Presenting a Caller with Music: Face Impression Formation with Music for Smart Phone

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Abstract

Multimedia push ringer (MPR) is a mobile application that presents a caller’s identity using various contents, e.g., audio and video and raises many important issues of social cognition. In this study, the influence of multimedia contents on impression formation is examined with a series of experimental procedures in which a genre of music - either trot (Korean pop music) or classical music - is sequentially combined with a facial image. The facial impression associated with different music genres is compared to that formed by a face only image along social warmth and intelligence dimensions. Results indicated that both genres of music significantly enhanced facial impressions in the social warmth dimension, but showed a distinguishable influence on the facial impression in the intelligence dimension. Our experiment provides an interesting insight into impression formation, and offers guidelines for the practical usage of

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Keywords: Multimedia push ringer, Facial impression, Ringtone, Social warmth, Intelligence

Introduction

Mobile phones are not only devices for communication, but they have become an extension of our digital self. People set their own background images and apply ring tones to their mobile phones in a way to show their identity and personality. Mobile technologies related to the presentation of a user’s identity have rapidly developed. For instance, a ringback tone service allows a receiver to set personalized music for a caller to hear while the phone they are calling is being rung. With the emergence of the smartphone, people reveal themselves to others in a much richer way with a multimedia presentation (Raento & Oulasvirta, 2008; Fortunati, 2005). Multimedia push ringer (MPR) enables a caller to push an outgoing multimedia ringtone to the receiving phone, which allows them to express themselves to the receiver with audio-visual contents (Lee, Lee, & Choo, 2012; Chung, Choi, Kang, & Lee, 2009). The self-presentation through mobile devices impacts the impression formation in more various ways than we may be aware of, and offers a new experience in how we perceive others. Thus, in the present paper we investigate the impact of multimedia self-
presentation, formed by music ringtones as well as visual face images, on impression formation.

The trait impressions using facial appearance have been intensively studied to reveal how people make judgments and decisions about others (for a review, see Todorov, Said, Engell, & Oosterhof, 2008; Cuddy, Fiske, & Glick, 2008). The judgment can be influenced by facial properties that convey structural or emotional information (Montepare & Dobish, 2003), methods for integrating different types of cues (Adaval, Isbell, & Wyer, 2007; Skowronski & Carlston, 1987), the social status that perceived persons belong to (Cote, 2011), and so on. The judgments influenced by these factors can be evaluated in various dimensions including attractiveness, friendliness, intelligence, competence, etc. According to Rosenberg (Rosenberg, Nelson, & Vivekananthan, 1968), trait adjectives describing impressions of other people were clustered into two main dimensions - socially good-bad and intellectually good-bad. Under consideration of ecological and evolutionary pressures, recent studies in social cognition suggested that there may be two universal dimensions in which judgment is mainly explained – social warmth and competence (Cuddy et al., 2008; Fiske, Thomas, & Vescio, 2007).

In contrast to the impression formation from visual facial appearance, music has long remained silent in experimental studies of social cognition. Recently, researchers began to pay attention to the role of music in person perception or impression formation. For instance, Rentfrow and Gosling (2003, 2007) investigated relations between music preferences and personality. They suggested four categories of music preferences labeled ‘Intense and Rebellious’ (e.g., rock), ‘Reflective and Complex’ (e.g., jazz), ‘Upbeat and Conventional’ (e.g., country), and ‘Energetic and Rhythmic’ (e.g., electronica/dance).

These categories are associated with 5 factors of personality, namely extroversion, conscientiousness, openness, agreeableness, and emotional stability. Furthermore, they also suggested that person perception can be influenced by an individual’s music preference. Classical music fans are perceived as politically conservative and intelligent, whereas country music fans are perceived as outgoing and conventional (Rentfrow & Gosling, 2009). This differentiation may be attributed to stereotypes of social classes linked to different music preferences.

Perceived impressions of others are often derived from a variety of cues, including verbal and visual information. These cues may contribute differently to dimensions of perceived impression. For instance, kindness may be effectively perceived from facial expressions (Otta, Folladore, & Hoshino, 1996), whereas intelligence or expertise may be easily perceived based on verbal responses during an interview (Stevens & Kristof, 1995). However, there are few studies on how music can influence facial impressions. The interaction between genre of music and facial image seems less clear although different genres of music may contribute to enhancing or impairing perceived facial impressions.

This study explores the role of a multimedia stimulus, sequentially composed of music and face images, in the impression formation assessed along the social warmth and
intelligence dimensions. In particular, we examine some issues of impression formation in the experimental conditions in which a particular genre of music may have influence on the evaluation of a subsequent face image. The experiment conditions simulated a hypothetical situation where a person is impressed with a caller’s information given by multimedia push ringer. In the experiment, two different genres of music - classical and trot - were used, and combined with face images. We first carried out a factor analysis to investigate the stereotypical view on trot and classical music fans, and then compared impression formation of the music fan after presenting an audio sound belonging to a particular genre. Second, the impressions formed by the combined multimedia contents were compared with those formed by only the face images. Throughout the experiments we examined the impressions formed in response to different types of sequentially presented multimedia contents, and our experimental results will be discussed in the context of interpersonal perception as well as mobile phone communication.

SmartRing

We developed a new kind of multimedia caller identification software so-called ‘SmartRing that is more advanced and enjoyable form of caller identification (“SmartRing,” 2014). The SmartRing has appeared in richer soil of information technology in which people express themselves in the form of user created contents (UCC) with various media such as text, music, image and video. That is, photos, music, video clips generated by a caller can be displayed on a receiver’s phone, and a receiver’s contents also can be displayed on a caller’s phone. The ‘SmartRing’ is free and can support both iPhone and Android phone environments.

Figure 1. graphically illustrates the SmartRing service. To present a caller’s content on the other party’s phone, it is required the SmartRing application is installed in the both phones. A user creates his/her own multimedia contents or purchases commercial contents that are transformed into an advanced multimedia format (AMF). The AMF file is sent and stored to the other party’s phone. The AMF file is registered with the caller’s phone number. Finally, the contents are displayed on the other party’s phone during ringing.

This service is not limited simply to show a caller identification, but can be used in various purposes. For instance, this service can be used as a name card containing a caller's business information or as a company and product advertisement.

Experiment 1

The objective of experiment 1 is to investigate people’s stereotypes and evaluation about fans who refer a particular genre of music - trot or classical music. Experiment 1 is composed of two sub-experiments. In sub-experiment 1, general stereotypes about trot and classical music fans are investigated and analyzed using the factor analysis. In sub-experiment 2, we investigated a participant’s evaluation on fans who preferred a particular genre of music after presenting 10 second audio clips of trot or classical music.
Trot is a genre of Korean pop music, and is beloved by the older Korean generation, especially the working class (Lie, 2012; “Trot,” 2013). In general, the trot music expresses the personal emotions of love and life. In some sense, the trot can be compared to American ‘country music’ that represents the rural working class. In contrast, classical music is recognized as the music for educated people, and generally perceived as difficult European music. These two genres of music were selected for this experiment since the genres may be contrasted in terms of intellectuality (well-educated vs. less-educated), social classes (higher vs. lower social), etc. It is assumed that these genres of music may contribute differently in forming individual impression.

Sub-experiment 1: Stereotypes for trot and classical music fans

Method

Participants

Twenty participants took part in the current study and were students attending Sungkyunkwan University, Korea. They were all recruited through the university’s website. The mean age of the participants was 25.9 years. They were paid 3000 Korean won (about 2.5 US dollars).

Materials

The questionnaire is composed of adjective words that were selected from opinion pools of Internet music sites and from Korean music magazines. These adjectives include ‘naive’, ‘folksy’, ‘boring’, ‘intellectual’, ‘elegant’, ‘intelligent’, ‘gentle’ and so on. The questionnaire used contains 30 questions. Each question requests a numbered response from 1 to 10 (need to check), representing disagreement and agreement.

Procedure

Subjects were instructed to check the number that they felt best described the music genres.

Result

The factor analysis of the 30 questionnaire items pertaining to participants’ evaluation of two music genres yielded both 9 factors with eigenvalues > 1, together accounting for 79.467% of the variances for classical and trot music genres. Principal Components Analysis (PCA) with Varimax Rotation shows the first 3 factors, which accounted for 68.560% obtained for participants’ opinions of the music genres. It should be noted that only those adjectives with absolute value of loadings higher than .50 are presented in Tables 1.

The first factor, which accounts for 29.883% of the variance, is made up of 12 adjectives. Most of them are associated with the ‘high-browness’ – ‘graceful’, ‘elegant’ ‘intelligent’, and ‘gentle’. The second factor, which accounts for 26.528% of the variance, is also comprised of 11 adjectives. This factor also includes the adjectives that are related to the excitement such as ‘elated’, ‘cheerful’, ‘exciting’, etc. The third factor consists of 3 adjectives accounting for 12.148% of the variance. This factor includes the adjectives that are related to ‘boredness’ such as ‘boring’, ‘ tiresome’, and ‘dull’.
Sub-experiment 2: Evaluation on a fan who likes a particular trot or classical music

Method

Participants

Fourteen participants in the first sub-experiments took part in this experiment. They were paid 3000 Korean won (about 2.5 US dollars).

Materials

For the two music genres, the most frequently downloaded files for mobile phone ringtones were obtained from a Korean music website (“Ringtone,” 2013). These music files were ranked on the basis of their downloaded frequencies. Each of the 10 files that were highly ranked was selected for classical and trot music stimulus. A highlighted section of the music files was sampled for 10 seconds and stored in a WAV file format.

The questionnaire is composed of 8 adjective words that are associated with the personality traits of ‘kindness’ and ‘intelligence’. These adjectives include ‘kind’, ‘warm-hearted’, ‘ferocious’, ‘friendly’, ‘intellectual’, ‘smart’, ‘muzzy’, and ‘intelligent’. The questionnaire used has 8 questions for each music sound stimulus. Accordingly, the questionnaire is composed of a total of 160 question items. Each question item asks for a numbered response from 1 to 10 (need to check), representing disagreement and agreement to a corresponding adjective.

Procedure

5 ballad and 5 rock and roll audio sounds, used as dummy stimuli, were added to the trot and classical music stimulus set. These dummy stimuli would not be used to analyze participants’ evaluation. After randomly presenting a music sound, we asked for a participant to evaluate an imaginary fan who likes the music sound.

Result

The result is summarized in Table 3. We found no significant difference in the social warmth dimension between trot and classical music (t(13) = .097, p=.924), while a significant difference was found in the intelligence dimension (t(13)=6.962, p < .01). This result indicates that both trot and classical music would not differently influence the impression formation about the music fans in the social warmth dimension. However, people tend to evaluate the classical music fans to be more intelligent than the trot music fans.

Discussion

The factor analysis showed the some stereotypical dimensions along that people tend to evaluate the trot or classical music fans’ traits. The first factor seems to be associated with high- or low-brownness of the two genres of music. Participants tended to believe that classical music fans are likely to be elegant, graceful, gentle, and intelligent whereas trot music fans are not. The second and third factors are related to the genre-associated characteristics - excitedness or boredomness. The trot music fans were perceived to be ‘elated’,..
’cheerful’, ‘delightful’, ‘naive’, and ‘good-natured’. In contrast, the participants tended to perceive classical fans to be as ‘uninteresting’, ‘boring’ and ‘tedious’.

It is believed that trot music is representative of lower-class culture. It served as a sign of a sad life for Koreans during the Japanese occupation and Korean Civil war with its slow tempo, but became exciting as it combined with dance music after the 1960s. In turn, our young participants in their mid-twenties may think of the trot fan as ‘delightful’. This music may be associated with old people who are less educated but warm-hearted. In contrast, classical music is considered to be part of the ‘elite culture’ enjoyed among high-class people. It is associated with the traits of intellectual or high class people such as ‘intelligent’, ‘graceful’, and ‘elegant’. The traits may be overlapped with the properties of classical music such as ‘sweet’ and ‘calm’. Also, it is not surprising for young Koreans to view it as ‘boring’.

In sub-experiment 2, on the other hand, we did not find any significant difference in the social warmth dimension between trot and classical music fans, whereas a statistically significant difference was found in the intelligence dimension. This result indicated that the two genres of music are distinguishable in the intelligence dimension, but not in the social warmth dimension. That is, the classical music imported from western culture is mainly considered to be music for intellectuals.

**Experiment 2**

Experiment 2 was designed to investigate how two different music genres – classical and trot - can influence facial impressions when compared with facial impressions without music.

**Method**

**Participants.**

Sixty participants took part in the current study and were students attending Sungkyunkwan University, Korea. They were all recruited through the university’s website. All participants had normal or corrected-to-normal vision and hearing. The mean age of the participants was 26.5 years. They were paid 5000 Korean won (about 4.5 US dollars) after the experiment.

**Stimulus.**

Face images were obtained from the Oriental Face Database (Gao et al., 2004) and the Postech Face Database (H. Lee et al., 2008). All faces of the databases are identified as Far East Asians. The image databases consisted of color photographs of faces, presented on a light sky blue background. The size of the face images is 300 by 300 pixels. The databases contained hundreds of different faces. It was necessary to select only a small portion of faces for the current research purpose. Ten postgraduate students were involved in the face classification task. They were asked to classify each face in terms of social warmth and intelligence. Based on their classification, 40 face images with a neutral expression were chosen. Ten faces each roughly corresponded to high or low social warmth and intelligence.
(e.g., Ten faces classified as high social warmth and low intelligence). There were 25 male faces and 15 female faces in the images.

For the two music genres, the most frequently downloaded files for mobile phone ringtones were obtained from a Korean music site. These music files were ranked on the basis of their downloaded frequencies. Each of the 20 files that were highly ranked was selected for classical and trot music stimulus. Since the music would be presented in a limited time interval, a highlighted section of the music files was sampled for 10 seconds and stored in a WAV file format.

**Apparatus**

Participants were located at a computer workstation with their head distanced approximately 45 cm from the computer monitor. A Samsung S22B150N widescreen LCD monitor was used. The screen size was 22 inches with the resolution set to 1920_1080 pixels and the display was calibrated to a refresh rate of 75 Hz. The music stimulus was presented through SAMSUNG SHS-100VB headphones. The Matlab-based Psychotoolbox 3 was used to construct the software application in order to present the face and music stimuli. Since these stimuli were randomly presented, the stimulus presentation order and participants’ responses were collected and stored in a text file.

**Procedures.**

Participants were asked to sign a consent form, and to indicate their demographic information (age and gender) and whether they had normal or corrected-to-normal vision and hearing. Then, they were guided to sit in front of the computer workstation and were informed of the experiment procedure. The information was presented on a screen. Before commencing the experiment, the participants completed a practice test using 2 face images (for face image-only condition) or 2 faces with music sound (for face image with music condition). This was conducted to help them to understand the experiment procedure. Participants were then instructed to start the experiment when they were ready.

**Image-only condition**

The face images were randomly presented at the center of the screen and lasted for 1500 ms. A 50 ms fixation cross preceded each face. After a face presentation, participants were asked to rate their first impression for 8 question items. Each question was sequentially presented on the screen and a response was made by pressing a number key labeled from 1 to 10. A participant’s responses were stored in a file.

**Face image with music condition**

Participants were told that a song preferred by the person in the face image would be presented, and then the face image appeared. They were asked to evaluate their first impression on the face, not music. As shown in Figure 1, a song preceded a face and lasted for 10 seconds. At 8450 ms after the music presentation, a 50 ms fixation cross appeared at the center of the screen, and then a face image followed and lasted for 1.5 seconds. In this experimental condition, 20 classical and 20 trot music files were used. These music files
were randomly matched with face images without any repetition. The presentation order was also randomly decided. As in the image-only condition, participants were asked to rate their first impressions for 8 question items after the stimuli presentation.

Result

As noted earlier, the main goal of this research study is to investigate the influence of different music genres on face impression formation. For this purpose, a repeated-measures ANOVA was conducted since the participants’ evaluations were confined to each of the face images, but varied along the three different conditions - image-only, with-classical music and with-trot music. The descriptive statistical results of perceived impressions for the three different conditions are summarized in Table 4. First, a statistically significant difference was found in the social warmth dimension (F(2; 78) = 18.806; p <.001). We also found a significant difference, yet much smaller, in the intelligence dimension (F(2; 78) = 3.6467; p = 0.031).

A post-hoc Bonferroni parwise comparison test that compared the mean difference among the paired conditions was also conducted. We found a significant difference in the social warmth dimension for the image-only and with-trot music condition pair (p < .001) and image-only and with-classical music condition pair (p < .001), but not a significant difference between with-trot and with-classical music conditions. In contrast, Bonferroni post hoc tests revealed that the image-only condition did not significantly differ from the with-trot and with-classical music conditions in the perceived intelligence dimension. However, the comparison between with-trot music and with-classical music pair showed that there is a significant difference in the perceived intelligence (p = 0.03).

For obtaining further insight on the results, we analyzed participants’ evaluations on each individual face. The means and standard deviations of perceived social warmth and intelligence for the individual face in the three different conditions are summarized in Table 5. For each individual face, an one way ANOVA test with Turkey’s honestly significant difference (HSD) was carried out. In Table 5, those shown significant differences were marked with one asterisk symbol (if p < .05) and two asterisk symbols (if p <.01). There is only 1 case that showed a significant difference between the with-trot and with-classical music conditions (case 10 in Table 5). The other significant differences are driven between the image-only condition and the with-trot or with-classical music condition. First, we found 7 cases that showed significant differences in the social warmth dimension in comparison between the image-only and with-trot music condition and 6 cases in the intelligence dimension in comparison between image only and with-classical music conditions. In contrast, we found only 2 cases that showed significant differences in the intelligence dimension in comparison between the image only and with-trot music conditions, but no case between image only and classical music conditions. Interestingly, the trot music negatively influenced people’s evaluation in the intelligence dimension.
Discussion

The repeated measure ANOVA and post-hoc Bonferroni pairwise comparison test indicated that both trot and classical music positively contributed to facial impressions in the social warmth dimension, and there is little difference between with-trot and with-classical music conditions. Even though we found a significant difference in the intelligence dimension among the conditions, the difference is not due to the comparison between different music genres and image-only conditions. Rather, it is attributable to the comparison to the trot and classical music genres. That is, both music genres may contribute differently to the impression formation, and they also led a polarized evaluation on the dimension, whereas there were no influences on the intelligence dimensions. Even though the means of the perceived intelligence in the with-trot condition and the with-classical condition were lower or higher than that in the image only condition, the differences were not statistically significant. These results may contradict with the studies in which fans of highbrow music such as classical music tend to be perceived as more ‘intelligent’, whereas fans of lowbrow music as less ‘intelligent’. However, these studies focused on the impressions formed from the information of individuals’ music preferences rather than the combination between a photo and a preferred song.

The result implies that stereotypes linked to the music affect interpersonal perceptions of individuals. For instance, Zillmann and Bhatia (1989) showed that women associated with a classical music preference were perceived as more attractive than those who preferred heavy metal. More recently, in Ziv (2008)’s study, participants were asked to evaluate a photo of people along personality traits who are associated with high or low status music. They found that people in the high-status music (e.g., classical music) condition were more positively evaluated, whereas those in the low-status music (e.g., country music) condition were more negatively evaluated. However, in our experiment, the effect of the different genres differentiates interpersonal perception in the intelligence dimension, but not in the social warmth dimension.

General Discussion

The results presented above help us to differentiate the influences of different music genres in impression formation. This is the goal of the current study. We also intend to provide general guidance of how to form an impression through investigating the influence of multimedia ringback tones on impression formation along the social warmth and intelligence dimensions.

Indeed, our experiment concluded interesting findings, which show that trot and classical music contribute differently to facial impression formation. Both of music genres contributed to enhance the perceived warmth of a person in an image, but did not significantly influence the perceived intelligence. However, both genres of music pushed the participants’ evaluations to the opposite directions, and the difference caused by the music
genres became significantly larger. Our experimental results raise several issues concerning the presentation of ‘who I am’ in mobile devices that need to be discussed.

Social class and Musical Preference

Culture preference reflects the social class, educational status, and even age group that one may belong to. For instance, in our study, upper class and well-educated people tend to prefer ‘highbrow’ music such as classical or opera, whereas lower class and poorly-educated people tend to prefer ‘lowlbrow’ music such as country or gospel. This tendency may have influence on the way an individual is perceived with respect to musical preference. It has been reported that people tend to categorize groups of people based on various personal attributes such as fashion or music preference. In our study, trot music is associated with lower social classes, poorly-educated people, and the older generations. Typically, old housewives are well-known trot fans in Korea society. In contrast, classical music is associated with high classes and well-educated people.

Stereotype Contents and Musical Preference

Particular social classes or education levels associated with music preference can be a reference for evaluating people in terms of warmth and competence dimensions. Fiske and colleagues (2007) proposed a model of stereotype contents in which stereotypes vary along the two dimensions. In the model, stereotype content refers to attributes that characterize members of group and thus categorize them into a group. For instance, housewives or elderly people can be characterized as ‘high warmth’ and ‘low competence’, whereas rich people can be characterized as ‘low warmth’ and ‘high competence’. In this regard, different genres of music fans can be aligned along the warmth and competence dimensions. In our study, the two genres of music are not clearly distinguishable in the warmth dimension even though they significantly enhanced the perceived warmth in comparison to the image only condition. In contrast, the music genres seem to be distinguishable in terms of the competence dimension. Relatively, the person presented with trot music is likely perceived as ‘less intelligent,’ but the person presented with classical music is likely perceived as ‘more intelligent’.

Application for Smart Phone

Current studies of impressions shaped by technology are mainly based in a desktop computer environment, particularly in the context of computer-mediated communication technologies. However, technological trends are rapidly moving away from traditional computing environments to a ubiquitous computing environment such as that provided by a mobile phone. In this respect, our study is an important attempt to adapt to this rapid change and to address issues of impression formation in mobile phone communication.

In particular, we designed an experimental procedure for the Multimedia push ringer (MPR) in which people express themselves in the form of user created contents (UCC) with various media such as text, music, images and video. The contents can vary depending on a sender’s expressive purpose - sending emotional states, displaying commerce advertisement,
or making an impression on the receiver. Important issues arising from mobile communication with MPR relate to its effects on the formation of caller impressions—how a sequential combination of ringtone and a facial photo influences impression formation, how MPR makes a positive contribution to subsequent phone conversations, etc. In this regard, our findings provide some guidance for the effective use of MPR or other self-presentational applications.

Conclusion

In this work we have not considered the characteristics of perceivers. If we know them, we can present ourselves in more persuasive or sympathetic way. For instance, we may classify mobile users into a specific personality group on the basis of mobile usage information such as call time, call frequency, number of contacted persons, personal interests and so on. Presenting a caller’s identity in a way that meets a receiver’s personality would increase interpersonal attractiveness. Future research will consider impression formation in terms of the perceiver’s characteristics.

Acknowledgements

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References


*Table 1:*

Factor loadings of traits associated with two music fans on factors identified in the principal components analysis with varimax rotation
### Table 2:
Perceived warmth and intelligence after presenting a genre of audio sound

<table>
<thead>
<tr>
<th></th>
<th>Social-warmth</th>
<th>Intelligence</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
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<tr>
<td>Trot</td>
<td>6.0071 (.8841)</td>
<td>4.9048 (.7673)</td>
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<tr>
<td>Classical</td>
<td>6.0429 (.8866)</td>
<td>6.9119 (.7662)</td>
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</table>

### Table 3:
Comparison between image-only, with-trot music, and with-classical music along the social warmth and intelligence dimension

<table>
<thead>
<tr>
<th></th>
<th>Only image</th>
<th>With trot</th>
<th>With classic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Social-warmth</td>
<td>4.2575 (1.0887)</td>
<td>4.6148 (0.9871)</td>
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<td>Intelligence</td>
<td>4.3076 (1.1787)</td>
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<td>4.4111 (1.1666)</td>
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<td>Impression</td>
<td>evaluation for each individual face image</td>
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<td>------------</td>
<td>--------------------------------------------</td>
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<td></td>
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<tr>
<td>image</td>
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<td>With classic</td>
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</table>

**Figure 1:** SmartRing service. The service lets people express themselves via User-Created Content (UCC) using media such as text, music, images and video.

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Figure 2: Experiment procedure. Participants were told that a music preferred by the person in a face image would be presented, and then the face image appeared. They were asked to evaluate their first impression on the face, not music. A music genre of audio sound preceded a face and lasted for 10 seconds. At 8450 ms after music presentation, a 50 ms fixation cross appeared at the center of the screen, and then a face image followed it and lasted for 1.5 seconds.