of audible segments in videos related to emotion of “happiness” by factor analysis. In factor analysis, it was divided two groups as “group that felt happiness” and “group that did not feel happiness”. The group of “felt happiness” consisted of those who marked more than 3 points out of 5 points in DES. The group of “not felt happiness” filled with people of 1 or 2 points.

Table 5. Correlations between DES ratings in emotions

		1	2	3	4	5	6	7	8	9	10
1	Interested	-									
2	Amused	.920**	-								
3	Sad	-0.454	-0.666	-							
4	Angry	-0.544	-0.56	0.142	-						
5	Fearful	-0.337	-0.469	0.109	.858**	-					
6	Anxious	-0.432	-0.572	0.212	.840**	.987**	-				
7	Disgusted	-0.418	-0.51	0.163	.966**	.947**	.929**	-			
8	Disdainful	-0.32	-0.368	0.027	.948**	.852**	.793*	.933**	-		
9	Surprised	-0.32	-0.368	0.027	.948**	.852**	.793*	.933**	1.000**	-	
10	Happiness	0.573	0.672	-0.2	-.837**	-.912**	-.945**	-.873**	-.769*	-.769*	-

Pearson’s r, *p < .05, **p < .001

The factor analysis on Table 6 was conducted to summarize the correlation structure of the impression evaluation in the "group that felt happiness". Unrotated factor analysis was initially conducted to extract a factor as following: 3 factors were appropriate (allowing eigenvalues over 1.0). The respective eigenvalues were 3.14, 2.31, 1.13, .99, .63, .52, .48, .33, .28 and .25 for variables. Subsequently, an exploratory factor analysis (major factor method) using varimax rotation was conducted. Table 6 shows the results of the factor analysis. Factor 1 consisted of variables 5 variables: joyful – sorrowful (.74), dynamic - static (.74), interesting - boring (.65), wide - small (.48), fresh - old (.46). The factor appeared to consist of variables that were measured as "delightful", such as joyful, dynamic, interesting so that factor 1 was labeled as "enjoyment". Factor 2 consisted of 3 variables: warm - cold (.99), beautiful – ugly (.68), stiff - soft (-.55). This factor appeared to consist of variables for "clemency", such as warm, beautiful. Factor 2 was labeled as "warmth". Factor 3 consisted of 2 variables: strong – weak (.67), heavy – light (.5). This factor appeared to consist of variable for "powerful". Factor 3 was labeled as "strength". The commonality of "warm - cold" in factor 2 was the highest (.98). Therefore, "war - cold" significantly related to "happiness".

Table 6. Rotated factor analysis by impression evaluation of felt happiness group (Varimax rotation)

	Factor Ⅰ	Factor Ⅱ	Factor Ⅲ	Communalities
joyful - sorrowful	**.738**	.109	-.297	.645
dynamic – static	**.735**	-.215	.071	. 591
interesting - boring	**.647**	-.013	-.119	.432
wide – small	**.478**	.096	.204	.279
fresh – old	**.457**	-.219	.014	.257
warm – cold	-.047	**.988**	-.023	.979
beautiful – ugly	-.114	**.680**	-.174	.505
stiff – soft	.023	**-.554**	.293	.393
strong - weak	.286	-.286	**.669**	.893
heavy - light	-.188	-.232	**.503**	.342
contribution of factor	2.35	2.00	.97	5.32
contribution ratio	23.54	19.96	9.67	53.17

N=145, Boldface indicates factor loading more than .40.

The factor analysis on Table 7 was conducted to summarize the correlation structure of the impression evaluation in the "group that did not feel happiness". Uunrotated factor analysis was initially conducted to extract a factor followed: 3 factors were appropriate (allowing eigenvalues over 1.0). The respective eigenvalues were 3.01, 2.28, 1.07, .91, .68, .57, .48, .4, .32 and .29 for variables. Subsequently, an exploratory factor analysis (major factor method) using varimax rotation was conducted. Table 7 shows the results of the factor analysis. Factor 1 consisted of variables 4 variables: beautiful – ugly (-.75), stiff - soft (.68), strong - weak (.63), warm - cold (-.62). The factor appeared to consist of variables that were measured as "tactile sense", such as beautiful - ugly, stiff - soft, strong – weak so that factor1 was labeled as "tactile". Factor 2 consisted of 4 variables: interesting - boring (.74), joyful – sorrowful (.62), dynamic - static (.6), wide – small (.55). This factor appeared to consist of variables for "interested". Factor 2 was labeled as "enjoyment". Factor 3 consisted of only one: heavy – light (.98). This factor appeared to consist of variable for "heavy – light". Factor 3 was labeled as "weight".

Table 7. Rotated factor analysis by impression evaluation of not felt happiness group (Varimax rotation)

	Factor Ⅰ	Factor Ⅱ	Factor Ⅲ	Communalities
beautiful – ugly	**-.753**	.000	.028	.567
stiff – soft	**.672**	-.053	.302	.175
strong - weak	**.626**	.516	.219	.546
warm – cold	**-.617**	.072	-.070	.391
interesting - boring	-.169	**.735**	-.016	.548
joyful - sorrowful	-.127	**.622**	-.160	.313
dynamic – static	.434	**.600**	.009	.999
wide – small	-.039	**.546**	.112	.706
fresh – old	.176	.375	.060	.428
heavy - light	.189	.046	**.980**	.569
contribution of factor	2.09	2.00	1.15	5.24
contribution ratio	20.93	20.03	11.48	52.43

N = 135, Boldface indicates factor loading more than .40.

5. Conclusion

We investigated in audible and visible sources of the videos by DES and Impression Evaluation (used ten adjective pairs), considering the factors and pleasant state through the videos in this study. Particularly, it was focused on audible sources rather than visible sources. It was revealed that evaluation was divided as the pleasant

and the unpleasant emotions when the videos were analyzed by factor analysis of DES ratings. The audible sources' factor score were higher than visible sources' in the pleasant states. As a result, the pleasant emotions felt from the videos were affected by the audible sources. The factor scores of *Ballet Dancer* and *Wave of Dot* that has a calm and slow music were higher than the scores of *Eyebrow Dance* and *Line Drawing* that has dynamic rhythm as examining the characteristic of each audible segment. Therefore, it is able to know that it was easier to elicit the pleasant emotions not by dynamic music but by calm music in this experiment.

The emotions of "interest" and "amused" belonged to the pleasant state. However, they have no significant negative correlation with the unpleasant emotions by Table 5. Thus, the emotions of "interest" and "amused" cannot be classified as the pleasant or the unpleasant states, but merely indicated that the videos were not bad to the subjects. Dirk Hagemann et al. (1997) also observed similar inclination of "interest" and "amused" comparing to this study. In their experiment, 13 films that elicit five target emotions, neutral, happiness, sadness, anger and disgust were shown 42 subjects, and they rated in level of ten emotions, interest, happiness, pleasant, amusement, sadness, fear, anger, disgust, valence and arousal showing the films. In their result, the emotion of "interest" had high scores in all films, and "amusement" was scored highly in the films that were targeted to happiness, anger and sadness.

Accordingly, the emotion of "happiness" was uniquely clarified as one of the pleasant emotions from the study. Furthermore, it was revealed that "happiness" was significantly related to audible segment rather than visible segment. In addition, those who focused on the warmth mainly in audible sources feel "happiness" so that the warmth indicated the degree of "audible temperature".

Marshall and Cohen (1998) suggested the "Congruence – associationist" model that is in terms of the relation between the film as a visible source and music, audible one. This model describes "Attention (ax)" for a video. "Attention (ax)" consists of "a" and "x". "a" is the part of overlap in a circle of music and a circle of film. "x" is only part in a circle of music.

When the result of this study applied to the model of "Congruence – associationist", "a" can be "enjoyment" as a part of "happiness" in the overlap part of audible and visible sources, and "x" can be "warmth" in audible sources. Therefore, the concept of the relation between "happiness" and "warmth" in an audible source was the most important idea in this study to clarify the characteristics of video that raises the pleasant states. Namely, "happiness" related with "warmth" can be the key of "attention" of audiences who watch videos.

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