

THE EFFECTS OF MUSICAL PIECES COMPOSED BY HIROYUKI SAWANO

A STUDY USING THE ANIME, ATTACK ON TITAN

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ABSTRACT

HiroYuki Sawano's musical pieces have the following common structure with videos where the musical sound fades out preceding the most exciting scene in a video, and silence comes for several seconds. Then, a loud solo vocal starts at the beginning of the most exciting scene, and the accompaniment follows the vocal. This structure was typically used in a musical piece in the anime, "Attack on Titan". In Experiment 1, Sawano's musical pieces composed for other anime replaced the original piece in "Attack on Titan" and participants continuously indicated their emotions. The results showed that the degrees of the arousal and congruency drastically increased at the most exciting scene when the pieces possess the same structure. However, a musical piece for a drama also showed low levels of arousal and congruency, in spite of the piece possessing the structure. In Experiment 2, the excerpt of "Attack on Titan" was consistently used for the preceding scene before the most exciting scene and the music is switched to one of various pieces for the most exciting scene. The results showed that the arousal and congruency degrees have drastically raised when the original piece was switched to the pieces that contains the same structure. This suggested that the silence preceding the exciting scene weakened the link between the different pieces. In the case of the drama piece, the degrees of the arousal and congruency were at low levels. This implies that the musical features other than the structure are also important for arousal and congruency.

Keywords: *continuous measurement, emotion, congruency, Sawano Hiroyuki, Attack on Titan*

1. INTRODUCTION

Hiroyuki Sawano is a popular composer who produces music for anime and dramas. His musical pieces have the following common structure with videos where the musical sound fades out proceeding the most exciting scene in a video, and silence comes for several seconds. Then, a loud female solo vocal starts at the beginning of the most exciting scene, and the accompaniment follows the vocal.

In western popular music, most pieces are constructed by “verse” and “chorus” parts. In Japanese popular music, the verse is often divided into an A-melody and a B-melody, and the chorus is called “sabi”. The part where a loud female vocal solely starts and the accompaniment follows the vocal corresponds to the “chorus” or “sabi” in Sawano’s pieces. The structure described above was typically used in a musical piece in a fighting scene in the Japanese anime, “Attack on Titan”. In the present study, whether the musical structure described above emphasizes viewers’ emotional excitement is tested using musical and video materials of “Attack on Titan”.

2. EXPERIMENT 1

2.1. Experimental Methods

The anime, “Attack on Titan” was first produced as a TV programme. Then, the series episodes were remixed into two theatre movies. The first one was entitled “Attack on Titan: Wings of Freedom”. In this movie, the climax scene showed two titans battling. In the TV series, the musical piece “ət'æk ON táɪtn” which contains the structure described above and was used for the scene. However, in the movie, another piece which did not contain the structure has replaced “Attack on Titan”. In Experiment 1, a part of the video of the movie “Attack on Titan: Wings of Freedom” was excerpted (Chapter 8, 1:44:08 ~ 1:46:07). The video started at a couple minutes before the climax battle scene. In the 5.1 channel audio tracks of the movie, the voices and sound effects were separately recorded from the music track.

Table 1 shows the list of excerpts of musical pieces used in Experiment 1. Hiroyuki Sawano composed many musical pieces for various anime and dramas using the same structure to “ət'æk ON táɪtn”. Eleven pieces composed by Sawano were prepared (#1A-#9A in Table 1). They contained the aforementioned structure. Ten of them were composed for anime, and the other one was composed for a drama entitled “ma-re” (#7A). Additionally, two pieces were composed by Sawano were also prepared (#10A and #11A in Table 1). They did not contain similar structures. Those pieces were synthesized with the video excerpted from the movie and eleven audio-visual stimuli were constructed.

Table 1: Musical pieces used in Experiment 1

Stimulus ID	Musical pieces
#1A	ymniam-Mkorch
#2A	MKAlieZ
#3A	BRE@TH//LESS
#4A	βios
#5A	KABANERIOFTHEIRONFORTRESS
#6A	Before my body is dry
#7A	Because of you (used in the drama, “ma-re”)
#8A	StarRingChild -English ver-
#9A	Uncontrollable
#10A	Wild war Dance
#11A	DOA

Russell (1980) showed that the emotions were illustrated by a two-dimensional plane spanned by valence and arousal dimensions, in the simplest way. Using this two-dimensional plane, E. Schubert (1999) measured musical emotions continuously. In the present study, a continuous measuring system of emotions like Schubert was prepared. The plane on a tablet showed an uncomfortable - comfortable axis and a calm – arousal axis (Fig. 1). A participant continuously indicated instantaneous emotions while drawing a pen on the plane, while an audio-visual stimulus was presented. The values of the emotions ranging from -10.0 to +10.0 were recorded in the computer system. The videos were presented through the 27.1-inch display (EIZO, ColorEdge CX271) and music was presented through the headphone (STAX SR-407) in $L_{Aeq} = 66.5$ to 68.5 dB. Fifteen students of the Kanazawa Institute of Technology (21-22 years old) participated in the experiment.

In the another session, the participants continuously rated the degree of congruency between the music and video while each stimulus was presented using the vertical axis of the tablet. After the continuous rating of the congruency, the participants rated the overall impressions for each stimulus, using seven-step scales of arousal, coolness, impressiveness, joy, preference, amusement and congruency between the music and video. The stimuli were re-presented in a random order for each participant.

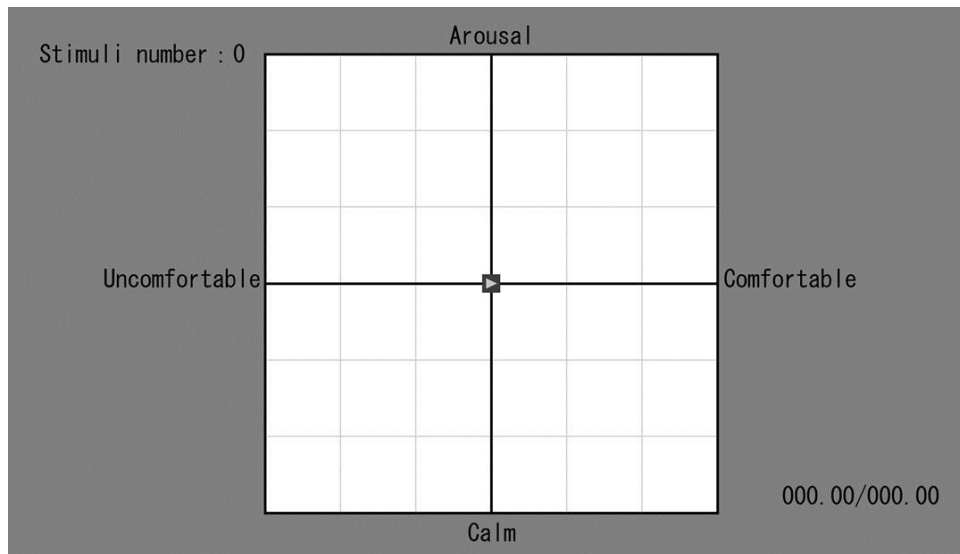


Figure 1: The plane of the tablet for the continuous measuring of emotions

2.2. Results and Discussion

Figure 2 shows the arousal degree for each stimulus as a function of time. Figure 2 shows that the arousal degrees reach to a high level for all pieces in the most exciting scene. However, the arousal degrees are quite different in the verse for different pieces. Especially, the piece which does not contain the structure (#10A) which showed a high arousal degree even in the verse. As a result, the increase of the arousal at the most exciting scene is smaller than the other pieces. In the case of the piece for the drama “ma-re” (#7A), the arousal degree is quite lower than the other pieces both in the verse and chorus parts. This piece was used in the climax scenes where the heroine’s father sobbed passionately in the drama, “ma-re”. Therefore, the piece might contain a low level of arousal.

Figure 3 shows the comfort degree. Figure 3 shows that the comfort degree is raised in the most exciting scene. However, the increase in the degree of comfort are different among the different pieces. Especially, the piece that does not contain the structure (#10A) is found to not increase largely. Figure 4 shows the congruency between the music and video. The congruency was raised in the most exciting scene. However, the piece for “ma-re” contains a low level of arousal which led to a low level of congruency for both the verse and chorus. Figure 5 shows the mean values of overall rating for each stimulus. Figure 5 shows that the overall ratings are lower in the case of the pieces for “ma-re”, than in the other pieces. These results implied that the emotional congruency between the music and the video is also important other than the structure.

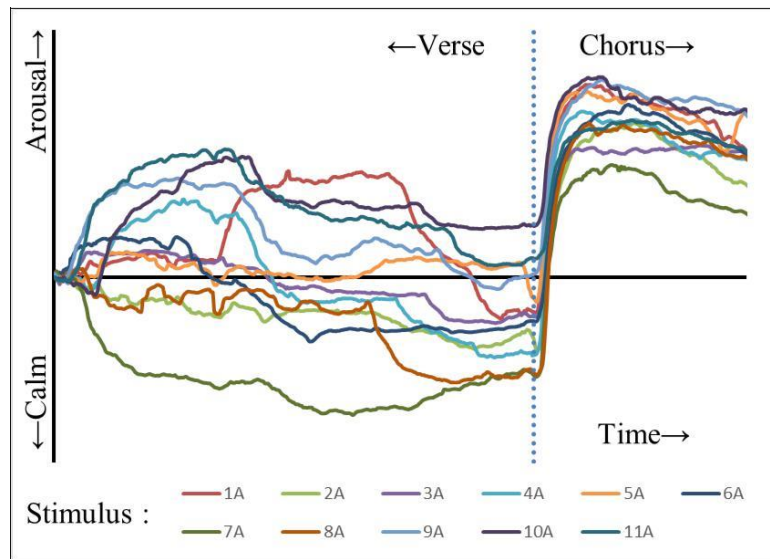


Figure 2: The arousal degree of each stimulus in Experiment 1 is plotted as a function of time

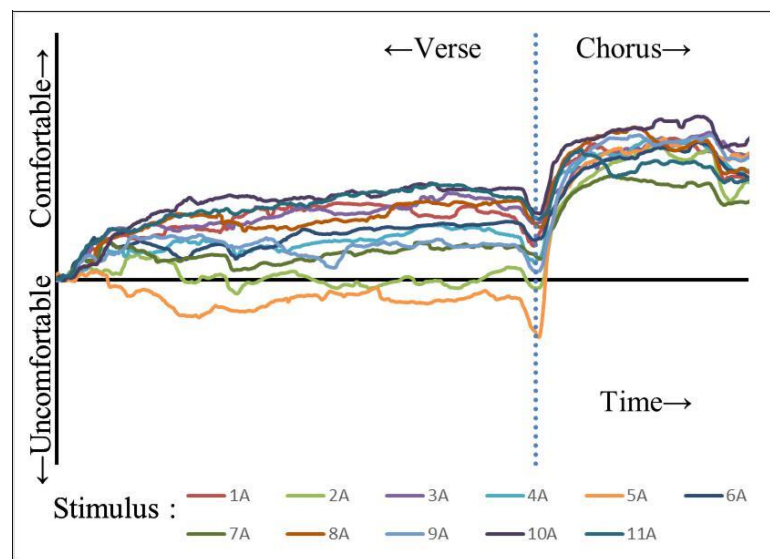


Figure 3: The comfort degree of each stimulus in Experiment 1

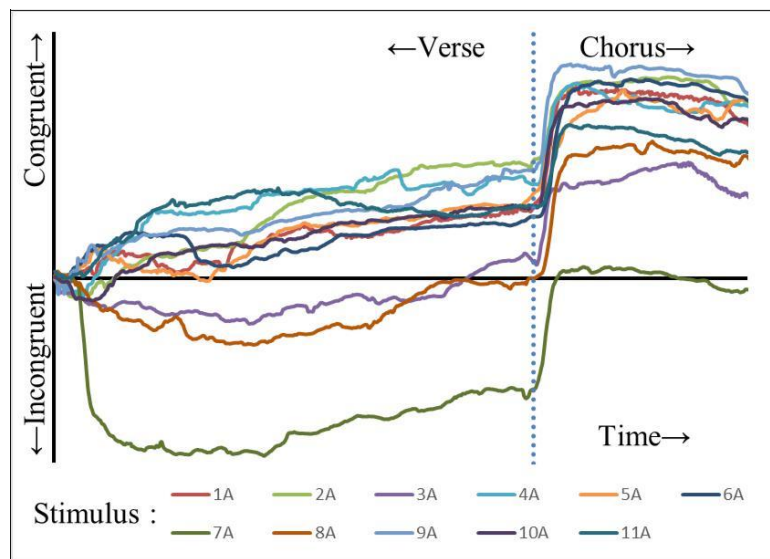


Figure 4: The congruency degree between the music and video for each stimulus in Experiment 1

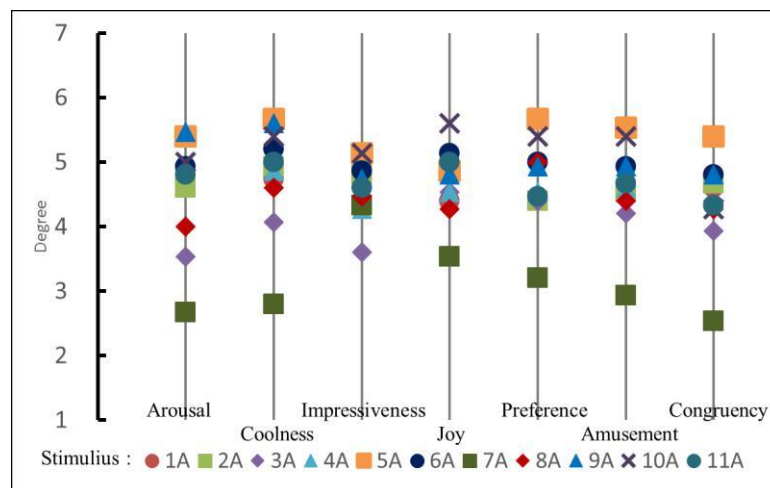


Figure 5: Overall ratings for each stimulus in Experiment 1

3. EXPERIMENT 2

3.1. Experimental Methods

The results in Experiment 1 showed that a musical piece might effectively replace the original piece for the video of "Attack on Titan", if similar structures was used throughout all the pieces. In this structure, the silence before the chorus may separate the connection between the verse and the chorus. Then, in Experiment 2, the verse part of the musical piece "ət'æk ɒn táɪtɪn" was consistently used for the preceding scene before the most exciting scene and the music was

switched to one of various pieces for the most exciting scene. The musical pieces used in Experiment 2 are listed in Table 2. All pieces commonly contained the structure, including the usage of female voices. The participants and the other experimental methods were identical to Experiment 1.

Table 2: Musical pieces used in Experiment 2

Stimulus ID	Musical pieces
#1B	ymniam-Mkorch
#2B	MKAlieZ
#3B	BRE@TH//LESS
#4B	Bios
#5B	KABANERIOFTHEIRONFORTRESS
#6B	Before my body is dry
#7B	Because of you (used in the drama, “ma-re”)
#8B	StarRingChild -English ver-
#9B	Uncontrollable

3.2. Results and Discussion

Figure 6 shows the arousal degrees. The arousal degree has raised significantly at the most exciting scene in all stimuli. However, the increase of the arousal is lower in the cases where the piece for “ma-re” (#7B) is used. Similarly, the increase of the comfort degree is lower in the piece for “ma-re” than the other pieces (Fig. 7).

Figure 8 shows the congruency between the music and video. In several cases, the congruency maintains in a high level after the piece was switched. However, in the case of #7B, where the piece for “ma-re” was used, the congruency declines after the piece was switched with “ət'æk ON táɪn”. This implies that the silence may not completely separate the verse and the chorus. The differences between the two pieces in various musical factors, e.g., tempo, key, timbre, etc., may decline the congruency between the music and video. In the case where the piece for “ma-re” was switched with “ət'æk ON táɪn” (#12B), the differences between the two pieces also negatively affected the congruency. Figure 9 shows that the overall ratings are very low in the case where the musical piece for “ma-re” was switched with “ət'æk ON táɪn”.

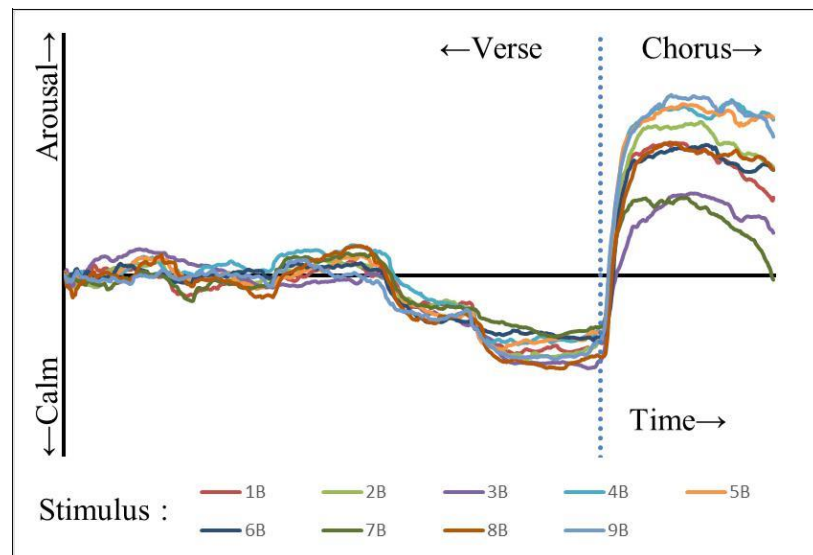


Figure 6: The arousal degree of each stimulus in Experiment 2

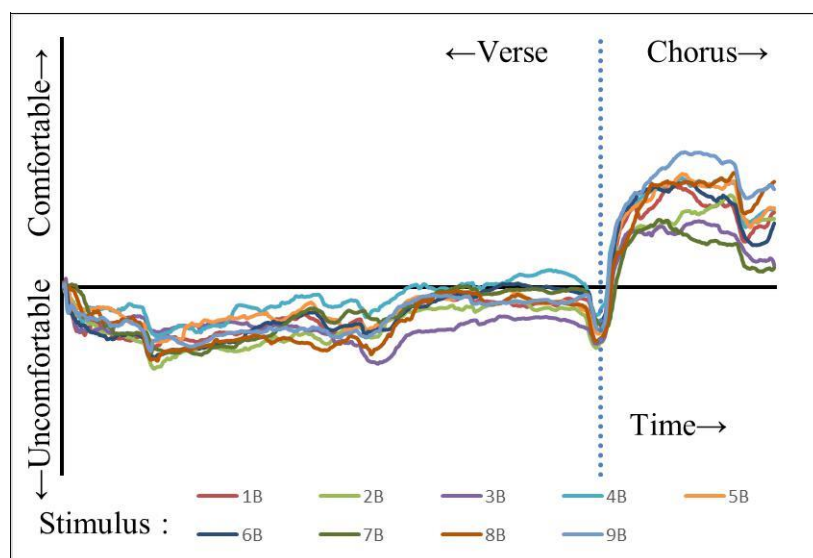


Figure 7: The comfort degree of each stimulus in Experiment 2

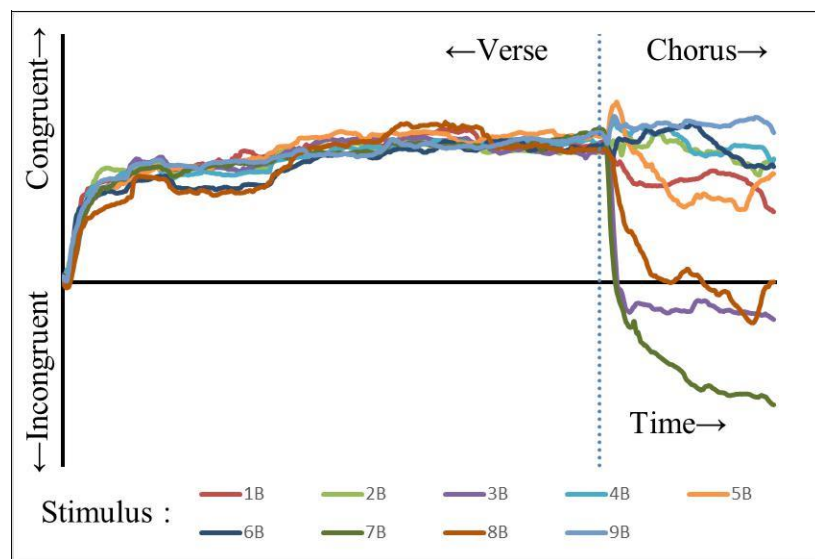


Figure 8: The congruency degree for each stimulus in Experiment 2

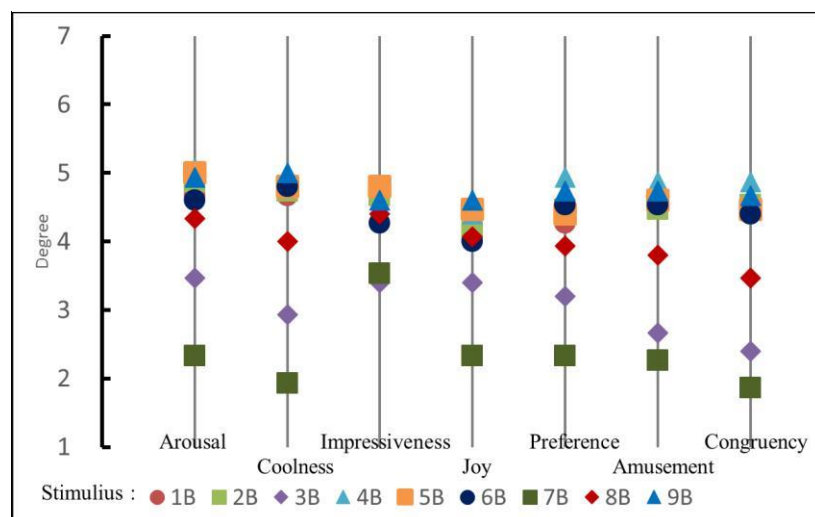


Figure 9: Overall ratings for each stimulus in Experiment 2

4. CONCLUSIONS

The musical pieces composed by Hiroyuki Sawano for anime and dramas shared a common structure in videos. In the present study, the correlation between the structure and the emotions was researched using an excerpt of the video of "Attack on Titan" and musical pieces composed by Hiroyuki Sawano. The results of the experiment strongly emphasised the arousal of the video and it led to a high congruency between the music and video and high degrees of overall ratings. It was also shown that not only the structure but also the emotional congruency between the music and the video was important for the overall ratings. Moreover, the results suggested that the silence at the end of the verse might not be completely separate the verse and the chorus.

5. REFERENCES

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