The effect of listening to music related to design project on designer's association

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Abstract: Most designers make it a rule to listen to music in their design routines. Studies show that music has impacts on many human being activities. In this study, a within-subjects design is conducted in the experiment. Each subject performed two experiment, they were asked to draw or write down their ideas and associations with a Japanese style lamp design while listening to Japanese and non-Japanese music. After the experiment, a questionnaire and retrospect task was conducted to take down details about their association and idea development by reviewing the recorded video.

Important findings obtained from the experiments include: When the subjects listen to Japanese music, more elements and the sketches of lamp ideas can be generated. Furthermore, Japanese music also helps trigger more types of idea elements for lamp design. Meanwhile, comparing questionnaires in paired T test supports these results. It shows that musical imply function while listening to related design project music will enhance designers associate to more idea categories related to design project.

Key words: music, design idea, association, protocol analysis

1. Introduction

People get in touch with music a lot in their daily life. To kill time in the monotonous traffic, they listen to music on their way to work or school. At the lunch time, restaurants or supermarkets always play music to enhance the dining atmosphere. And it is everybody's experience to listen to a couple of our favorite music to relax at home after work or classes; music indeed plays an important part in people's daily life [20]. In the past, there were many studies regarding the effectiveness of music. For example, music can enhance the customer purchase rate [13, 15]. North, Hargreaves and McKendrick claim that playing representative French and German music at the supermarket can help stimulate the willingness of consumers to buy the local products [16]. It is, therefore, a question worthy of investigation whether playing specific pieces of music that feature some local culture can help designers to think about related cultural characteristics. In this situation, music may help designers work out product design rich in local culture or characteristics by the transformation of cultural imagery into design elements. Some studies propose that listen to or sing familiar music can enhance the creativity, liveliness, and fluency of drawing skills of young children in painting [21], and that playing music during the picture viewing can strengthen the memory effect [2], indicating that listening to music can help improve cognitive ability, creativity, and memory. As far as effects of music on design is concerned, Lesiuk invited 56 software designers at four Canadian companies for five weeks and found that listening to music had a positive impact upon work performance [8]. It is clear that music has impacts on many aspects of people's life. With

technical advances in recent years, the application of computer, MP3, mobile phone to play music is widely popular. And the way of music listening has changed from public playing to more personal, adding more freedom and privacy to the selection of music. In this paper, the authors observed the way designers listen to music while they are working with the design projects. It is an important issue for in-depth investigation.

Design behavior is a kind of knowledge transformation, rational thinking, innovative concept, and emotional integration. Industrial design is a process-oriented creative activity. Ulrich & Eppinger maintain that the product development process can be divided into six stages: (1) planning, (2) concept development, (3) system-level design, (4) detailed design, (5) testing and refinement, and (6) production ramp-up [22]. In the design process, each stage has its value, and the concept development stage has the greatest impact on the design activity. This is because designers will define the relationship among the product components in the concept development stage, and thus guide the object shape, size and material, affecting the subsequent design development [19]. It is why the authors choose the concept development stage for exploration in this study. In design process, the idea generation is often manipulated by the designer through his or her memories, imagination, and evaluation of related information. Furthermore, designers will apply drawings, notes, models and analytical concepts to propose ideas and solutions to the design problems [18]. In the early concept development stage, most designers often adopt the relatively loosen sketches to present their concepts and to help with their design thinking [17]. Sketches can serve as a tool for cyclic thinking to help designers explore novel ideas [7]. Sketch drawing can be regarded as one of the unique presentation skills of designers. Therefore, in this study, sketches and text notes were used as the way how designers record their ideas.

2. Association

Association refers to the thinking of other related things from a specific entity. It is a mental activity of human beings. When we hear a voice, it will remind us of the speaker, and even of the speaker's appearance[24]. Locke points out that the forming of some idea will naturally link to another idea. But the derived association varies with the tendency of people's personality, educational level, and inclination [10]. In his book "On Memory and Remembrance", Aristotle clearly pinpoints that when people are recalling, they will find the things they are looking by the event similarity, contrast, or contiguity. These experiences construct the course of memory [1]. In this light, association is the basis of perception, concept, memory, and imagination and creative ideas do not come up in a single step. As far as music association is concerned, Yeoh and North applied music and pictures as stimuli to investigate the memories triggered by different types of music and found that playing the right music could help people recall things associated with the attributes of music [23]. Lowis' study shows that 90% of the subjects had the experience of recalling things in the past from the process of music listening [11]. For designers, they often apply associations to connect the cognition and knowledge they already have so as to generate a lot of ideas. In this study, the authors attempt to explore whether designer will generate more elements related to design project when they listen to the music associated with the design theme.

3. Method

We understand that the design process is a combination of many mental behaviors. The external behavior of the design process can be easily detected but it is not easy to interpret the internal factors of these behaviors. Therefore, asking subjects to inform their ways of thinking and points of view is an effective way to obtain the

subject's ideas [5]. In many behavioral analytic methods, protocol analysis is a commonly used one in recent years in that it can lead us deep into the designer's thinking mode, and open the designer's secret cognitive behavior [4]. Generally, protocol can be divided into Concurrent Verbalization and Retrospective Reports. Ericsson and Simon claim that thinking-aloud and immediate retrospect are two methods that are able to reflect the cognitive procedure of people [6]. Some other studies, however, indicate that concurrent verbalization is different from people's normal behavioral model and may have some side-effects. Lloyd, Lawson, and Scott conducted a concurrent verbalization experiment on bike design project demonstrated such kind of phenomena [9]. Considering concurrent verbalization is not the same as normal behaviors of designers, retrospective report method is adopted to explore the behaviors of subjects in their concept development.

3.1 Experimental design

Because individual differences in design ability are inevitable among the designers recruited and because perceptions evoked by music is multiple, the subjective feelings of the individual experience [18] is emphasized in this study. In this study, therefore, a within-subject design is adopted to reduce the error variance caused by individual differences. Each subject performs two experiment tasks in a counterbalancing way. A PC is used to play six pieces of music randomly. Each piece of music will approximately be played. During the process, a digital VCR is used to record the subject's concept development process. After the experiment, subjects are asked to fill in a questionnaire regarding their opinions and subjective feelings about the experiment. Finally, subjects are asked to watch the video and speak out their motivation and ways of thinking during the process.

3.2 Music used in the experiments

Two types of music, Japanese and non-Japanese music, are used in the experiment. Each type of music includes There are six pieces of music in each type of music and contains both vocal and instrumental music. The music is played in a random way and each piece will be played about two times.

The principle for selecting Japanese style music is that the musical instruments have Japanese characteristics such as shakuhachi, Japanese harp, and drum. The other principle is that the singing way features unique methods in Japanese singers, for example, the Enka singing and portamento method particularly heard in Japanese songs. One more principle for the music selection is that the words of a song are sung in Japanese or can be easily identified as Japanese style. Therefore, the songs belong to pop western music are excluded in the experiment because it is not easy to tell them from other Asian songs or music. The Japanese music used in this experiment cover vocal and instrumental types. The vocal music contains unique Japanese songs by singers Misora Hibari and Hikawa Kiyoshi as well as popular songs by Okinawa singer Natshukawa Rimi. Instrumental music includes The Moon over a ruined castle which is played by Japanese harp and Shakuhachi, and Miyake mainly played by Taiko drum.

From a previous survey made by the authors, over 50% of designers in Taiwan frequently listen to western pop music, Chinese pop music, and TV / movie soundtrack [3]. Therefore, two pieces of western pop music, two Chinese pop music, and two TV/movie soundtracks are selected for non-Japanese music. Both western and Chines pop music contain one male singer and one female singer. TV / movie soundtrack music is selected from the popular ones. The soundtrack of western incidental music comes from the movie Twilight, and that of Chinese film comes from Seediq Bale: the Rainbow Warriors.

Table1. lists the Japanese and non-Japanese music played in the experiment

Japanese music	Singer/Player	non-Japanese music	Singer/Player
1. The Moon over a ruined castle	Toshiko Yonekawa	1. Poker face	Lady GaGa
2. Miyake	Ondekoza	2. Just the way you are	Bruno Mars
3. Shining tears	Natshukawa Rimi	3. Disappear	A-Mei
4. Sake of tears	Hikawa Kiyoshi	4. Smell of rice	Jay Chou
5. Port Town address 13	Misora Hibari	5. Twilight	Christina Perri
6. Tokyo Ondo	Yukio Hashi & Akemi Misawa	7. Seediq Bale: The Rainbow Warriors	Key actors

3.3 Tasks and experimental facilities

The principle for experiment task is to consider the design of daily things everybody is familiar with. Floor lamp and ceiling lamp are selected for design projects because there are not too many technical limits in the design and they are things in our daily life. Furthermore, they are different in operation and lighting demands, which can avoid the learning effect in experiments. Subjects were invited to design a floor lamp in Experiment 1 and a ceiling lamp in Experiment 2 that features Japanese style. The experiments were conducted at a studio at the National Taiwan University of Science and Technology. Except the whiteboard, there was no object on the white wall to reduce the interference factor from the environment. In the experiment, two digital cameras were prepared, one for the recording of idea elements and the other for the interactive situations around the studio.

3.4 Experimental procedure

Before the experiment, researchers tell subjects the purpose of this study and the tasks. They are encouraged to generate as many idea elements helpful for the design of Japanese style lamps as the way they do in their daily design routine. In the early five minutes, they can take it easy by scribbling randomly. Then, they have 40 minutes to develop ideas for a floor or ceiling lamp of Japanese style. During the experiment, subjects are asked to put on headphones for the music while there is a small set of speakers playing music at the same time. Two digital cameras are used to record the protocol data. One is used to shoot the procedure designers generate idea elements and the other for the interactive situation around the subjects

After subjects finish the design project, they are asked to fill in a questionnaire regarding their feelings and opinions about the music and idea development in the experiment on a 7-point Likert scale, 1 point for not helpful at all and 7 point for very helpful (Table 2). The retrospect reporting starts after a 10-minute break. Subjects are invited to watch the video of their design procedure on a computer and to speak out their motivation and ideas about the elements of lamp ideas. The verbal data obtained are taken down by a digital recorder for further coding.

Table 2. The questions in the survey after design project	1 ……. 7
1. How helpful is the music in this design project?	Not helpful at all ……Very helpful
2. How helpful is the music in triggering your ideas for Japanese style lamp?	Not helpful at all …… Very helpful
3. How helpful is the music in developing product form of Japanese style?	Not helpful at all …… Very helpful
4. Do you feel a Japanese style from the music?	No feeling at all …… Great feeling
5. Do you feel a Japanese style from the instrumental feature of the music?	No feeling at all …… Great feeling
6. Do you feel a Japanese style from the rhythm feature of the music?	No feeling at all …… Great feeling
7. Do you feel a Japanese style from the singing feature of the music?	No feeling at all …… Great feeling
8. Do you feel a Japanese style from the words of the songs?	No feeling at all …… Great feeling

3.5 Pilot experiment

Before the formal experiment, two designers were invited for a pilot experiment to find the drawbacks and feasibility of the experiment. Results of the pilot experiment demonstrated the following problems or situations:

1. Subjects spent too much time in the representation of sketches, reducing the width and quantity of ideas.
2. There was a 3-day interval between two experiments. Subjects indicated that they would deliberately avoid the elements that had been used in the early experiment.
3. Subjects considered the task was of a moderate difficulty.
4. Subjects considered that the time for experiment was appropriate, neither too short nor too long.
5. Subjects felt that the music played gave them some kinds of Japanese style feelings.
6. Subjects stated that playing music while they were watching the video helped them recall the way of thinking they had during the experiment.

According to the above-mentioned phenomenon, some parts of the experiment were improved.

1. For problem 1, the subjects were told that no comparisons would be made regarding their design ability. They were asked to do the task as their daily routine and the drawing skill was not the key point in the experiment.
2. Problem 2 shows the carryover effect. To reduce such effect, subjects were told not to care about whether an element was used in earlier experiment. Any idea element is all right if they think it is helpful for the experimental task. Moreover, the interval between two experiments was lengthened to 2-3 weeks, lightening the memory subjects have for idea elements in the earlier experiment.
3. Situations 3 to 6 reflect that the experimental measures are appropriate and will be applied in the formal experiment.

3.6 Subjects and task assignment

Twelve subjects participated in the formal experiment, including eight industrial designers and four graduate students at Department of Industrial and Commercial Design, National Taiwan University of Science and Technology. In gender, there were seven males and five females. These subjects were divided into Group A and Group, B, each consisting of six members, four industrial designers and two graduate students. Subjects in Group A first conducted the lamp design project while listening to Japanese music. Two weeks later, they did the lamp design while listening to non-Japanese music. Subjects of Group B first conducted the lamp design project while they were listening to non-Japanese music, and two weeks later, processed the design project with the Japanese music being played.

4 Results and Analysis

4.1 Concrete output elements

The elements subjects generated for Japanese lamp are diverse and can be roughly divided into two types: graphical and word elements as parts of Subject 4's ideas in Figure 1. The graphical elements can be further categorized into concrete lamp sketches (see LS1-LS2 in Figure 1) and sketches not belonging to a specific type subjects recorded readily (see G1-G3 in Figure 1). In this study, if the pattern or meaning of a graphic element can be clearly judged, it is referred to as an effective graphic element. Such kind of word elements are the key words (see W1-W4 in Figure 1) or texts helpful for the lamp designs (see W5-W9 in Figure 1). Similarly, the judgment of phrase or sentence elements depends upon whether they have clear meanings. If the graphic elements and word elements refer to the same thing, then only the graphic elements are counted. Before the experiment, the subjects were told to record idea elements helpful for Japanese style lamps. Consequently, most of the idea elements

subjects generated are related to Japan. The effective graphic elements, word elements, and number of lamp sketches are listed in Table 3

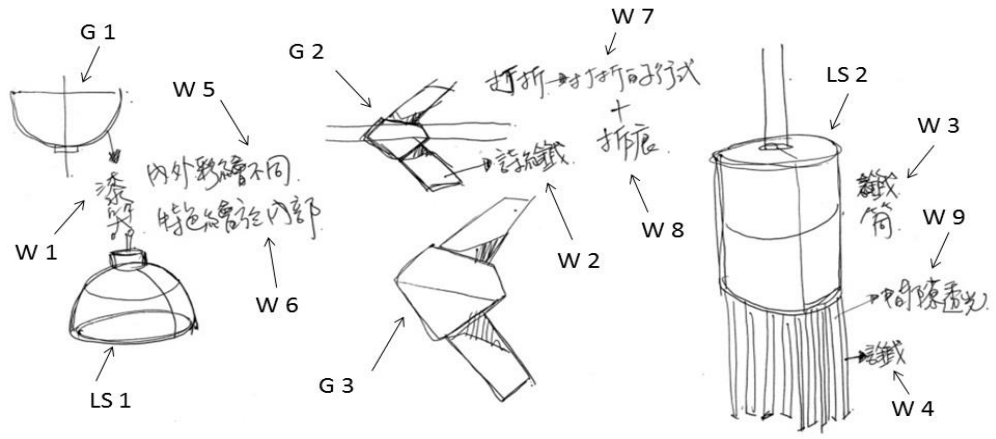

Figure 1, Some idea elements and sketches of a subject in the Japanese lamp design experiment

From Table 3, it is clear that subjects can generate more graphic elements, word elements, and sketches helpful for Japanese style lamps when they listen to Japanese music. Calculating the differences between graphic elements associated from Japanese and non-Japanese music, seven subjects could think about more graphic elements helpful for Japanese lamp design. However, five subjects generated more graphic elements when they listened to non-Japanese music. Furthermore, nine subjects generated more word elements when they listened to Japanese music but three subjects generated more word elements when they listened to non-Japanese music. Particularly, there were ten subjects who could generate more lamp sketches when they listened to Japanese music. These evidences demonstrate that listening to Japanese music helps designers generate idea elements of Japanese style.

Table 3. Comparison of the output of idea elements from Japanese and non-Japanese music

	Subjects	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	Total
Graph elements	Japanese music	16	25	13	8	15	17	8	8	13	19	11	19	172
	non-Japanese music	6	16	14	11	13	10	5	9	10	15	31	21	162
	Difference	10	9	-1	-3	2	7	3	-1	3	4	-20	-2	11
Word elements	Japanese music	36	8	49	44	16	69	48	28	58	37	1	67	461
	non-Japanese music	25	7	49	34	11	81	42	18	48	35	21	56	427
	Difference	11	1	0	10	5	-12	6	10	10	2	-20	11	34
Lamp sketch	Japanese music	12	7	18	8	8	22	3	23	8	17	24	16	166
	non-Japanese music	10	5	15	1	7	12	2	26	6	14	7	17	121
	Difference	2	2	3	7	1	10	1	-3	2	3	17	-1	44

Note: Numbers in the cell represent the number of idea elements.

4.2 Comparison of types of idea elements associated from music

From the subject's retrospect protocols, their ideas come from a variety of things and each subject is different in expressing how they got the ideas. The principle of idea element classification is the clear association with Japan. Such kinds of Japanese idea elements cover typical icons of Japan such as shapes of Fuji Moutain, cherry blossoms, samurai sword, and texts of Kimono, and tatami. If it is hard to judge whether it is related to Japan, then verbal protocols were used for the classification. Such kinds of idea elements include dead trees, lanterns, and the like or verbal descriptions such as simplicity and politeness. Because there are a wide variety of idea elements,

twelve types are specified according to their characteristics, as listed in Table 4. Moreover, to explore whether there will be differences in terms of types of idea elements when subjects are listening to different music, the idea elements are categorized into twelve types (Table 5) according to the graphic and text elements in Table 4.

Table 4. Types of sources for idea elements of Japanese lamp design

Type of idea elements	Key words
1. Specific Japanese characters	Naoto Fukasawa,
2. Japanese historical culture and symbols: unique in Japan	Geisha, Edo period, ninja, cherry
3. Japanese geographical features: architecture, landscape, climate	Fuji Mountain, Okinawa, snow, hot spring
4. Japanese daily life objects: objects common in Japan	Ramen, trams, Izakaya, Sake, fan, clogs
5. Japanese life attitude and spirit: special sense of value	Simplicity, hard-working, expertise
6. Japanese religious belief and customs	Shrine, monsters, Carp
7. Japanese mass media: Comic books, movies, the Internet, books	The Last Samurai, Chibi Maruko, Slam Dunk
8. Japanese literature and drama	Noh, sumo
9. Japanese living environment and interior furnishing	Tatami House, dry landscape, pull-out door
10. Japanese brands and enterprises	Toyota, Muji
11.Scenario association: contextual description	Feeling of autumn, flowers falling from the tree.
12. Things related to music	Taiko drum, Shamisen piano, melody, Enka

Table 5 Categories of idea elements associated from Japanese music and non-Japanese music

Subjects	S1		S2		S3		S4		S5		S6		S7		S8		S9		S10		S11		S12		Total	
Music style	J	N	J	N	J	N	J	N	J	N	J	N	J	N	J	N	J	N	J	N	J	N	J	N	J	N
1.Specific Japanese characters	●	△				△					●	△	●	△			●	△					●		5●	5△
2. Japanese historical culture and symbols	●	△	●	△	●	△	●	△	●	△	●	△	●	△	●	△	●	△	●	△	●	△	●	△	12●	12△
3. Japanese geographical features					●	△	●	△			●		●				●	△		△		△	●		6●	5△
4. Japanese daily life objects	●	△	●	△	●	△	●	△	●	△	●	△	●	△	●	△	●	△	●	△	●	△	●	△	12●	12△
5. Japanese life attitude and spirit	●		●		●	△	●		●		●	△	●	△			●	△	●			△	●	△	10●	6△
6. Japanese religious belief and customs	●		●	△			●	△	●	△	●	△				△	●	△	●	△		△	●	△	8●	9△
7. Japanese mass media					●	△			●	△		△		△	●		●	△	●	△		△	●	△	6●	8△
8. Japanese literature and drama	●				●			△			●	△	●						●				●	△	6●	3△
9. Japanese living environment	●		●	△	●	△			●		●	△	●	△	●	△	●	△	●	△		△	●		10●	9△
10. Japanese brands and enterprises				△		△											●	△		△					1●	4△
11.Scenario association	●	△			●				●	△	●		●	△	●	△	●	△	●	△	●	△	●	△	10●	8△
12.Things related to music	●		●		●				●		●		●		●				●				●	△	9●	1△

Note: **J** means under Japanese music condition. ● means subject claim idea elicited by music.
N means under non-Japanese music condition. △ means subject didn't express idea elicited by music
Total means the number of subjects for the specific situation.

Table 5 clearly demonstrates that there are differences for most subjects in idea element distributions in different situations where Japanese or non-Japanese music is played. Table 6 lists the comparisons of idea element types associated from Japanese and non-Japanese music for 50% and 75% subjects. The numbers in Table 6 represent types of idea elements generated by subjects in the experiments. The comparisons let us know that 50% subjects would think about Japanese historical cultural symbols, daily life objects, life attitude and spirit, religious belief and customs, mass media, living environment, and scenario association for the idea elements of Japanese lamp design both in Japanese and non-Japanese music situations. In addition to these idea elements, when they listened to Japanese music, 50% subjects would generate more idea elements regarding Japanese geographic features, literature and drama as well as things related to music than listening non-Japanese music situations. If 75% subjects are taken into consideration, they would think about Japanese historical cultural symbols, and daily

life objects for Japanese lamp design both in Japanese and non-Japanese music situations. It indicates that most subjects tended to use the cognition they already had of Japanese culture to start their idea development. Beside these idea elements, 75% subjects would think about life attitude and spirit, scenario association, and things related to music for lamp design when they listened to Japanese music. This demonstrates the effects of listening to Japanese music in designer's idea development. In the case of listening to non-Japanese music, 75% subjects tend to develop their ideas from Japanese religious belief and customs for lamp design. For these reasons, there exist differences in types of idea elements for lamp design of Japanese style between listening to Japanese music and listening to non-Japanese music.

When subjects listened to Japanese music, the procedure of listening to this kind of music might be reminded of the past experience of music listening [11]. Moreover, subjects felt that non-Japanese music was not closely related to the Japanese style lamp design. Instead of catching their inspirations from the music they listened to, most subjects tended to explore their ideas from their existed cognition of Japanese features. On the contrary, when they listened to Japanese music, they felt that the music they listened to was related to the design task. Therefore, in addition to their cognition of Japanese culture, they would accept the features presented by the music, resulting in a wider variety of idea elements and inspirations from Japanese music. As pointed out by Yeho & North, playing suitable music will help people recall things related to the music and trigger associations similar to the scenarios in the music [23]. Maconie also claimed that in searching for related connections, music could guide listeners to related events [12]. In other words, the hints provided by the suitable piece of music helped most subjects who were listening to Japanese music connect to the events related to the task of design in a natural way. As a result, most subjects will generate more idea elements and more varieties of ideas for Japanese lamp design.

Table 6. Comparisons of idea element types associated from Japanese and non-Japanese music

% of subjects	Music type	Types of idea elements	Differences between two experiments
50% subjects	Japanese music non-Japanese music	2, 3, 4, 5, 6, 7, 8, 9, 11, 12 2, 4, 5, 6, 7, 9, 11	3, 8, 12
75% subjects	Japanese music non-Japanese music	2, 4, 5, 9, 11, 12 2, 4, 6,	5, 11, 12 6

Note: the numerals represent the type of idea elements in Table 5.

4.3 Results of the survey after the design projects

Paired T tests were conducted to examine whether there existed significant differences between two experiments where Japanese and non-Japanese music were played. The result of paired T test is shown in Table 7. From Table 7, it is clear that Japanese music is significantly more helpful than non-Japanese music for subjects in performing the design project, in triggering their ideas, and for their Japanese product form development (all P values =.000 < 0.05), demonstrating that Japanese music is helpful for the design project of Japanese lamp. Similarly, subjects considered that the style, rhythm, melody, words of song, music instrument feature, and singing style in Japanese music (songs) would give them a significantly more evident feeling of Japanese style that those of non-Japanese music (all P values =.000 < 0.05). This indicates that the music played in the experiment did give subjects an impression of Japanese culture.

Table 7. Result of paired T test between experiments where Japanese and non-Japanese music

	Listen to Japanese music		Listen to non-Japanese music		t	P value
	Mean	Std	Mean	Std		
1. Helpful for the design project	5.917	.996	3.333	.888	6.824	.000
2. Helpful for in triggering ideas	5.833	1.115	2.500	1.000	7.416	.000
3. Helpful for Japanese product form development	5.667	.888	2.583	1.505	6.828	.000
4. Feeling of Japanese style from the music	6.583	.669	1.833	.937	13.538	.000
5. Feeling of Japanese style from music instrument	6.500	.522	1.583	.669	21.479	.000
6. Feeling of Japanese style from music rhythm	6.417	.900	1.750	.622	16.416	.000
7. Feeling of Japanese style from the singing feature	6.333	.651	1.500	.522	23.328	.000
8. Feeling of Japanese style from words of song	5.083	1.379	1.333	.492	8.749	.000

5. Conclusions

In the concept development stage of product design process, all designers expect to generate more idea elements helpful for the design project. From the study, we have found that music is like a key to our memory. During the exploration of ideas, music can open another window for designers and amplify the probing scope of their inspirations. In this study, a within-subject experimental design was conducted to explore the associations designers have in listening to music related to the design theme and music they frequently listen to in their daily life.

The output idea elements of subjects indicated that, when subjects listen to Japanese music, the number of idea elements in graphic, word elements and lamp sketches is much larger than the situation when the subjects listen to non-Japanese music (table 3). Moreover, comparisons of idea element types associated from Japanese and non-Japanese music (Table 6), 50% subjects could generate 10 types of idea elements, larger than 7 types of idea elements associated with Japanese style in the case of non-Japanese music. This demonstrates that while listening to Japanese music, most subjects will have more association categories, meeting the expectation of designers to generate more diverse ideas in the concept development stage. The comparison of types of idea elements associated with music reflected that many idea elements associated with Japanese style are generated when subjects were listening to Japanese music. It indicates that listening to Japanese music is helpful for the design and development of products that feature Japanese style. More importantly, some associations occurred in Japanese music context did not appear in non-Japanese music situation. For instance, the cases that most subjects trigger their ideas from the associations of Japanese musical instruments rarely happen when subjects are listening to non-Japanese music. These phenomena can be verified by paired T test of the survey conducted after the design tasks. Japanese music is significantly more helpful than non-Japanese for subjects in the development of design project, in triggering ideas, and in forming the Japanese style. Moreover, subjects also approvingly agreed that the Japanese music played in the experiments had Japanese characteristics. The results mentioned above demonstrate that listening to Japanese music has positive effectiveness in producing idea elements for Japanese style lamp design.

It has been found that when listening to music related or unrelated to the design project, designers can use the cognition they already possess to generate diverse ideas for the design project. However, in the situation where music related to the design project is played, the impressions designers get from the music can help designers develop associations that are closely related to the scenarios and music played in the studio primarily due to the fit

between music feature and design theme. Many factors are involved in the development of designer's associations. Results of the current study demonstrate that Japanese music does have positive effects on the idea elements of product design of Japanese style. At last, whether there will be the same results in other specific styles and related music should be further investigated in the future.

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