

Verbal Effect on Memorisation and Recognition of Wagner's Leitmotifs

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ABSTRACT

This study aims to investigate the different listening experiences of Richard Wagner's leitmotifs with and without verbal (external) information provided about the leitmotifs, their meanings and the librettos of the work. In the experiment half of the participants were asked to read and memorise written information about two leitmotifs, and then to listen to the two corresponding leitmotifs several times until they were memorised. The other participants were asked to perform the same task without reading the written information. A recognition task was then conducted, which instructed participants to listen to an excerpt from Wagner's *Das Rheingold* and respond with whether they noticed the two leitmotifs memorised during the earlier part of the experiment. The results showed that there was not a significant difference in recognition between the two groups of participants.

I. INTRODUCTION

Since the 19th century Wagner's leitmotifs have been given names, meanings and symbols associated with particular characters, objects, feelings or ideas by musicologists. This is despite the fact that Wagner himself had never intended his leitmotifs to be thought of in such a way. The concept of the leitmotif is complicated and is difficult to define as a simple sign (Sanko, 2002). However, leitmotifs have established themselves in the common knowledge of admirers and listeners, some of whom have tried to memorise particular leitmotifs using names and semiotic structures to locate them within a musical work (Isoyama, 1996). 'Verbal (external) Information' here refers to information that the leitmotifs have acquired through history; names, meanings of leitmotifs and explanations about leitmotif situations. How does this information influence the listening experience?

It is hypothesised that there may be two roles of this verbal (external) information; a guide to the way we feel about or interpret music and a series of pointers which help listening and recognising the structure of the musical works. Regarding the listeners' perceived impression from the similar leitmotifs, no significant effects of verbal information had been found (Morimoto, 2008).

However, if 'the listener who wishes to grasp the design of a work must first be able to identify fixed points and invariant foundations to build his organization around' (Deliège, 1992), then verbal information would be better able to effectively produce these 'fixed points'. A listener will better recognise and grasp the structure and intended direction of the music when these 'fixed points' (e.g. words or ideas) exist. Therefore, the information may assist the listener in memorising and recognising the leitmotifs during listening. Moreover, external information may make the music more

appealing to some listeners as it is able to provide them with a more accessible point for understanding the work.

I. Deliège's *Recognition of the Wagnerian Leitmotiv—Experimental Study Based on Excerpt from 'Das Rheingold'* (1992) inspired our study. The aim of Deliège's study was to 'develop the idea of cues as internal or external reference to the musical work.' In her study, a recognition experiment was conducted using Wagner's leitmotifs as cues. The participants were asked to memorise three leitmotifs selected from the second scene of *Das Rheingold*. Each participant was then asked to respond if they could recognise the three leitmotifs and their variations during the listening of a twenty-five minute excerpt that included the leitmotifs. The participants were divided into three categories: a group of professional musicians, music teachers and non-musicians. The difference in the number of leitmotifs correctly recognised among the three categories, often depended on the type of leitmotif. Musicians and music teachers were able to better grasp the beginning of the leitmotifs than the group of non-musicians. Yet regardless of music education, many participants tended to mistakenly recognise 'false' motifs that were similar to the three selected leitmotifs.

We conducted an experiment which developed Deliège's experiment to scrutinise the differences in listening experiences of Wagner's operas or music dramas with and without verbal (external) information. In this experiment, participants were asked to memorise two leitmotifs from Wagner's *Das Rheingold*, listen to an excerpt that includes the two leitmotifs and respond if they identify the leitmotifs during their listening. The method employed here followed Deliège's experiment. However, in order to investigate the differences between those who had been informed about the verbal information and those who had not, participants were divided into two groups; an experimental group (Group A) which was provided with the verbal information and a controlled group (Group B) which was not. If a listener memorises leitmotifs with verbal information, that is, its names, meanings and the story of the musical works, the leitmotifs may become more obvious cues, and a listener may be able to recognise the leitmotifs more easily than memorising them without any verbal information.

II. METHODS

The experiment used in this study was based on Deliège's experiment, but differed in that it attempted to identify how knowledge of leitmotifs affects recognition among listeners. This experiment consisted of four sections; a memorisation task, a memorisation test, a recognition task and a verbal information test. To begin with, participants were asked to memorise two specific leitmotifs. An excerpt of *Das Rheingold*, which includes the two leitmotifs, was played back over headphones. Participants were asked to press a button at

the moment when he or she detected either of the two leitmotifs. Half of the participants were informed about the leitmotifs' names and the narrative outline of the work, while the rest were not. Before and after the recognition task, a memorisation test was conducted in order to assess the memorisation of verbal information concerning the leitmotifs. The experiment was conducted individually in Japanese language.

A. Material

The two leitmotifs selected for this experiment are called the *Motif of a Contract* (Figure 1) and the *Motif of Freia* (Figure 2) from the second scene of Richard Wagner's *Das Rheingold*. The *Motif of a Contract* is a descending movement of cello and contra bass in unison. The scene begins with the appearance of the Giants brother, accompanied by the *Motif of the Giants* that consists of a characteristic appoggiatura and dotted rhythms by tutti. The *Motif of a Contract* follows, descending from the *Motif of the Giants*. At the same time *Fasolt* begins to sing "Sanft schloß Schlaf dein Aug'," which appears to make recognising the *Motif of a Contract* difficult because of both their temporal overlap and similarities.



Figure 1. Motif of a Contract

The *Motif of Freia* begins with ascending chromatic notes. Using different instrumentation (e.g. the contra bass, cello, viola and oboe), subtle changes in melodic organisation, pitch, modes and tonalities, the *Motif of Freia* is frequently varied unlike the *Motif of a Contract*, which remains melodically consistent played by the low strings. The *Motif of Freia* appears from behind the bass part when the Giant, *Fasolt* (bass) who has an affection for *Freia*, refers to women or love. These leitmotifs, shown to the participants during the memorisation task, were played and recorded in advance by the author using a synthesised piano sound.



Figure 2. Motif of Freia

A six and half minute excerpt from the beginning of scene two—the appearance of the Giants' brothers *Fafner* and *Fasolt*—up to just before *Froh*'s appearance was used in the recognition task. The music used was a 1967 recorded performance by the Chor und Orchester der Bayreuther Festspiele conducted by Karl Böhm. The reason for choosing this particular section of music was that the *Motif of a Contract* and the *Motif of Freia* reoccur many times—five and four times respectively—in the beginning of scene two. Moreover, the beginning includes several other leitmotifs, one of which is very similar to the *Motif of a Contract* called the *Motif of Execution* (Figure 3). The similarities between these two motifs challenged the participants in the way they were able to distinguish between the *Motif of a Contract* and the

Motif of Execution, and helped identify how verbal (external) information and impacted their own musical experiences and ability.



Figure 3. Motif of Execution

B. Procedure

For this experiment, 16 students studying composition, recording techniques and acoustics at Tokyo University of the Arts participated. They were divided into two groups; Group A, comprised of individuals who had been informed of the verbal information about the work and Group B, those who had not. Diagram 1 shows the experiment procedure of each group. The experiment was conducted individually in Japanese language, with the order of the memorisation test and the recognition task changed for each participant.

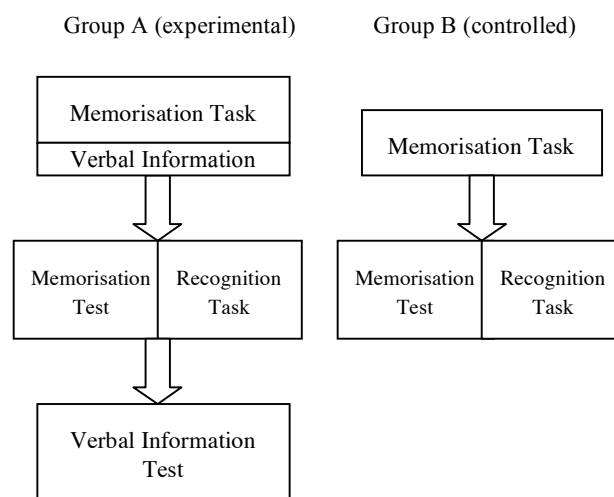


Diagram 1. Procedure of the experiment

1) Memorisation Task

The participants in Group A were instructed to read the explanation written in Japanese by the author about the story and the two leitmotifs, which referred to Sanko, et. al. (1992, 2002). The following is a translation from the original Japanese explanation:

"You will listen to two leitmotifs from Wagner's *Das Rheingold*. The scene of this story is the world of the Gods and Goddesses. *Wotan*, the leader of the Gods, offered the Giants to build his castle on the top of the mountain. The Giants wanted *Freia*, the Goddess of Beauty and *Wotan*'s sister-in-law, as payment. *Wotan* agreed to the promise, as he wanted his own brilliant castle. However, he regards the Giants as intellectual fools and he does not really have any intention of giving up *Freia* as she is his dear sister.

One day when *Frica*, who is a wife of *Wotan* and sister of *Freia*, woke up, she noticed the construction of the castle had been completed. She was astonished and panicked, and so complained to *Wotan* asking what he would do about the promise. While *Wotan* and *Frica* quarreled, *Freia* escaped

from the place and away from the chasing Giants. The Giant brothers, *Fafner* and *Fasolt* demanded that the promise be kept and that Freia be given to them.

The first leitmotif is called the *Motif of Freia*. Freia is the Goddess of Beauty, but is described as a slightly idiotic, delicate woman who struggles to deal with difficult situation on her own.

The second leitmotif is the *Motif of a Contract*. Wotan's power and control over the world is based on contracts with others."

The two leitmotifs were presented, and all participants in both Group A and B were asked to memorise them. Participants were able to listen to the leitmotifs as many times as they needed to in order to memorise them. The number of times of each participant listened to the material was recorded by the experimenter.

2) Memorisation Test

The memorisation test was conducted to check the memorisation and define the musical ability of participants. It was a listening test that required participants to listen to three motifs and choose one correct leitmotif that they had memorised, or write a cross if they thought there were no correct motifs. The *Motif of a Contract* and the *Motif of Freia* were tested separately. Three motifs made one set, two of which or all of them were 'dummy' motifs. The test consisted of 10 sets per leitmotifs, so each participant listened and answered to the total of 20 sets. The motifs shown to the participants were played and recorded in advance by the author using a synthesised piano sound.

3) Recognition Task

In the recognition task, an excerpt of *Das Rheingold* was played. Participants were asked to press a corresponding button on a musical keyboard when they recognised either of the two leitmotifs. The musical keyboard was connected to a Pro Tools audio system to accurately record their responses. The participants were instructed to consider transpositions and variations of each leitmotif as the same leitmotifs as the originals themselves. The excerpt that they were presented with was an actual performance, listened to through a pairs of audio headphones.

4) Verbal Information Test

The participants in Group A were tested on the understanding of external information. The written test consisted of a series of questions based on the information they had read in the memorisation task. There were 20 questions that asked, for example, the names of the Goddess of the Beauty or the reason for *Wotan's* refusal of the execution of the contract with the Giants. Participants were asked to write the answers within 10 minutes.

III. RESULTS

A. Memorisation Task

Figure 4 shows the results of the memorisation task. The whiskers indicate 95% confidence intervals about the means. The average number of listening times of the *Motif of a Contract* in both Group A and B was 3.75 and 3.25, and the

Motif of Freia was 3.75 and 3.63. The fewest numbers of listening times was 2, while the highest was 5.

ANOVA was run to compare the two groups, using a statistical software R. Table 1 shows the result. There were no significant differences between Group A and Group B in the average number of listening times; $F(3,28)=0.62, p=.61$.

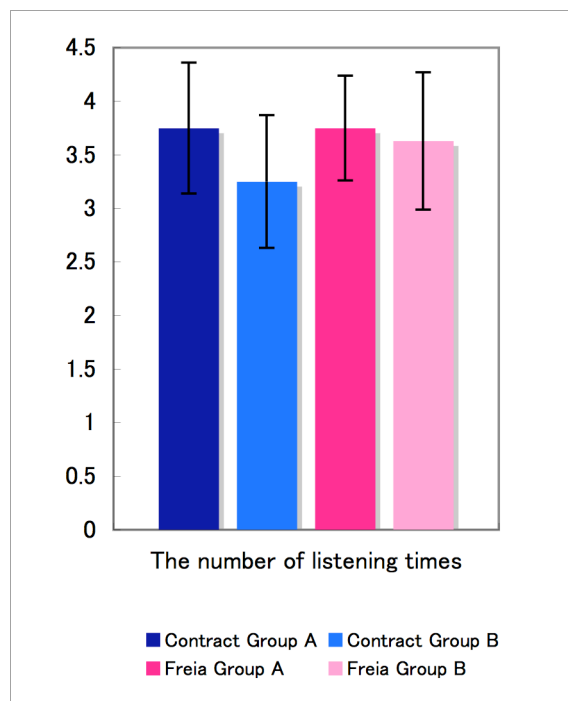


Figure 4. The average number and 95% confidence interval of listening times

Table 1. ANOVA table. The average number of listening times

	Df	SS	MS	F	p-value
Motif	3	1.34	0.44	0.61	0.61
Residuals	28	20.37	0.72		

B. Memorisation Test

The results of the memorisation test is summarised in Figure 5. The average scores of the *Motif of a Contract* of Group A and B was 9.75 and 9.25, and the *Motif of Freia* was 8.63 and 8.88 respectively. 75% (6 people out of 8) and 50% (4 people out of 8) of the participants in Group A gained full marks in the memorisation of the *Motif of a Contract* and the *Motif of Freia*, while the number of participants who answered all sets correctly in Group B was 4 and 3.

The result of ANOVA was shown in Table 2. No significant differences between two groups in the number of correct answers given was found; $F(3,28)=1.28, p=.30$. We can see from the results that the participants did not differ in their ability to memorise the leitmotifs.

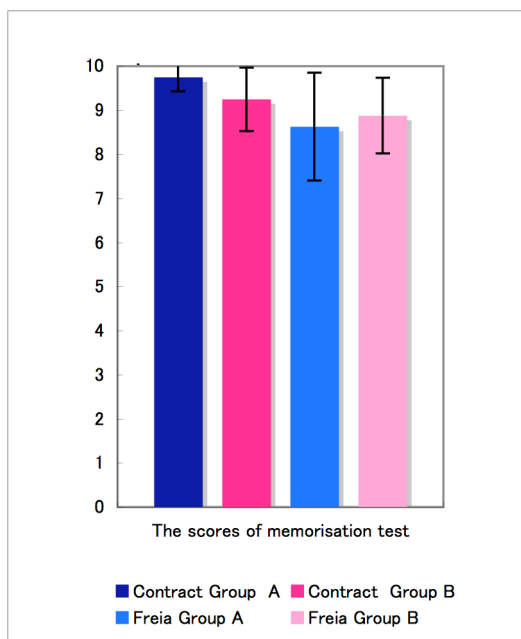


Figure 5. The average scores (max.10) and 95% confidence interval of memorisation test

Table 2. ANOVA table. The average number of correct answers

	Df	SS	MS	F	p-value
Motif	3	5.75	1.91	1.28	0.30
Residuals	28	41.75	1.49		

C. Recognition Task

The *Motif of a Contract* and the *Motif of Freia* appear five times and four times respectively in the six and half minute excerpt from the second scene of *Das Rheingold*. It was found that half of the participants identified the first appearance of the *Motif of a Contract*. 81 % of all participants (13 people out of 16) were able to recognise all other appearances of the *Motif of a Contract*. The Figure 6 shows the average rate of correct recognitions of all participants in Group A and Group B, which was 70% and 82% respectively.

The excerpt includes two appearances of the *Motif of Execution*, which begins with ascending dotted rhythms before descending. The *Motif of a Contract* only descends. 5 of the 16 participants responded at the time of its first appearance. This number decreased to 3 when the motif made its second appearance. The first appearance of the *Motif of Execution* is played canonically, preceded by the Bass part (“weißt du nicht offen, ehrlich und frei”), with cellos and contra basses following. The song and the instruments play the descending part together, so the ascending dotted rhythms of the beginning becomes less audible than those of the descending part.

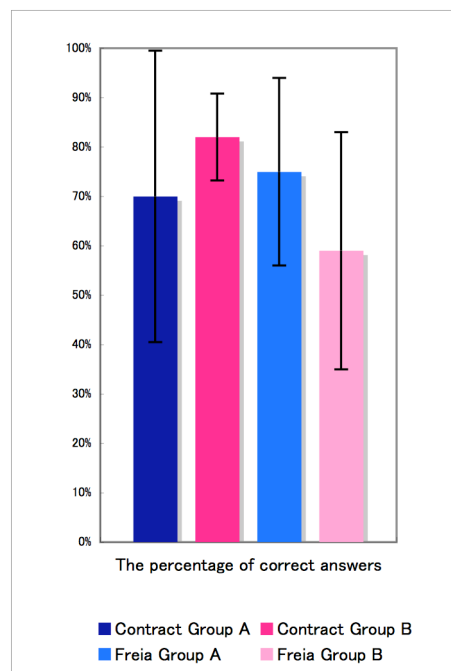


Figure 6. The average percentage and 95% confidence interval of correct answers

The second appearance of the *Motif of Freia* proved to be the most difficult one to recognise for the participants. The violas starts ascending from the subdominant (F) and when it reaches the tonic (C) in the next bar, the cellos continue the *Motif of Freia*, before descending to an end, making the overall structure reminiscent of a turn on a single note. It was found that 37% of the participants (6 people out of 16) responded to this statement, while more than 12 participants were able to recognise the other three statements of the *Motif of Freia*. The average percentages for correct recognitions among all the participants in both Group A and Group B was 75% and 59% (Figure 6).

Welch’s *t*-test was used to compare the differences between the two groups in respect to the rates of correct recognition. The *Motif of Freia* and the *Motif of a Contract* appear 4 and 5 times respectively in the excerpt presented to the participants. The results were measured using a percentage of correct answers. No significant differences were found in both leitmotifs; the *Motif of Freia*, $t(13)=1.00, p=.34$. the *Motif of a Contract* $t(9)=-1.07, p=.31$.

D. Verbal Information Test

The result of the verbal information test for Group A shows that most participants could understand and remembered the story and the background knowledge of the two leitmotifs. The average score was 16 out of 20. With the lowest and the highest scores being 13 and 20 respectively, half of the participants in Group A made good scores of more than 19.

IV. DISCUSSION

The results of the memorisation task and memorisation test presents that there were no significant differences in the ability of memorising two leitmotifs between participants in

Group A and Group B. However, no significant differences were found in the recognition test, though participants in Group A were able to understand and remember the verbal information. Yet, it may be premature to conclude that external information has little or no effect on the listening experience.

V. CONCLUSION

How do our listening experiences of Wagner's operas or music dramas differ when we have been informed about the verbal (external) information and when we have not? The experiment was conducted, using Wagner's leitmotifs and an excerpt from *Das Rheingold*. In the memorisation task, half of the participants (8 people) in an experimental group (Group A) were asked to memorise two leitmotifs and their verbal information, whereas the rest (a controlled group, Group B) performed the same task without verbal information. Then, in the recognition task all participants were asked to listen to a six and half minute excerpt which includes the two leitmotifs from *Das Rheingold* and press a button if they identify the two leitmotifs. Before and after the recognition task, memorisation test was conducted in order to check the extent of memorisation of the two leitmotifs. Participants in Group A were also tested on their understanding of the verbal information.

The results produced by the experiment are followings; participants in both groups did not differ in memorising the two leitmotifs, and there were no significant differences in recognition between Group A and Group B. We cannot see the differences in the listening experience with and without verbal information.

However, the recognition task revealed an interesting listening behaviour, where listeners appeared to focus on slightly different parts of the music according to the instrument that each participant was practicing at the time. For example, an individual who plays the violin tended to easily recognise the leitmotifs played by the violin and/or viola, whereas the same individual struggled to identify leitmotifs performed in different instrument groups, such as those in the contrabass parts. It would appear that we are sensitive to those instruments whose sounds we encounter frequently in our lives.

This experiment was complex and required the participants to perform a series of different tasks. Improvements to the experiment will be required in order to investigate more thoroughly the effects of semantics and contextual information on the listener. Francés remarked that 'the decisive effect of verbal instructions on those (=semantic) inductions leads to the thought that different psychological states can occur in relation to the same musical structure' (Francés, 1958. 1988.). It is thought then that information does play a significant role in shaping our listening experience, not only in our memory and recollection of material but also through our subjective impressions and emotions of musical content. This will be studied in future researches.

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