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# Empirical Aesthetics and the Philosophy of John Cage: A Literature Review and Experimental Study

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EMPIRICAL AESTHETICS AND THE PHILOSOPHY OF JOHN CAGE: A LITERATURE  
REVIEW AND EXPERIMENTAL STUDY

by

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A project submitted in partial fulfillment  
of the requirements of the University Scholars Program

Seattle Pacific University

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## ABSTRACT

This paper examines the musical philosophy of composer John Cage in terms of psychological theories and experimental design. A literature review was first conducted to extract testable hypotheses from Cage's musical works, writings, and interviews relevant to theories and research in empirical aesthetics. A study was then devised to examine the relationships between cognitive appraisals of the interestingness, enjoyableness, orderliness, and musicality of general sound events, as well as to determine the influence of openness to experience and the effect of two intentional-listening strategies, inspired by Cage's ideas, on these relationships. Participants ( $n = 21$ ) completed an openness to experience questionnaire, listened to 20 sound recordings, and responded to each sound on a cognitive appraisal form. Participants were also randomly assigned to one of three groups ( $n = 7$ ) and were encouraged to adopt one of two intentional listening strategies, or no strategy, depending on assignment. The analysis found significant relationships for interestingness, enjoyableness, and orderliness in predicting musicality, though scatter plot distributions suggest that orderliness is less essential to musicality than interestingness and enjoyableness. Openness to experience was found to be insignificant for all appraisals and relationships, as were the listening strategies, with one exception: appraisals of interestingness were found to decrease as a result of adopting a Cage-inspired listening strategy, though the validity of this result is suspect.

## TABLE OF CONTENTS

List of Figures .....	iii
List of Tables .....	iv
Acknowledgements .....	v
INTRODUCTION .....	2
Background .....	2
Purpose of this Paper.....	3
John Cage’s Musical Philosophy .....	4
Theoretical and Empirical Support .....	8
Gaps in the Literature.....	10
Present Research .....	10
METHOD.....	11
Participants.....	11
Sounds .....	11
Measures .....	12
Listening Strategies .....	12
Procedure .....	13
Goals of Analysis .....	13
RESULTS .....	14
Appraisal Predictors of Musicality .....	14
Openness to Experience .....	14
Listening Strategies.....	15
DISCUSSION .....	16
Limitations .....	18
Conclusions .....	18
REFERENCES.....	20
APPENDIX A: Figures .....	23
APPENDIX B: Design Materials.....	24

## List of Figures

Figure 1. Scatter Plots of All Cognitive Appraisals with Musicality.....	23
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## List of Tables

Table 1 Appraisal Means and Standard Deviations.....	15
Table 2. Between-Group Tests of Significance (ANOVA).....	15
Table 3. Post-Hoc Tests of Significance and Effect Sizes.....	16

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EMPIRICAL AESTHETICS AND THE PHILOSOPHY OF JOHN CAGE: A LITERATURE  
REVIEW AND EXPERIMENTAL STUDY

## INTRODUCTION

### Background

John Cage (1912-1992) was an American composer of avant-garde music known for incorporating non-traditional sounds and elements of chance into his often highly conceptual work. A notable example of this is *4'33"*, arguably Cage's most well-known composition. Premiered in Woodstock, New York in 1952, it is a three-movement piece that contains no notated notes or rhythms; instead, it instructs the performer to maintain silence for four minutes and thirty-three seconds. As a result, the audience are given the opportunity to listen to the sounds that naturally occur in the performance space, or which they themselves make, and consider them as music. As Cage noted about the premiere:

there's no such thing as silence... you could hear the wind stirring outside during the first movement. During the second, raindrops began pattering on the roof, and during the third, the people themselves made all kinds of interesting sounds as they talked or walked out (Kostelanetz, 1988, p. 65).

The premiere reportedly "infuriated" and "dismayed" most in attendance (Revill, 2014, p. 166), which was to be expected. While the program that day featured experimental music both by Cage and his contemporaries in the avant-garde (Gann, 2014), no one in attendance could have anticipated a piece of music defined only by length and made up entirely of unintended sounds. This performance reportedly lost Cage the valued friendships of those who "thought that calling something you hadn't done, so to speak, music was a form of pulling wool over their eyes" (Kostelanetz, 1988, p. 66).

However, Cage's stated intention for the performance was not to provoke controversy. Rather, he hoped to encourage the audience members to listen in a new way - to listen to the incidental sounds occurring in their immediate environment and consider them as music (John Cage Trust, 2013). In this light, *4'33"* can be interpreted as an argument for a definition of music that does not require sound to

be intentionally organized. And while this is often taken to mean that “all sounds are music” (Gann, 2014, p. 11), it more accurately grants all sound the potential to be experienced as music. Since this potential is realized by the individual listener - for example, a sound can be music to one person but mere noise to another - *4'33"* essentially identifies music not with an objective reality defined by a composer or by convention, but with subjective, phenomenal experience.

### **Purpose of this Paper**

Given the level of debate and controversy surrounding *4'33"*, and the subjective nature of musical philosophy, a discussion of Cage's ideas would benefit from a more objective analysis. Fortunately, Cage's ideological recast of music as musical experience provides a potential solution to this epistemological problem. While the question, “what is music?” tends to rely on aesthetic philosophy, the question, “what is the musical experience?” can appeal to branches of psychology dedicated to art and art experiences, such as empirical aesthetics. While this sort of analysis has not been previously explored, it is my view that empirical aesthetics can comment meaningfully on Cage's ideas.

The purpose of this paper is not to define musical experience, but to identify its salient characteristics according to John Cage and to determine whether or not his ideas are supported by psychological theories and research. A few limitations regarding this approach should be admitted. First, Cage never systematically or expressly outlined his musical philosophy, so I have relied on scattered writings and interview snippets in order to assemble a coherent system of thought. This assumes that while Cage's music may have gone through various phases throughout his career, his underlying philosophy has remained relatively consistent. Second, while Cage wrote and spoke about both musical experience and general aesthetic experience, I have pulled supporting quotes from each under the assumption that they are consistent with and generalizable to one another. And third, while many of Cage's statements about aesthetic and musical experiences concern his own habits, I have treated these statements as generalizable to broader human experience. Despite these concerns, I

believe this approach can meaningfully capture Cage's thoughts on musical experience in psychological terms, and that these thoughts may yield testable hypotheses.

### **John Cage's Musical Philosophy**

Foundationally, all of Cage's statements about the musical experience involve an individual listener, a physical vibration, and a sensory experience of sound. This should come as no surprise - logically, a definition of musical experience should require a sound experience of some kind. Whether or not the experience of sound arises from vibrations detected by the ear or from the brain's memory, which Cage challenges later on, is secondary to this foundation.

But what separated Cage from his contemporaries was his view that attention to one's sensations was all that was required for a sound experience to be musical, and that any further mental processes, such as meaning-making, only limited the types of sounds that could be experienced as music. He gave an example of this in a 1969 interview with Don Finegan et al.:

What distinction between music and sound is: if I rent a car and when I put on the breaks and they squeak and the whole car shakes, then the squeak is indicative of some malfunction of the car, and so stops me from using my aesthetic faculties. But otherwise, I would include the very same sound if it didn't have all those other danger signals connected with it (Kostelanetz, 1988, pg. 231).

In this example, Cage describes how using his "aesthetic faculties," or listening musically, is subverted by automatic interpretations of a sound's meaning. According to aesthetic theorist Leonard B. Meyer, meaning in sound can be divided into two categories, *designative* and *embodied*. Here, Cage is rejecting the importance of designative meaning, or a sound's source, cause, or symbolism (Meyer, 1956, 1957) in shaping the musical experience. This alone was not a revolutionary idea - Western composers have long debated over whether music can represent something outside of itself (e.g. programmatic music), or whether its only meaning is its sound (e.g. absolute music). Cage merely extended the implications of absolute music to suggest that any sound listened to without interpreting

its designative meaning can be heard as music, regardless of whether it originated from a musical instrument or was intended by a composer. As he explained in a 1983 interview with Stuart Smith, “I just mean accepting the fact that noises are sounds and that music is made with sounds, not just musical sounds” (Kostelanetz, 1988, pg. 61).

Cage’s rejection of meaning in music also extended to embodied meaning, or a sound’s organizational relationships to itself and other sounds in time. Relationships like these, such as tonality and rhythm, allow the brain to make sense of sounds and predict how they will unfold over time (Meyer, 1956, 1957). But, as with designative meaning, Cage felt that focusing on embodied meaning limited one’s musical appreciation for sound only to those organized by stable tonal or rhythmic relationships. For example, he argued in the interview with Don Finegan et al. with regard to tonal expectancy:

my point has been that we don’t hear anything until it is audible. At least I don’t. And if I did hear something before it was audible, I would have had to take *solfège*, which would have trained me to accept certain pitches and not others. I would then have found the environmental sounds off tune, lacking tonality. Therefore I pay no attention to *solfège*. I don’t have perfect pitch; I simply keep my ears open, my mind empty but alert. Period. And the result is that I can hear things that are off tune, on tune (Kostelanetz, 1988, pg. 227-228).

This quote reflects both Cage’s general dislike of traditional music education as well as its emphasis on predicting relationships between sounds. His argument is simple: while traditional music is constructed from agreed-upon tonal and rhythmic relationships, most environmental sounds are not. Therefore, if one wants to have musical experiences with general sound events, it is self-defeating to try to discern rhythm, tonality, or other orderly relationships in them. Instead, Cage proposed that any and all sounds can be heard musically when listened to with open ears and an empty, alert mind.

What does it mean to have open ears and an empty, alert mind? For Cage, the terms openness and emptiness were nearly synonymous and referred to one’s acceptance of sensory perceptions

without expectation or preference. For example, one might normally have preconceived notions of whether a given sound is music, or ideals of what a musical sound should be, and may base their liking or disliking of the sound based on whether or not the sound meets those expectations. However, Cage referred to this sort of listening as “narrow-minded,” and believed “you can become open-minded, literally, by giving up your likes and dislikes and becoming interested in things. I think Buddhists would say, ‘as they are in and of themselves’” (231). In other words, he felt that any evaluation of sound based on external criteria were impositions of the listener and did not reflect the sound itself.

Cage often referred to approaching “each sound as itself” in his own listening (Kostelanetz, 1988, pg. 227), by which he meant the raw perception of the sound. He believed a sound was entirely defined by physical properties as received by the ear, which he identified as “pitch, duration, overtone, and amplitude” (Kostelanetz, 1988, p. 60). Cage believed that these four pieces of information constitute a sound, while anything the brain does with it afterward - such as identifying, interpreting, or trying to predict it - is auxiliary. As he expressed in his 1967 book *A Year from Monday*, Cage felt that his music was helping to:

liberate sounds from abstract ideas about them and more and more exactly to let them be physically, uniquely, themselves. This means for me: knowing more and more not what I think a sound is, but what it actually is in all of its acoustical details and then letting this sound exist, itself, changing in a changing sonorous environment (Cage, 1967, p. 100).

Importantly, Cage felt that this way of listening was an active process that causes change in the listener. As he shared in two interviews, “the best way to be ready for a new experience is to be attentive and empty,” and “music is about changing the mind - not to understand, but to be aware” (Kostelanetz, 1988, p. 235, 212). That is, though listening to each sound as itself does not require the brain to interpret sound, it still requires the listener to pay active attention to it. And as a result of this effort, Cage believed a change took place in the listener - i.e. the way they listen after hearing a sound

as itself is different from the way they listened beforehand. Specifically, he felt that listening in this way increased the range of sounds one considers beautiful.

Cage also had a unique, deconstructive take on the concept of beauty. As he shared in a 1983 press conference, “we say, when we like a work of art, that it is beautiful; but what we mean is that it’s interesting, because the word ‘beauty’ has no meaning other than we approve of it; the only reason we approve of it is because it keeps our attention” (Kostelanetz, 1988, p. 185). Beauty, arguably the central concept in aesthetics, is regarded here as that which makes a stimulus worthy of attention. This is consistent with Cage’s ideas so far, which hold that musical listening can be reduced to attentive perception. And though this can be seen as a devaluation of beauty, Cage conceived it as an expansion, a conceptual means of broadening his experiences of beauty to all perceptions. As he once shared, “the first question I ask myself when something doesn’t seem to be beautiful is why do I think it’s not beautiful. And very shortly you discover there is no reason” (Larson, 2012, p. 313).

Cage’s identification of beauty with interest and attention touches on the final major component of his thoughts on musical listening: the qualities of the experience itself. A way to approach this within a psychological framework is to ask: what states tend to accompany musical experiences? From Cage’s own account, musical experiences with sound are typically accompanied by both *interest* in the sound and *enjoyment* derived from perceiving it. For example, in a 1982 interview, he referred to listening to sound in the manner of a constant performance of *4’33”* as “the source of my enjoyment of life” (Gann 2010, p. 186). Consistent with his view that raw perception is the only necessary component of art experiences, this enjoyment seems to arise from perception alone. In the French documentary *Écoute*, he remarked that sounds don’t “have to mean anything... in order to bring us deep pleasure” (Sebastik & Grange 1992), and in a similar statement about film, which can be regarded as a visual analog of music, “I enjoy all of it. Many people enjoy poor film. I, with them, am overcome by the pleasure of simply looking at moving images” (187). The following statement from Cage makes

the connection between enjoyment and aesthetic appreciation of both music and all other art experiences clear:

It seems to me to have been the effect of modern art in this century to change our way of seeing such that wherever we look we may look aesthetically. This is what is happening in the field of music, now, and when it finally gets around to all of our ears, we will discover that our ears are open to ambient sound, no matter where we are and that we will be able to enjoy it aesthetically. This also applies to theater. In other words, wherever you are you will be able to look, listen, et cetera, to the experience around you aesthetically (Kostelanetz, 1988, p. 281).

Interest also features prominently in Cage's experience with sound. As he shared in a 1973 interview, "noises delight me, each one interests me" (Kostelanetz, 1988, p. 60). Interest, as with broader aesthetic experience, seems to depend on the way one listens. In his 'Credo: The Future of Music' published in *Silence*, he argued "wherever we are, what we hear is mostly noise. When we ignore it, it disturbs us. When we listen to it, we find it fascinating" (Cage, 1961, p.3). This is consistent with his argument that musical experiences occur when listening to sounds without interpreting meaning, and suggests that we find environmental noises most interesting when we intentionally listen to them rather than try to ignore them. Since in Cage's reported experience, both interest and enjoyment tended to occur with musical experiences, I believe it is fair to say that these experiences are characteristic of musical listening.

In summary, Cage believed that musical experiences occur when intentionally listening to the physical properties of a sound without interpreting the sound's embodied or designative meaning and that this process expands the range of sounds one finds beautiful, i.e. interesting and enjoyable.

### **Theoretical and Empirical Support**

In various respects, theories and research in empirical aesthetics both agree and disagree with Cage's thoughts on musical and aesthetic experience. With regard to Cage's emphasis on interest and enjoyment, most theorists dating back to D. E. Berlyne have operated under a similar assumption that

interest (also referred to as *aesthetic fascination*) and enjoyment (also referred to as *hedonic tone*, *pleasingness*, or *liking*) are fundamental states of aesthetic experience (Nusbaum & Silva, 2014). Some researchers have placed greater emphasis on enjoyment (Shimamura, 2002), others on interest (Tan, 2000), while still others integrate the two (Graf & Landwehr, 2015). Supporting this assumption, a 1994 study found strong correlations between evaluations of preference and both pleasingness and interestingness in listening to music (Russell, 1994), though few other studies have directly investigated the relationship between interest, enjoyment, and aesthetic experience. Though other ‘unusual states’ like chills and feelings of awe (Nusbaum & Silva, 2014), and even negative emotions like disgust (Silva & Brown, 2007) are also thought to be a part of the aesthetic experience, the assumption that musical experiences of environmental sound are primarily characterized by traditional aesthetic states like interest and enjoyment has theoretical and some empirical support.

A small number of studies have investigated emotional experiences with environmental and meaningless sounds, but none have specifically addressed aesthetic experience. In general, research on stimulus factors related to interest and enjoyment in art tend to highlight the adeptness of organized music over noises for eliciting these responses. This can be attributed to higher levels of discernible order (or, embodied meaning) in music compared to environmental sounds. For example, theories of music-induced pleasure tend to emphasize prediction effects - that is, fulfillments and violations of expectancy (Vuust & Kringelbach, 2010; Meyer, 1956; Salimpoor, Zald, Zatorre, Dagher, & McIntosh, 2014; Zatorre & Salimpoor, 2013). Since prediction requires a high degree of order, and since human music is often structured by steady rhythms and tonal scales, traditional music is likely more sensitive to prediction effects than environmental sounds. Similarly, studies on interest in visual art highlight the importance of coherence and comprehensibility (Silva 2005), which in music presumably rely on the same elements of structure that govern prediction effects. In other words, the structure of music is likely what makes it both interesting and enjoyable for the common listener, which challenges Cage’s dismissal of embodied meaning in creating interesting and enjoyable musical experiences.

With regard to the concepts of openness and emptiness, a number of studies have explored the relationship between the personality trait *openness to experience*, which has been linked to “increased aesthetic sensitivity, active imagination, curiosity, creativity, and awareness of inner feelings” (Ladinig & Schellenberg, 2012, p. 147) and musical-aesthetic experiences. They suggest that openness to experience is positively related to aesthetic chills (Colver & El-Alyli, 2015; Nusbaum & Silva, 2010; Silva & Nusbaum, 2011; McCrae, 2007), feelings of awe (Silva, Fayn, Nusbaum, & Beaty, 2015), and liking for novel, intense and/or complex music (Hunter & Schellenberg, 2011; Ladinig & Schellenberg, 2012; Nusbaum & Silva, 2010). Assuming that openness to experience at least partially corresponds to Cage’s concept of openness and emptiness, these studies support his idea that openness and emptiness are related to aesthetic appreciation for general sound events.

*Gaps in the Literature.* As previously mentioned, most empirical research on aesthetic experience has been conducted with visual art, and few have directly measured and compared the relationship between interest, enjoyment, order, and aesthetic experience. Of studies on aesthetic experiences with music, none concern environmental sounds. And lastly, few studies have investigated the effect of intentional listening strategies on aesthetic experience. While one study tested the effect of attentional focus on aesthetic experience, this focus was on traditional musical concepts in classical music (Madsen, 1997), and so does not strongly relate to Cage’s ideas.

### **Present Research**

The present research seeks to fill the above gaps in the literature by studying the relationship between cognitive appraisals of interestingness, enjoyableness, orderliness, and musicality of various general sound events. Additionally, it seeks to test the effect of listening strategies inspired by John Cage’s listening practices as well as the influence of the personality trait ‘openness to experience’ on these appraisals. The following hypotheses, designed to reflect Cage’s views, are proposed:

First, appraised musicality of sound events will be predicted by appraisals of interestingness and enjoyableness, but not orderliness. Second, a listening strategy that focuses on the physical properties of sound will increase appraised musicality, interestingness, and enjoyableness, but not orderliness, relative to a control condition. Conversely, a listening strategy that focuses on orderly relationships in sound will decrease appraised musicality, interestingness, and enjoyableness, but not orderliness, relative to a control condition. Third, a listening strategy that focuses on the physical properties of sound will increase the strength of prediction of musicality by interestingness and enjoyableness, while lowering prediction by orderliness, relative to a control condition. Conversely, a listening strategy that focuses on orderly relationships in sound will decrease the strength of prediction of musicality by interestingness, and enjoyableness, while increasing prediction by orderliness, relative to a control condition. And fourth, openness to experience will predict higher appraisals of musicality, interestingness, and enjoyableness, but not orderliness. Similarly, openness to experience will predict strength of prediction for musicality by both interestingness and enjoyableness, but will negatively predict strength of prediction for musicality by orderliness.

## METHOD

### Participants

Participants were 21 music students from Seattle Pacific University over the age of 18.

### Sounds

20 sound recordings were used (see Appendix B). Sound files were downloaded from the online collaborative repository *freesound.org* and were chosen to reflect a range of natural sounds (e.g. ocean waves, howling wind, fire), industrial sounds (e.g. hammer striking, automobiles, machinery), and instrumental sounds (e.g. flutes, drums, gongs). Instrumental sounds, excluding those common in Western art music (e.g. piano and violin), were included under the assumption that all sounds lie on a continuum of musicality, and to exclude all instrumental sounds would limit the range of this study.

This is recognized as a potential limitation. All sounds were edited to last 10 seconds with 1-second fades.

## **Measures**

*Openness to Experience.* This was measured with the 10-item openness to experience subscale from the Big Five Inventory, a measure of the Big Five Factors of personality (John, Donahue, & Kettle, 1991). Items were self-statements rated on a 1 to 5 scale from “disagree strongly” to “agree strongly,” then averaged to yield a single score.

*Sound Appraisals.* Cognitive appraisals of each sound’s interestingness, enjoyableness, orderliness, and musicality were collected with a 7-item, 7-point semantic differential (see Appendix B). Interestingness was measured with two items, INTERESTING : UNINTERESTING and ENGAGING : BORING. Enjoyableness was measured with two items, ENJOYABLE : UNENJOYABLE and PLEASANT : UNPLEASANT. Orderliness was measured with two items, ORDERED : RANDOM and PREDICTABLE : UNPREDICTABLE. Appraised musicality was measured with a single item, MUSICAL : UNMUSICAL. Three additional items were collected, but were deemed irrelevant to the original hypotheses and so were excluded from analysis. These were CLEAR : CONFUSING, NOVEL : FAMILIAR, and SIMPLE : COMPLEX. These items were presented to participants in the same randomized order for each sound.

## **Listening Strategies**

Two listening strategies were devised for this study. The first strategy was intended to reflect Cage’s self-described listening practices by encouraging participants to focus on the physical properties of sound. Definitions for the following terms were provided to participants who were given this strategy: frequency, duration, loudness, and timbre. The second strategy was intended to reflect a more traditional listening strategy by encouraging participants to focus on relationships between sounds.

Definitions for the following terms were provided to participants who were given this strategy: harmony, rhythm, dynamics, and sonic texture.

## **Procedure**

Participants were tested individually in a single session lasting approximately 30 minutes. The setting was a near-soundproofed and air-conditioned room equipped with a Mac computer, audio interface, and a pair of monitors. Before their arrival, participants were randomly assigned to one of three groups, either an experimental group A, who read the Cage-inspired listening strategy, an experimental group B, who read the traditional listening strategy, or a control group who did not read a listening strategy. After arrival, participants filled out an informed consent form and the investigator provided a general overview of the procedure. The investigator remained in the testing room to answer any questions that arose in the testing session.

All responses were collected via computer. Participants first completed the measure of openness to experience, then read a page of text on the computer introducing the following sounds and, depending on group assignment, encouraged the adoption of the Cage-inspired listening strategy, the traditional listening strategy, or encouraged no strategy.

Participants then listened to the 20 sounds and completed an appraisal form for each sound before moving on to the next. Participants were allowed to listen to the sounds as many times as they liked, and could adjust the volume to their liking. After completing the appraisal forms for all 20 sounds, participants were thanked and allowed to ask questions.

## **Goals of Analysis**

The first goal of analysis was to determine whether appraisals of interestingness, enjoyableness, and orderliness in the recorded sounds predicted appraised musicality. A second goal was to determine whether the personality trait ‘openness to experience’ predicted average appraisal responses or prediction slopes among appraisals. A third goal was to determine whether adopting either of the two

intentional-listening strategies influenced average responses or prediction slopes relative to a control condition. The data were analyzed using R and the ‘lme4’, ‘lmer test’, and ‘MuMIn’ packages for multilevel modeling, the ‘boot’ package for bootstrapping, the ‘effsize’ package for effect sizes, and the ‘ggplot2’ package for plotting.

## RESULTS

### Appraisal Predictors of Musicality

Since observations of appraisals were collected both between- and within-persons, multilevel modeling was employed when analyzing predictions among appraisals. The within-person regression equation used was:  $\text{Musicality} = B_0 + B_1(\text{Interestingness}) + B_2(\text{Enjoyableness}) + B_3(\text{Orderliness})$ . Using the lme4 and lmer test packages, analyses found significant average effects for each appraisal in predicting musicality. In the sample, enjoyableness was the largest predictor,  $b = .47, p < .001$ , while interestingness and order each shared a lower value,  $b = .31, p < .001$ . Using the MuMIn package, based on a paper by Nakagawa and Schielzeth, 2012 on generating  $R^2$  values from multilevel models, it was determined that interestingness, enjoyableness, and orderliness were responsible for 54% of variation in musicality. Scatter plots for each variable with musicality are given in Figure 1.

To determine whether the difference between slopes was statistically significant, a nonparametric bootstrap was employed for the size of the difference in slopes (1000 resamples, basic method; Davidson and Hinkley, 1997). The difference between the slopes for enjoyableness and interestingness was 95% CI [-.09, .39]. The difference between enjoyableness and order was 95% CI [-.01, .31], and the difference between interest and order was 95% CI [-0.16, 0.14].

### Openness to Experience

Multivariate regression analysis was used to determine whether openness to experience predicted average appraisal responses. Openness to experience did not significantly predict the appraisals together,  $b = .02, t(19) = 0.39, p = .70$ , and did not explain a significant proportion of variance in the appraisals together,  $R^2 = -.04, F(1,19) = .15, p = .70$ . Openness to experience also did

not significantly predict the appraisals independently, neither interestingness,  $b = .04$ ,  $t(19) = .86$ ,  $p = .40$ , enjoyableness,  $b = -.005$ ,  $t(19) = -.11$ ,  $p = .91$ , orderliness,  $b = -.05$ ,  $t(19) = -1.36$ ,  $p = .19$ , nor musicality,  $b = .02$ ,  $t(19) = .39$ ,  $p = .70$ . Openness to experience also did not significantly explain a significant proportion of the appraisals independently, neither interestingness,  $R^2 = -.01$ ,  $F(1,19) = .74$ ,  $p = .40$ , enjoyableness,  $R^2 = -.05$ ,  $F(1,19) = .01$ ,  $p = .91$ , orderliness,  $R^2 = .04$ ,  $F(1,19) = 1.85$ ,  $p = .19$ , nor musicality,  $R^2 = -.04$ ,  $F(1,19) = .16$ ,  $p = .70$ .

Multilevel modeling was used to determine whether the slopes of appraisals predicting musicality varied by openness to experience. Openness did not significantly predict the slopes for interest predicting musicality,  $b = .03$ ,  $p = .75$ ., nor did it significantly predict the slopes for enjoyableness predicting musicality,  $b = .06$ ,  $p = .52$ , nor did it significantly predict the slopes for orderliness predicting musicality,  $b = .06$ ,  $p = .70$ .

### Listening Strategies

Table 1

#### *Appraisal Means and Standard Deviations*

	Group A		Group B		Group C		Total	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Interestingness	4.81	0.59	5.20	0.75	5.90	0.60	5.30	0.79
Enjoyableness	4.49	0.74	4.66	0.61	5.34	0.89	4.83	0.75
Orderliness	3.96	0.83	4.06	0.97	3.97	0.33	4.00	0.66
Musicality	4.64	0.85	4.81	0.61	5.11	1.25	4.85	0.87

Table 2

#### *Between-Group Tests of Significance (ANOVA)*

	$\omega^2$	<i>df</i>	<i>F</i>	<i>p</i>
Interestingness	0.26	2, 18	5	<b>.02</b>
Enjoyableness	0.16	2, 18	3	.08
Orderliness	-0.1	2, 18	0	0.96
Musicality	-0.05	2, 18	0.5	0.61

Table 3

*Post-Hoc Tests of Significance and Effect Sizes*

<i>p</i> (A, C)	Tukey HSD		Cohen's <i>d</i>		
	<i>p</i> (B, C)	<i>p</i> (A, B)	<i>d</i> (A - C)	<i>d</i> (B - C)	<i>d</i> (B - A)
<b>.02</b>	.16	.54	-1.61	-1.07	-0.56
.08	.18	.89	-1.13	-0.96	-0.28
.99	.97	.96	-0.02	0.12	-0.12
.59	.79	.94	-0.50	-0.33	-0.20

**DISCUSSION**

Consistent with John Cage's philosophy and most theories of aesthetic experience, interest and enjoyment predicted aesthetic appreciation of the sound recordings, with enjoyment being the significantly stronger predictor. However, contrary to Cage, orderliness predicted aesthetic appreciation as strongly as interest, suggesting that order may be an important component of musical experiences even with general sound events. However, it can also be argued that this finding reflects a maladaptive listening pattern for experiencing general sound events as music since sounds that were appraised as less orderly also tended to be appraised as less musical. In other words, while a weaker relationship between orderliness and musicality might represent Cage-like listening, a relatively strong relationship may represent Cage's diagnosis of general listening practices among individuals who listen to music to implicitly detect orderly relationships.

Though not pertaining to specific hypotheses, the distribution of data points on the scatter plots given in Figure 2 provides a valuable insight. Distribution in the second quadrant is particularly interesting since it depicts the portion of sounds appraised high in musicality but low in the predicting appraisal. Theoretically, high or low distribution here should suggest whether or not the musicality of sound is necessarily accompanied by the predicting appraisal. For example, the second quadrant in the plots of both interestingness and enjoyableness are scarcely occupied relative to the plot of orderliness.

This suggests that while high musicality is almost always accompanied by high interestingness and enjoyableness, it is not always accompanied by orderliness. In other words, interestingness and enjoyableness appear to be integral to a sound's musicality, whereas orderliness is a less necessary condition. This supports Cage's view that the perception of order is not required in musical experiences.

Inconsistent with Cage's view that open-mindedness is related to musical appreciation of general sound events, openness to experience failed to significantly predict any of the appraisals or relationships between appraisals. This could suggest that openness to experience is unrelated to aesthetic experiences with sound, inconsistent with past research, or that while it is related to traditional musical experiences, it is unrelated to musical experiences with general sound events. Another explanation is that Cage's definition of 'open-mindedness' is not equivalent to the personality trait openness to experience. A third explanation is that the participants, having all been university music students, did not provide a wide enough range of scores to be detected by the analysis.

Inconsistent with the hypotheses that adopting an intentional-listening strategy would influence appraisals and relationships between appraisals, almost all group differences were insignificant, with the exception of average appraised interestingness between the Cage-inspired listening group ( $M = 4.81$ ,  $SD = 0.59$ ) and the control group ( $M = 5.90$ ,  $SD = 0.60$ ). Since the difference between the two groups was significant and had a large effect size, this result suggests that adopting a listening strategy focused on physical properties results in sounds being appraised as much less interesting. This would directly contradict Cage's belief that listening to sound without focusing on embodied meaning makes them more interesting.

However, there is reason to suspect this finding as a false positive, given the small number of participants per group ( $n = 7$ ), and the lack of significant findings between the other groups on any of the other appraisals or relationships between appraisals. It could be that the finding reflects a real effect, in which case Cage loses credibility. Alternatively, the finding may reflect sampling error,

magnified by the small number of participants. It could also be that the listening strategies themselves were not designed properly to effectively alter participants' listening styles. Given the large effect size, the result is worth considering, but replication of this finding is necessary before accepting its validity.

### **Limitations**

There are several limitations to this study. First, the sample size was very small for an experimental study. Additionally, the participants sampled were all music students at a private university, which was likely reflected in the limited range of openness to experience scores. More demographic information could have been collected to enhance the detail of this study, such as age, year of schooling, and musical education received.

Second, sounds were chosen somewhat arbitrarily by the investigator, and while sounds were generally similar in most respects (such as loudness), they could have been chosen with greater care to ensure an equal quality of sound recording and uniformity of stereo spread. Additionally, the inclusion of instrumental sounds, such as drums and flute are arguably not relevant to hypotheses concerning general sound events. While they were included on Cage's assumption that sounds are not fundamentally different from one another, this is a potentially limiting assumption.

Third, the listening strategies devised may not have been effective for significantly influencing participants' listening styles. This could have been due to either their wording or their presentation in a single page of text. Future studies should consider more intensive presentations involving more participation and/or the use of video.

Fourth, instructions given to the participants by the investigator concerning the sound appraisal form could have been clearer, and greater care could have been taken to ensure that the computer's media player functioned reliably between participants.

### **Conclusion**

This study supports aspects of John Cage's musical philosophy while remaining inconclusive about others. In support, this study found significant relationships between appraised musicality of sound events and all other appraisals (interestingness, enjoyableness, and orderliness), with scatter plot distributions of these relationships suggesting that orderliness is less essential to aesthetic experience than either enjoyableness or interestingness. In contrast with Cage's philosophy, however, the personality trait openness to experience was not significantly related to any variable measured and so does not appear to be relevant to aesthetic experiences with sound. Since this is inconsistent with past literature, alternate explanations are likely. Similarly, the listening strategies devised for this study were insignificant on all but one finding, though it remains unclear whether this finding reflects a real treatment effect or sampling error.

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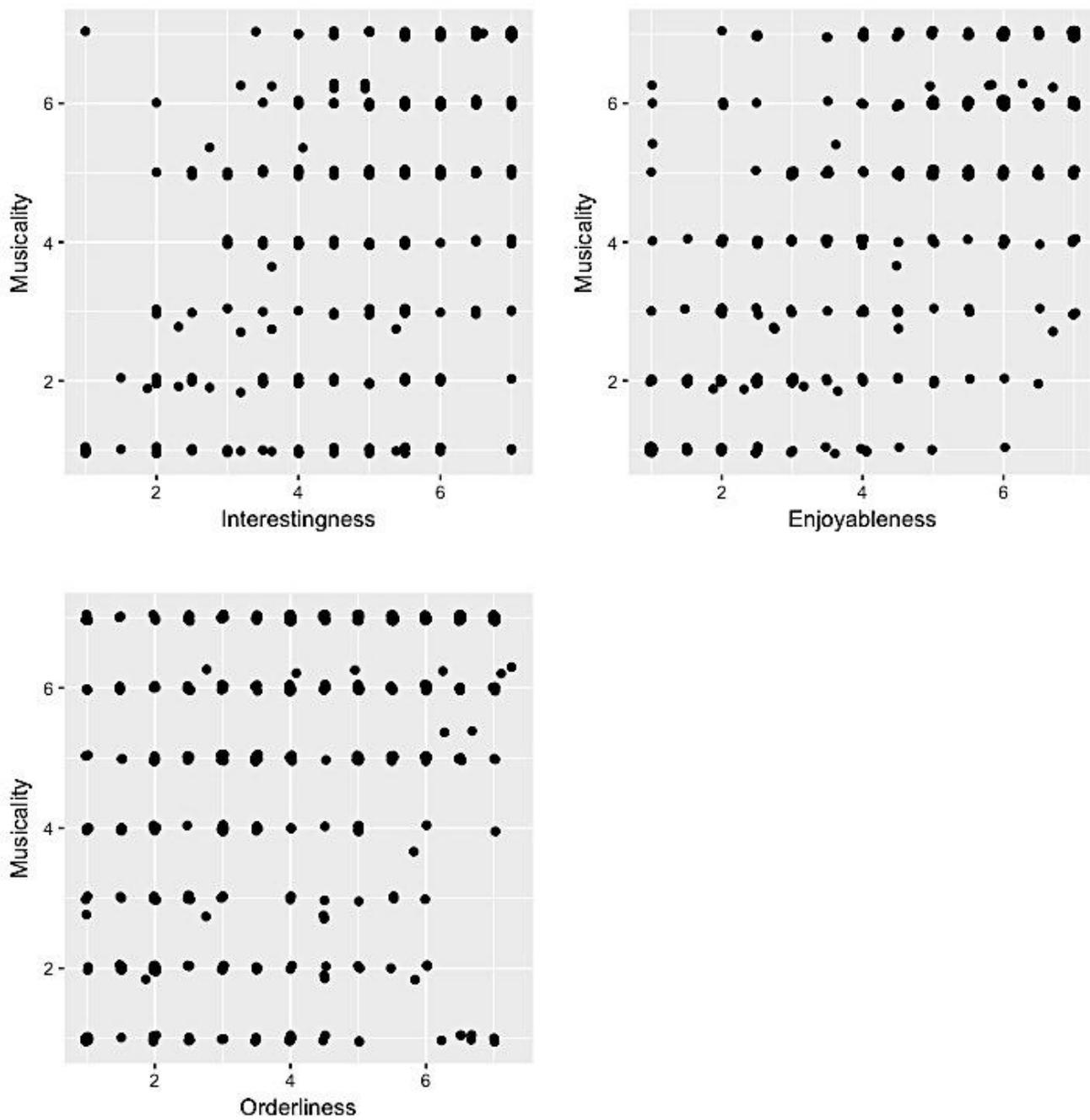
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## APPENDIX A: Figures

Figure 1

*Scatter Plots of All Cognitive Appraisals with Musicality*

**APPENDIX B: Design Materials****List of Sounds:**

1. Hammer striking
2. Birds chirping
3. Tombak drum
4. Passing automobile
5. Hulusi flute
6. Ocean waves
7. Thunder
8. Tone bowl
9. Match being lit
10. Frog croaking
11. Gong striking
12. Duduk flute
13. Fire crackling
14. Bedug drum
15. Flickering lightbulb
16. Footsteps on twigs
17. Calculator printer
18. Howling wind
19. Tabla drums
20. Bats echolocating

