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The Effects of Structural Interventions in the First Movement of Mozart's Symphony in G Minor K. 550 on Aesthetic Preference

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In a debate in this journal concerning the importance of structure in the effects of musical compositions, Robert Batt suggested the first movement of Mozart's Symphony in G Minor K. 550 as the ideal example on which research could contravene the minimal effects of structural interventions that have been observed in prior research by Konečni. This article reports the results of putting Batt's suggestion to empirical test. As Batt pointed out, the first movement of K. 550 can be broken down into nine segments that can be broadly defined as expository (two themes), developmental, and recapitulative (two themes). The original and four differentially intrusive versions of the piece were presented to 42 college non-music-student subjects and 11 college music-student subjects. On the dimensions of pleasingness, interestingness, and a desire to own a copy of the piece, the original version consistently failed to elicit greater preference than the altered versions did in both subject populations, although all versions were much liked by these non-musician and musician subjects.

In an article generally concerning the importance of structure for aesthetic appreciation in a number of art forms, Konečni (1984) showed that drastic global structural alterations of Beethoven's string quartets and piano sonatas resulted in no measurable advantage for the original versions. In a later study, Gotlieb and Konečni (1985) examined related issues in what is universally recognized as the pinnacle of structural design achievement of baroque music, namely Johann Sebastian Bach's great Goldberg Variations (Gould, 1955; Terry, 1963). In this research, regardless of instrumentation and playing style (seven different recordings were used), the original was not preferred to the altered versions. The alterations included a randomly scrambled order of the 30 variations between the introductory and concluding arias, a similar ordering except with both arias positioned in the middle of the piece, and the isolation and reordering of two triplet sets of variations. It is important to note that

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although the subjects were not music experts, they certainly had no aversion to baroque music. On the contrary, all the versions received high ratings on the scales of warmth, pleasingness, and interestingness.

In the Winter 1987 issue of *Music Perception*, Batt criticized the tenor of this earlier work. He especially focused on the alleged unsuitableness of the Goldberg Variations as a vehicle to test the importance of structure: "Such works are usually based on a self-contained, and even preexisting, theme; to the extent that each variation has the same form, harmonic and melodic structure, and is in the same key, each variation is also self-sufficient" (Batt, 1987, p. 210). Batt claimed, therefore, that the Goldberg Variations could be altered without negative impact to the natural progression of the work because of the variations' independence.

As a proper test, Batt suggested the first movement of Mozart's Symphony in G Minor K. 550. As he pointed out, "altering the order of sections within a movement will permit the investigation of music in which the complete spectrum of tonal channels of structure is operative" (Batt, 1987, p. 212). Furthermore, "Not only could the order of the exposition, development, and recapitulation be altered, but the order of the four sections within the exposition and, separately, within the recapitulation could be altered" (Batt, 1987, p. 212). Clearly, Batt implied that this work would be ideal for a study of this nature.

In the rebuttal to Batt's article, Konečni (1987) outlined an experiment that would put Batt's suggestion to the test (see footnote 1, p. 215) and invited Batt to do it. Since this has not been forthcoming, we have done it ourselves.

Study 1

METHOD

Stimulus Materials

Five versions (the original and four "doctored" ones) of the first movement of Mozart's Symphony in G Minor (no. 40) K. 550¹ were used in this study (Table 1). In Version 2, the order of the themes within both exposition and recapitulation was changed, and in Version 3 all nine sections were randomly arranged. In Version 4, the order of sections within exposition and recapitulation was random, and in Version 5 the order of the exposition, development, and recapitulation was rearranged while leaving the order of the themes in each intact. In making Versions 2 through 5, every attempt was made to reduce signs of modification.

Rating Instruments

Subjects evaluated each variation of the piece on the following three 200-mm bipolar scales: pleasing/not pleasing, wish to own/do not wish to own a recording, interesting/not

1. The piece was performed by the Orchestra of the 18th Century on period instruments and was conducted by Frans Bruggen. Philips recording, 5/1985.

interesting. The positive and negative extremes of the various scales were alternated on the answer sheets to minimize bias. Subjects made their evaluations upon completion of each variation. These evaluations were then measured to the nearest millimeter for the data analysis. In addition, subjects reported which variation they perceived to have the best structure.

Subjects and Experimental Design

Subjects for this study were a total of 42 male and female undergraduate students from the University of California at San Diego.² Subject comments on rating sheets indicated they had little to no knowledge of the symphony movement. A within-subjects design was used in which each version was heard by every subject. To minimize order (especially primacy and recency) effects, we randomly assigned subjects to one of three different groups (Table 2). The music was played at a comfortable listening level. No title was given to the work.

TABLE 1
Structural Arrangements in the Five Experimental Versions

Version	Elements
Original	Exposition: theme 1, transition, theme 2, closing, Development, Recapitulation: theme 1, transition, theme 2, closing
Version 2	Exp.: theme 2, transition, theme 1, closing, Dev., Recap.: theme 2, transition, theme 1, closing
Version 3	Recap.: theme 1, Exp.: theme 1, closing, Dev., Recap.: transition, closing, Exp.: transition, Recap.: theme 2, Exp.: theme 2
Version 4	Exp.: transition, theme 1, closing, theme 2, Dev., Recap.: theme 1, closing, transition, theme 2
Version 5	Dev., Recap.: theme 1, transition, theme 2, closing, Exp.: theme 1, transition, theme 2, closing

NOTE: The specific bar numbering of the first movement of K. 550, as specified by Batt, is as follows: Exposition: theme 1 (mm. 1–20), transition (mm. 21–43), theme 2 (mm. 44–72), closing (mm. 72–99); Development (mm. 100–163); Recapitulation: theme 1 (mm. 164–183), transition (mm. 184–226), theme 2 (mm. 227–260), closing (mm. 260–299).

TABLE 2
Order of Versions Heard by Each Non–Music-Student
Experimental Group

Order	Presentation Sequence				
A	Version 1	Version 4	Version 2	Version 3	Version 5
B	Version 3	Version 4	Version 5	Version 1	Version 2
C	Version 2	Version 4	Version 3	Version 5	Version 1

2. We thank David Summers for his assistance in conducting this experiment.

Subjects were told the following:

You will be presented with a series of groupings of music segments. While there will be a slight disruption in the flow of what you hear, please keep your attention focused on the music. After hearing each group of music segments, you will be asked to rate them on four scales [hand out rating sheets.] Please avoid the scale ends on each measure, because you may prevent yourself from responding higher or lower on a subsequent group. Each group of music segments will last approximately 6 min.

RESULTS

Although this composition was singled out by Batt as one the enjoyment of which would be strongly affected by structural modifications, subjects' ratings were minimally influenced by the drastic alterations. The results are presented in Tables 3–5. There were no significant main effects for either the Order or Version factors. However, there were highly significant interactions between these two factors on all three measures (see notes to Tables 3–5). These interactions can be clearly interpreted as strong primacy effects. When the original version was heard first (Order A), subjects rated it higher than all four altered versions on each of the three dependent measures. Furthermore, the original was significantly preferred over only three of the four other versions, specifically, those heard second, fourth, and fifth (using Duncan's Multiple Range test, Original > Version 4, $df(4,65)$, $p < .05$; Original > Version 3, $df(3,65)$, $p < .05$; and Original > Version 5, $df(5,65)$, $p < .05$, respectively).

However, these primacy effects were just as strong for versions other than the original. Subjects listening to Orders B and C—where the version heard first was not the original—also rated the version heard first the highest (Versions 3 and 2 were heard first in Orders B and C, respectively).

TABLE 3
Treatment Means (Standard Deviations) for "Pleasingsness"
Measure of Non-Music-Student Subjects

Order	Version					Mean Totals
	1	2	3	4	5	
A	134.69 (46.13)	114.00 (48.80)	111.92 (50.05)	105.08 (57.74)	91.46 (57.69)	111.43 (52.58)
B	100.57 (52.52)	96.50 (53.05)	121.57 (28.53)	118.07 (30.92)	105.79 (39.23)	108.50 (42.07)
C	120.27 (43.36)	141.00 (32.89)	109.60 (49.14)	112.47 (38.18)	126.87 (48.69)	122.04 (43.24)
Mean Totals	118.17 (48.31)	117.81 (48.12)	114.31 (42.94)	112.05 (42.49)	108.88 (49.89)	114.24

NOTE: The higher the number (0–200), the more pleasing the version was found by the subjects. Interaction: $F(8, 156) = 4.095$, $p = .0002$.

