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Research Article

Korean way of perceiving the determinism of French spectral music and concrete music since 1970

Kim JINHO

Professor, Department of Music, Andong National University, Gyeongdong-ro (SongCheon-dong), Andong, Gyeongsangbuk-do, 36729, Republic of Korea. ORCID: 0000-0002-9688-3148 Email: sultasto@andong.ac.kr

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Abstract

We studied determinism and free will, encompassing links between philosophy, psychology, musical poetics, music analysis, and musical theory of mind (MTOM). The determinism of a musical piece refers to its deterministic features, the deterministic compositional processes involved in its creation, as well as the psycho-poetical determinism of its composer. A strong deterministic composition generates multiple musical elements rigidly and automatically under the premises set by a strong poetic determinist. A weakly deterministic composition, as created by the weak poetic determinist, generates small elements somewhat automatically and logically. Poetic libertarians compose music without planning and as their fancy dictates. We use these ideal definitions to classify certain French spectral and concrete composers and their pieces. We surveyed Koreans to establish whether they heard these genres and composers as such. Five hundred four randomly selected respondents in Korea heard parts of two spectral and two concrete pieces, then completed a data collection tool. Analyzing data in SPSS/Microsoft Excel we identified how people listen to musical determinism/libertarianism and how people have MTOM depend on their psycho-social attributes, including their psychological beliefs in and understanding of determinism/libertarianism: e.g. Respondents who properly understood determinism/libertarianism did better at perceiving the deterministic spectral music and free concrete music than did individuals who did not. Our phenomenological research did not provide the only possible explanation of the links or correlations.

Keywords

determinism, French concrete music, French spectral music, Korean way of perceiving the musical determinism/libertarianism, musical poetics, musical theory of mind, prepared deterministic composition, psychological determinists/libertarians

Determinism and Free Will Pools: Philosophy, Science, Socio-Culture, and Psychology

According to the philosophical determinism, an event or a state at a certain point of our universe is both a result of a previously existing cause or causes and the cause of subsequent events or states; between the cause and its effect, there is causality. Determinism was proposed with atomism and causality by ancient Greeks (Dennett, 2003, p. 7-8). With the keyword in determinism being causality, Pink suggests causal determinism (2004, p. 13). With causal determinism, we can accept the idea that the world can be understood, explained, and predicted. Our universe is strongly deterministic if causality always works within.[1] The explanation of the deterministic universe needs physical inevitability. Searle mentions the only explanation of a natural phenomenon, that it had to occur without other possibilities (2007, p. 38-39). Penrose goes a step further: Causality is expressed by some precise mathematical scheme and the entire history of causal universe is fixed following this scheme (2016, p. 559). The important elements of philosophical

[1] For strong determinism, see Wegner (2004), Smilansky (2011) and Churchland (2013). Neural determinism is a logical basis for strong determinism. For neural determinism, see Gazzaniga (2011, p. 44, 129), Harris (2012, p. 9), Libet (1985), Fried *et al.* (2011), Haggard (2011) and Haynes (2011). The brain processes incoming signals via circuits that have been laid down by our genetic inheritance (Critchlow, 2019, p. 4).

determinism are causality, inevitability, and pre-fixation. Does the pre-fixation mean a fate? Determinism was proposed with fate in many ancient cultures (e.g., *Oedipus* of Sophocles and Karma of the ancient Indian culture).[2] Some researchers distinguish fatalism or predestination from determinism; for Critchlow the fate is understood as the destination we were always overwhelmingly likely to arrive at (2019, p. 9).

An implicit concept of freedom was proposed by Aristotle (2002), with self-control and decision (p. 126). Freedom has been linked with control (Engels, 1969, p. 136; Pink, 1996, p. 3; Pink, 2004, p. 2, 3). Later, freedom was connected with choice: Tatian the Assyrian (?-185) argued that the free will was required so that the bad man could be justly punished. The free man has a choice to commit a sin: Only he is ethically responsible for his sin (Frede, 2011, p. 11). According to Campbell, freedom has long been presupposed in moral responsibility (p. 400). Based on theories of self-causation/ self-determination, free will became the universal foundation for American legal system.

One can express causality with natural/ usual language or ideal/artificial language (Mackie, 1965). Some have identified many different concepts of causality in scientific laws, simple physical feelings (Whitehead, 1978, p. 236), magical thought (Pronin, Wegner, McCarthy & Rodriguez, 2006), intuition (Kistler, 2015), intuitive theories (Gopnik & Wellman, 2012; Shtulman, 2017, p. 4), common-sense psychology (Heider, 2015, p. 5), language (Copley & Wolff, 2015), etc. Taylor identified various realms of determinism (Taylor, 1967).

Causation is informed by our experiences of the world we all live in and reflect on (Honderich, 2005, p. 9). Causality, causation, determinism, and free will can be studied as philosophical/scientific terms and as sociocultural/psycho-cultural beliefs/memes, people's psychological experiences, artistic motifs/poetics/terms, etc.[3] There are determinism and free will pools from which persons draw their own small repertoire.

The sociocultural meanings of beliefs in determinism/libertarianism have changed; e.g., for conservative LeBon, deterministic socio-economic laws were more decisive, which conflicted with the freedom that French revolutionaries argued for (1980, p. 129). Today's American conservatives tend toward libertarianism, liberals toward determinism (Harris, 2012, p. 61). Researchers study who believes in scientific or incredulous theories and to what degrees (Miller, Scott & Okamoto, 2006; Harris, 2009; Pew Research Center, 2009 & 2015; Hood, 2009; Lewandowsky, Ecker, Seifert, Schwarz & Cook, 2012). Sociocultural/ psycho-cultural studies on who believes in determinism or free will and to what degrees are necessary. Sociocultural factors influence children's academic achievement (Oulhote & Grandjean, 2016), obesity (Datar & Nicosia, 2018), and emotions (Kramer, Guillory & Hancock, 2014). Sociocultural factors may influence individuals' beliefs about determinism and free will, as well as their musical experiences. There may be psychological determinists and libertarians among composers and among music listeners. How people listen to a musical

[2] Since then, determinism as fate or destiny has been used as motifs in arts: e.g., Shakespeare's *Macbeth*, Diderot's *Jacques le fataliste et son maître*, Wagner's *Parsifal*, Hardy's *Tess of the d'Urbervilles*, Marquez's *One Hundred Years of Solitude*, and Kurumi's *Repeat*, etc.

[3] People have psychological experiences of free will (Locke, 1979, p. 625; Schopenhauer, 1985/1981, p. 349; Barash, 2003, p. 222). Some tie the illusion of free will to our evolutionary past (Wright, 1995, p. 350; Carter, 2010, p. 207; Baumeister, 2013; Miller 2018, p. 198). People have also experiences of deterministic situations: that they were not the authors of their thoughts/actions and rather than these had just happened to them; they report being able to only observe how their thoughts manifested inside of them or being aware of their inability to control their thoughts (Hadamard, 1945, p. 13, 15, 16, 17; Penrose, 2016, p. 419; Mithen, 1996, p. 167, 169; Lichtenberg, 2012, p. 6; Baggini, 2016, p. 88; Sacks, 2017, p. 144). People's feelings of free will and determinism may not match up with philosophical free will and determinism.

piece may depend on their sociocultural attributes, including their psychological beliefs in and understanding of determinism/libertarianism.

Brief History on Determinism and Free Will in Musical Poetics

A poetics of music is a consciously created theory about how music can be composed. Creating a compositional process is creating a poetics or theory of composition. That is, some composers consciously invent and follow certain compositional processes that generate elements of a musical piece.[4] Such processes can exist prior to the piece and generate outputs automatically or inevitably from their corresponding inputs; we can call such a process a "prepared deterministic compositional process" (PDCP). There is a causality between output generated from PDCP and input. Like Penrose's pre-fixed universe, Strongly deterministic music is pre-fixed following the input and PDCP. Composers who use a PDCP have deterministic beliefs about musical poetics.

The determinism in composition arises from formal processes that describe logical or automatic generation (De Gérando, 1996, p. 9). The compositional formalism means "any systematic ordering, or way of organizing, creating, or analyzing compositional systems" (Loy, 1989, p. 293). A PDCP is systematic compositional formalism, such as by method, rule, or algorithm. One can categorize stronger determinisms of composers and their PDCPs: composers who follow a PDCP flexibly to generate one or two dimensions of music are weakly poetic determinists, and those who stringently follow the PDCP as the algorithm for many dimensions are strong poetic determinists. For a weakly deterministic piece, processes work flexibly, with some random and inexplicable elements. In a strongly deterministic piece, there is little or no inexplicable randomness; many things within it are understandable and explainable. A PDCP is useful when one needs understanding and explanation. We use "method" to mean a low-level PDCP, "rule" to mean an intermediate-level PDCP, and "algorithm" which is the most carefully defined to mean a high-level PDCP.[5] Poetic libertarians compose their music without planning and as their fancy dictates. Debussy reportedly said that "I wish only to render what I can hear. There is no theory. You have only to listen. Pleasure is the law". If he worked in this way, he was a poetic libertarian.

The classic tonal system is a rule that guarantees some predetermined and predictable harmonic/melodic progressions. It is a statistical system (Meyer, 1956, p. 54); compositional syntax can be represented as formal grammars (Roads, 1979, p. 53). These specify rules that determine valid constructions (p. 49); Besson and Faïta (1995) allege that people appear to internalize such a classic tonal system. The post-romantic tonal system is a low-level PDCP that permitted various harmonic/melodic progressions that were difficult to predict. According to Szendy (1996), Schoenberg had a hard time with the long instrumental forms in his free atonal period (p. 20). It was possibly because he had discarded traditional PDCPs; his twelve-tone technique was novel and the strongest PDCP of his time. With it, he could again compose large-scale instrumental works. Webern's *Variationen für Orchester, Op. 30,* is a preexisting structure that delimits compositional liberty (Schäffer, 1963, p. 263-268). Nono (1958, p. 25-37) identified

[4] Borrowing Molino's model (1989), Nattiez (1987, p. 34) proposed three semiotic dimensions of the symbolic phenomenon: *poïétique dimension, esthésique dimension,* and *trace*. We translated the poïétique dimension into the poetic dimension. For us, poetics concerns this dimension. Nattiez said that the symbolic form results from a creative process that one can describe or reconstruct. A musical piece can be a symbolic form. Creative compositional processes can be Weber's ideal types, on which see Weber (1949. p. 90), Coates (2006, p. 87), and Babbie (2016, p. 346). A historian can create a musical model as a hypothetical construction in which he compares phenomena to each other (Dahlhaus, 1985, p. 121).

[5] For a history of formalism, see Schwanauer and Levitt (1993). For algorithms, see Loy (1989, p. 291-318).

three historical phases: melodic serialism (Schoenberg); melodic, harmonic, rhythmic, and timbral serialism (Webern as composer of *Variationen für Orchester*); and serialism of all musical elements (Boulez, Maderna, Nono, and Stockhausen). One sees here the increasing musical determinism of PDCPs, which was a sociocultural/psycho-cultural phenomenon of WEIRD (Western, Educated, Industrialized, Rich, and Democratic) settings between 1923 and 1970.

A PDCP can be based on nature or artificial algorithms. It can be assisted by computers. Composers can generate musical elements without using computers, as Schoenberg manually did from his prime form of the row.

Determinism and Free Will in Spectral/ Concrete Music and Research Questions

Here we lay out reinterpretations of certain French spectral pieces and concrete pieces. From the analytical/poetic studies on these pieces, certain research questions – stated in bold/italic font – will be raised. We will survey South Koreans to establish how they respond to these questions.

In spectral music (SM), tones are already registered in the compositional project: their destiny is predetermined (Murail, 1989, p. 154). Scientific and rigorous dissection of selected sounds results in objective descriptions that transcend the personal tastes of the spectral composer (Anderson, 1989a, p. 21-22). Spectralists simply plant a musical seed as a harmonic spectrum and watch it grow (Anderson, 1989b, p. 135). These may be metaphorical stories or authoritative claims. Anyway, spectralists presented new ways to create music by analyzing acoustic sounds.

There are some PDCPs and deterministic features in contemporary Western artistic music. Many deterministic pieces between 1950 and 1970 were created by serialists who mainly wrote based on symbolic/ mathematical research. Some find it difficult to listen to serial music (Barrière, 1989, p. 39; Dufourt, 1991, p. 292). Certain spectralists studied the audibility of music (Murail, 1989, p. 151, 162; Barrière, 1989, p. 37; Malherbe, 1989, p. 47). If so, ***is the determinism of SM perceptible?*** To examine this research question, we study SM and reformulate it to make it easier to answer.

Concrete music (CM) makes a good subject for comparison with SM:

1. Many concrete composers created their music by literally playing it by ear. They also considered the auditory perceptibility.

2. Some concrete composers showed weak PDCPs and a free way of composing music.

3. Certain concrete composers posed another deterministic question, one of virtual causality (see below).

Are the weak determinism, freedom, and virtual causality of CM perceptible? To examine this research question, we study CM and reformulate it.

Figure 1. Gérard Grisey (1946-1998)

Grisey analyzed the E_2 sound of a trombone and acquired a sonogram presenting certain spectra, from which he took some partials that were loud and long. He did not choose partials arbitrarily. He then transcribed the parameters of the partials into musical equivalents, which produced the last page of *Périodes*. These equivalent elements were fixed outputs for an input, the E_2 sound. He did the same for the opening part of *Partiels* with the E_2 sounds of a trombone and a contrabass. Grisey (1991, p. 356) called the last page of *Périodes* "a synthetic spectrum . . . the projection of the natural structures [of the tone E_2] into a dilated

and artificial space [as orchestral sound]". *Périodes* orchestrally resynthesizes the E_2 sound. Grisey (p. 352) did an "instrumental [additive] synthesis", equivalent to an additive synthesis in electronic music. These descriptions also apply to *Partiels*. The process of instrumental additive synthesis is dilation of a sound object, whereas the sound object [as a natural structure/spectrum] is a contracted process (Grisey, 1989, p. 103). If some spectral data of a sound object are given, its dilation is also given. The predetermined automatic transition from the object/spectrum to process/projection is a PDCP.

Some other examples of PDCP in SM are the decimal logarithm of the ratio between harmonic partials, multiplied by a factor *k*, which generates the durations in seconds of *Partiels* (Baillet, 2000, p. 114); the amplitude modulation (AM) used from bars 23 to 31 of Grisey's *Modulations* (Grisey, 1991, p. 369, 370); and the frequency modulation (FM) for an inharmonic bell spectrum in the opening part of Murail's *Gondwana*. These PDCPs are for automatic generation of materials composing the synthetic spectrum.[6]

Composition with a spectrum implies considering its transformations in time (Anderson, 1989a, p. 14). Dilation composes a section of SM, whereas transformations create its part or global form. In *Partiels*, Grisey gradually transforms the harmonic state of the orchestrally synthesized spectrum over time, by increasing inharmonicity. Many spectral pieces are created with such progressive sonic transitions. For the materials of *Partiels*, Grisey used PDCPs, such as the instrumental additive synthesis and the decimal logarithm, and for its transition he increased inharmonicity, for which he followed his imagination. Grisey (1984) said that "[w]e must understand [our compositional] model as a landmark or an airway beacon for an imaginary drift where everything is possible" (p. 16). ***Do Korean listeners to Partiels judge its composer to be a weakly poetic determinist? Do they feel weak determinism vis-à-vis Partiels?***[7]

Spectralists can compose the transition by following their PDCPs. In *Mémoire/Erosion*, Murail had not yet discovered how to organize the transition (Anderson, 1989b, p. 125). He still showed arbitrary transition in *Dérives* and *Territoires de l'oubli*. In *Ethers*, he finally becomes a strong poetic determinist: In the dimension of materials, tones are automatically generated from ring modulation,[8] and in the dimension of form, "its important parts are composed as a suite of waves" (Anderson, 1989b, p. 126). In measures 17-70, each of the waves is shorter than the previous one. This acceleration is calculated by a logarithmic curve (p. 128), a graphic image of the logarithmic function by a dilation. Logarithmic functions always produce a determined output for any input. ***Do Koreans judge the composer of Ethers to be a strong determinist? Do they feel strong determinism vis-à-vis Ethers?***

Feeling determinism (or freedom) vis-à-vis a piece is different from judging its composer to be a determinist (or libertarian). When a piece is only heard to a listener, its determinism (or freedom) is message for the listener, its composer is messenger for him. When a listener says that he can judge a composer, we suppose that he has a musical theory of mind. Theory of mind (TOM) entails an ability to read others' minds (Mithen, 1996, p. 53), or "an ability to perceive others as thinking entities" (Critchlow, 2019, p. 144), or "the capacity to be aware of such mental states as desires and intentions in both ourselves and others" (Shermer, 2011, p. 87).[9] Varki and Brower (2013) present four levels of TOM, and

[6] For *Gondwana*, Murail introduces the aleatory to humanize the mechanistic FM (D'Albavie, 1989, p. 157). One can consider the aleatoricism deterministic (Du Sautoy, 2016, p. 21, 22, 23).

[7] A feeling is the perception of a certain mode of thinking and of thoughts with certain themes (Damasio, 2003, p. 86).

[8] For the ring modulation in instrumental music, see Grisey (1991, p. 369).

[9] For more discussions on the TOM, see Humphrey (1976), Baron-Cohen (1995), and Frith & Frith (1999).

unlike levels 1 and 2, which are achieved by nonhuman animals, only humans appear to have achieved levels 3 and 4; at the level 3, "full TOM", individuals fully understand that others have independent minds just as they themselves do. At the level 4, "extended TOM", individuals comprehend that others they have never met have minds (p. 85-86). If a listener has attained level 4, she/he may have insights into others' minds and perceive certain features of a piece as resulting from the composer's mental workings. Human beings may perceive a musical piece as an ensemble of signs left by its composer.

When we ask the following question "Do Koreans judge the composer of *Ethers* to be a strong determinist?", we are actually asking the following question: ***Do Koreans have a musical theory of mind (MTOM)?*** However, the extended MTOM may differ/vary according to listener's psycho-social backgrounds. Our another research question is that: ***Do Koreans' MTOM and their perceptual abilities differ/vary according to their psycho-social backgrounds?***

What may be deterministic feeling vis-à-vis the transition/transformation of spectral pieces? Laplace presented the idea of modern determinism (1902, p. 4). It is based on Leibniz's metaphysics (Strien, 2014, p. 24), which is formulated as: (1) nature makes no leaps; (2) all natural transitions are gradual; and (3) nothing can change from one state to another without passing through all the intermediary stages (p. 37). These classical formulations can be used as guidelines for defining the deterministic spectral transition: (1) Listeners to the transition must have no feelings of discontinuity, which are signs that there were leaps; (2) the transition must evoke a feeling of gradualism; (3) and a short sonic state that remains the same, as a section of such a transition, must be created so that its listener can perceive it as intermediate between preceding and subsequent sections.

"Nothing takes place suddenly, and it is one of my great and best confirmed maxims that *nature never makes leaps*. I called this the Law of Continuity. [...] There is much work for this law to do in natural science. It implies that any change from small to large, or vice versa, passes through something which is, in respect of degrees as well as of parts, inbetween." Gottfried Leibniz (1981, p. 56-57)

Figure 2. Leibniz and his view about the Law of Continuity

The listener may perceive this series of sections as being both continuous and causal. If this logic is not yet plausible, we must introduce the concept that causality implies temporality. This refers to uni-directionality, asymmetry, and irreversibility between things or states. For many modern people, cause differs from effect; in a deterministic universe, "nothing can be the cause of itself" (Strawson, 2009, p. 299). People assumed "the priority of time in the cause before the effect" (Hume, 2010, p. 378). This means that cause has one direction, toward effect: The cause has an asymmetric relationship to time.[10] If some sonic states compose a unidirectional, asymmetric, and irreversible transition that changes gradually, progressively, and continuously in time, without evoking the feelings of discontinuity, contrast, and rupture, then the transition is a deterministic expression of transitional SM. This musical temporality results from how people feel time as flowing. "Central to our feelings of awareness is the sensation of the progression of time" (Penrose, 2016, p. 391). For the study on people's way of perceiving the music, it is recommended that one starts from the sensation of the progression of time.

[10] Few say that the cause and the effect can occur at the same time, and the cause is in symmetrical relation with its effect (McTaggart, 1915; Russel, 1950; Taylor, 1963 & 1966).

 Galen John Strawson (1952-) is a British analytic philosopher.	 David Hume (1711-1776) was a Scottish Enlightenment philosopher.	 Roger Penrose (1931-) is a British mathematical physicist, philosopher of science and Nobel Laureate in Physics.
"Nothing can be the cause of itself" (Strawson, 2009, p. 299).	"[T]he priority of time in the cause before the effect" (Hume, 2010, p. 378)	"Central to our feelings of awareness is the sensation of the progression of time" (Penrose, 2016, p. 391).

Figure 3. Some philosophers who talked about determinism, causality, and progression of time

Anderson (1989b) argues that the continuous transformation in Murail's music strongly recalls Escher's *Metamorphoses*. The same princple of continuous transformation in these lithographs offers a striking visual analogy with *Ethers* or *Gondwana* (p. 135). Denisov and Ligeti, a pioneer of SM, also think that some of Ligeti's pieces resemble some of Escher's pieces (Steinitz, 2003, p. 206-207). Grisey's music may also recall Escher's pieces. Those who see Escher's transformation may feel temporality. In his *Metamorphoses III*, there is one direction toward which things that gradually transform point (see (1) of question A2-2 in Appendix 1. We assumed that the parts of Escher's pieces that we selected for the survey are textbook examples of continuous transformation. One may have feelings of continuousness, gradualness, progressivity, asymmetry, unidirectionality, irreversibility, and temporality, even though there are still a few discontinuities).

To restate the question ***"Do Korean listeners to Partiels and Ethers feel determinism?"*** in a simpler form appropriate for the survey, we proposed ***"Do they perceive the analogy between these spectral pieces and Escher's Metamorphoses?"*** We can also restate the question ***"Do they judge each spectralist to be a (weak or strong) determinist?"*** (see A2-1 of Appendix 1). Later, Murail departed from the world of continuity.[11]

For Murail, the audience for SM is a Western public who search for novelty and reject obsolete systems (1989, p. 162). The determinism of SM and CM is a novelty. Identifying whether and how the Koreans – people who live in an EEIRD (Eastern, Educated, Industrialized, Rich and Democratic) country – perceives such WEIRD novelties is meaningful.

Schaeffer's fixed music on a medium is "concrete because it is directly constructed from preexistent elements" (Chion, 1991, p. 12). Schaeffer presented a new way to record and manipulate sounds from daily life. The concrete preexistent sonic element is a sound object, which can also be a short recorded fragment of sonic material. Schaeffer also used "acousmatic sound" (1966, p. 91), a sound whose cause is invisible. Acousmatic/concrete music is produced by manipulation

[11] For the later pieces, which cannot serve as textbook examples of deterministic and perceptible SM, see Anderson (1989b, p. 135), Murail (2000, p. 5-9), and Lelong (1988, p. 47).

of sound objects, projected by speakers in halls.

The acousmatic situation through the radio/disc/telephone isolates the sound from the audio-visual complex and dissociates hearing from sight (Deliège, 2003, p. 421). For this situation, Schaeffer proposes "reduced listening" (1966, p. 270-272, 349-359), an attitude of listening to sound for itself, or decontextualized sound.[12] With reduced/acousmatic listening, concrete composers will not detect physical causes of the sound nor recall its referential and cultural meanings. The acousmatic sounds are "detached from their method of production," which implies "abandonment of their real causality in favor of the virtual causality that generates internal or external, induced, imaginary, metaphoric spaces; the juxtapositions of these spaces provoke the meanings" (Denis Dufour, in Bosseur, 1996, p. 12). A cello sound is recorded and manipulated by means of certain tools until it becomes unidentifiable. For Dufour, the virtual causality emerges from the manipulations, whereas the cellist and his cello are the real causes. This dichotomy of real and virtual is not apposite, because for an acousmatic sound, all elements and manipulations that help make it are causes. Anyway, ***in an acousmatic situation, do Korean listeners conjecture virtual causes or not?*** (see A2-3, A2-4 and A2-5 of Appendix 1).

The important techniques of early CM used the cut sound fragments arising from heterogeneous sources. "One entered an empirical world which is totally strange to the history of the composition". Schaeffer managed to design the structure of the sound object (Deliège, 2003, p. 432, 424). Given his own classifications, Schaeffer had "some preferable processes" (1966, p. 414), which were somewhat prepared and deterministic. However, according to Deliège, there is an arbitrariness in composing that Schaeffer did not deny. Schaeffer no longer saw language and grammar in his music (2003, p. 439), since these can be considered deterministic elements.

In his last piece, *Bilude* (1979), Schaeffer showed how to avoid arbitrariness: he did an integral citation of J. S. Bach's *2nd prelude in c minor* of the *Well-Tempered Clavier*, using it as a virtual automatic generator. The determinism of *Bilude* comes from how he just uses certain elements of Bach's work as they are. This idea is a PDCP. Whether or not Bach's work is deterministic, as long as Schaeffer appropriates it as a template, certain elements of *Bilude* are inevitably predetermined. Certain elements of Bach's work are simply replaced with other instrumental sounds. There seems to be no PDCP that determines which instruments are to be used and when. Schaeffer did not establish a PDCP for timbre. ***Is he then felt as being weakly deterministic? Do Korean listeners feel weak determinism?***

"There's this idea of freedom now which is easily evoked which is kind of like, we want to do what we want, whatever that is, though we're not quite sure" (Baggini, 2016, p. 87-88).

Figure 4. An English contemporary artist Grayson Perry (1960-) and his liberalistic views.

[12] For reduced phenomenological listening, see Kane (2007, p. 16-17).

CM as imperfect collage/montage/bricolage does not disturb Pierre Henry (Deliège, 2003, p. 422). If an artist does not feel disturbed when he creates something without a logical process, he probably feels free. As Grayson Perry said, "[t]here's this idea of freedom now which is easily evoked which is kind of like, we want to do what we want, whatever that is, though we're not quite sure" (Baggini, 2016, p. 87-88). Henry's *Divinité du Styx*, the eighth piece of *Écho d'Orphée*, is a typical collage, in which one hardly identifies PDCPs. ***Do Korean listeners to Divinité du Styx feel freedom? Is this piece felt as being libertarian?*** We can restate the questions for *Divinité* and *Bilude*. ***"Do Korean people perceive the analogy between these concrete pieces and some collages?"*** (A2-1 of Appendix 1).

Research Model

We sent survey invitation emails to 5,000 people who were randomly selected from the Korean population as of July 2019. We did a nationally representative quota sampling for age and sex of 504 people aged 18 years and older. The survey period was from January 23 to January 28, 2020. Five hundred four randomly selected respondents in Korea heard parts of two spectral and two concrete pieces, then completed a data collection tool. Analyzing data in SPSS/Microsoft Excel we identified detailed responses to the research questions. The data collection tool is composed of certain qualitative and quantitative questions (see Appendix 1).

This online survey had a 95 percent confidence level with a ± 4 percent error margin, and adhered to the principles expressed in the Code of Ethics of the American Association for Public Opinion Research.

Data Collection Tool

The data collection tool refers to the devices/instruments used to collect data. Our tool was originally written in Korean, but here we present the English version (see Appendix 1). It examines four categories: (1) the social attributes of Korean respondents, including their psychological beliefs in determinism and libertarianism and their understanding of philosophical determinism and libertarianism; (2) how they judge each composer after listening to each of the stimuli; (3) whether they have an impression of determinism or of freedom; and (4) whether they conjecture acoustic causes of the stimuli they listened to – all pieces are only heard – or if they sought virtual causality. We call this data collection tool "Determinism/Libertarianism in Musico-Philosophical Disposition Inventory".

Four stimuli composed no earlier than 1970 were selected as follows: (1) *Partiels* (1975, 115 seconds); (2) *Ethers* (1978) in measures 17-70 (150 seconds); (3) *Bilude* (1979, 68 seconds); and (4) *Divinité du Styx* (1988, 64 seconds). Respondents listened to these stimuli in this order.

For category (2), the survey presented five examples to the respondents: example (1) is a strong determinist's answer, (2) a weak determinist's answer, (3) the answer of a weaker determinist or weaker libertarian, (4) a weak libertarian's answer, and (5) a strong libertarian's answer (see Appendix 1). Category (3) is based on four working hypotheses: that Escher's lithographs offer a visual analogy to the SM and together they evoke a deterministic feeling, and that some collages offer a visual analogy to the CM and together they evoke freedom. The survey presented two images to the respondents: specific parts of Escher's *Metamorphoses III* and the Brazilian designer Rodrigo Pinheiro's collage *Paste in Place* (see Appendix 1). Respondents chose one of the two images as visual equivalents.

Questions pertaining to (1). The factual questions in A0 are on the respondent's social variables; the information question A1-1 asked what is the respondent's belief; and the information questions A1-2 and A1-3 asked whether he properly understood determinism and libertarianism. We identified whether a respondent's perceptual abilities were related to their psycho-social

backgrounds.

Questions pertaining to (2), (3), and (4). The questions from A2-1 through A2-5 address whether listeners have a MTOM and how they perceive SM and CM. We did a crossover analysis between the sociocultural/psychocultural/cognitive attributes revealed by (1) and the responses pertaining to (2), (3), and (4). These attributes make up quantitative data. We scored respondents' responses in terms of the expected correct/appropriate answers to the questions (Table 1).

Table 1. Expected correct answers to the questions on the data collection tool

A1-2	A1-3	Music	A2-1	A2-2	A2-3	A2-4	A2-5
(2)	(4)	*Partiels*	(2) or (3)	(1)	(1)	(2)	
		Ethers	(1)	(1)	(1)	(2)	
		Bilude	(3) or (4)	(2)	(2)		(2)
		Divinité du Styx	(5)	(2)	(2)		(2)

All answers to A0 and A1-1 and certain answers in A2-4 and A2-5 were not included in the scoring. We identified and analyzed the scores and the attributes of the variables in the questions in A0 using SPSS; theories were constructed inductively.

Validity and Reliability of Data Collection Tool

The Cronbach Alfa reliability coefficient for three main musical questions (A2-1, A2-2, and A2-3) is low (0.280). However, these questions do not measure the same concept, which means that it offers a low-risk solution: If we fail a question, we get minimal loss. For other statistical information, see Appendix 2.

Table 2. Item statistics for main three musical questions

	Mean	Standard Deviation	N
Question A2-1	2.14	1.247	504
Question A2-2	1.14	0.346	504
Question A2-3	1.31	0.464	504

Table 3. Item total statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach Alfa if Item Deleted
Question A2-1	2.45	0.351	0.283	0.095
Question A2-2	3.46	1.843	0.385	0.079
Question A2-3	3.28	2.021	0.068	0.342

Table 4. Scale statistics

Mean	Dispersion	Standard Deviation	Number of Items
4.60	2.325	1.525	3

Results

There were 18 questions. On a scale of 99 points, the average score (AS) of the 504 respondents was 52.66, which reflects a typical Korean's aptitude for a specific musico-philosophical task in the year 2020. The AS of people who answered A1-2 and A1-3 correctly was 54.01, the AS of people who got only one answer right was 52.71, and that of people who answered none correctly was 46.75. This last group supported either of the two dominant political parties in Korea, whereas the others were more diverse in the parties they backed. Apart from the two philosophy questions, there were 16 music questions. On a scale of 100 points, respondents who answered A1-2 and A1-3 correctly attained an AS of 63.16; those who answered one of them correctly scored 62.66; and those who answered none of them correctly scored 58.32. Respondents who properly understood determinism/libertarianism did better at perceiving SM/CM than did individuals who did not.

We classified respondents who chose response (1) in A1-1 as determinists, and those who chose (2) as being libertarians. There were more libertarians than determinists; the latter outscored the former (Table 5). There were more libertarians among men than among women. Women outscored men; determinists outscored libertarians (Table 6).

Table 5. Determinists / Libertarians breakdown and the AS (for 18 questions)

Total persons: 504					
Determinists			Libertarians		
Persons	AS	%	Persons	AS	%
220	52.90	43.7	284	52.48	56.3

Table 6. Gender breakdown by determinist/libertarian leanings and the AS (for 18 questions)

		Total		Determinists		Libertarians	
		Persons	AS	Percentage(%)	AS	Percentage(%)	AS
		504	52.66	43.7	52.90	56.3	52.48
Sex	Male	261	52.07	43.3	52.37	56.7	51.84
	Female	243	53.30	44.0	53.46	56.0	53.18

Among men in their twenties, 56.1% were determinists, whereas 33.3% of 40-something men were determinists. Libertarian women in their 20s scored the highest (57.86). The AS of libertarian men in their 60s or older was 47.74. Except for women in their 20s, people in their 30s, and men in their 40s, determinists tended to outscore their libertarian counterparts across all ages/genders (Table 7).

Table 7. Age/Genderbreakdown by determinist/libertarian leanings and the AS (for 18 questions)

	Persons	AS	Determinists				Libertarians			
			%			AS	%			AS
All ages	504	52.66	43.7			52.90	56.3			52.48
20s	120	53.90	55.0	M.	56.1	53.81	45.0	M.	43.9	50.45
				F.	53.7	54.05		F.	46.3	57.86
30s	87	51.40	44.8	M.	50	48.30	55.2	M.	50	52.37
				F.	39.0	51.22		F.	61	53.46
40s	106	52.92	35.8	M.	33.3	53.47	64.2	M.	66.7	53.78
				F.	38.5	52.80		F.	61.5	51.73
50s	113	53.25	40.7	M.	37.5	54.48	59.3	M.	62.5	53.59
				F.	43.9	53.68		F.	56.1	51.73
60s or older	78	50.97	39.7	M.	35.9	50.68	60.3	M.	64.1	47.74
				F.	43.6	55		F.	56.4	51.75

Out of the 220 deterministsm, 30% were in their 20s (Table 8).

Table 8. Determinists/Libertarians breakdown by age (for 18 questions)

	20s	30s	40s	50s	60s or older
Determinists	30.0%	17.7%	17.3%	20.9%	14.1%
Libertarians	19.0%	16.9%	23.9%	23.6%	16.5%

The AS of the only respondent with no formal education was 38.50; she/he was determinist. For libertarians, a relatively strong positive correlation existed between educational attainment and the interconnected mental abilities of musical perception and philosophical/logical thinking; the link was correspondingly weak for the determinists, who outscored libertarians across all educational categories, except for graduate-degree holders (Table 9).

Table 9. Educational background by determinist/libertarian leanings and AS (for 18 questions)

	Persons	AS	Determinists		Libertarians	
			AS	%	AS	%
No Formal Education	1	38.50	38.50	100		0
High School or less	72	48.67	50.11	49.3	47.27	50.7
Community College	68	53.38	56.38	41.2	51.29	58.8
College Graduate	274	53.09	53.52	44.9	52.74	55.1
Graduate Degree	89	54.07	50.67	37.1	56.08	62.9

Students included more determinists, whereas both white-collar and regular blue-collar workers included more libertarians. (Are these vested interests?) The AS of white-collar workers was highest; that of blue-collar workers, unemployed, and homemakers were among the lowest. (White-collar workers included freelancers/ self-employed, small business owners, executives in government corporations/ big business, senior employees/retirees, office workers, full-time workers, and

STEM workers. Blue-collar workers included day workers, part-time employees, and salespersons as non-employees.) Except for office workers, salespersons, and "other," the determinists outscored the libertarians across all professions (Table 10).

Table 10. Occupation by determinist/libertarian leanings and AS (for 18 questions)

	Persons	AS	Determinists		Libertarians	
			AS	%	AS	%
White-collar	297 (58.9%)	53.31	53.80	40.1	52.99	59.9
Blue-collar	21 (4.2%)	51.60	50.60	47.6	52.50	52.4
Student	48 (9.5%)	52.25	52.25	62.5	52.25	37.5
Homemaker/Unemployed	68 (13.5%)	51.12	51.93	50.0	50.31	50.0
Other (senior employees/retirees)	70 (13.9%)	52.01	51.74	38.6	52.19	61.4

For libertarians, as household and personal income rose, their interconnected mental abilities (AS) increased in tandem; for determinists, this relationship held until the USD 4,130-5,779 range (Table 11). The survey presents Korean currency of the respondents as examples of income. We did the analysis in terms of American dollars; 1,000,000 Korean won was approximately USD 825.47 as of February 2020.

Table 11. Income breakdown by determinist/libertarian leanings and AS (for 18 questions)

		AS	%	Determinists		Libertarians	
				AS	%	AS	%
Personal Monthly Income (USD)	Under 2,478	52.29	43.1	53.74	44.2	51.14	55.8
	2,478 - 4,130	53.29	30.0	52.45	37.1	53.78	62.9
	Over 4,130	53.07	11.3	50.42	42.1	55.00	57.9
	Other	52.22	15.7	53.00	55.7	51.23	44.3
Household Monthly Income (USD)	Under 2,478	52.15	16.5	53.57	55.4	50.39	44.6
	2,478 - 4,130	52.27	33.9	52.33	39.8%	52.22	60.2
	4,130 - 5,779	54.19	26.8	55.54	37.8%	53.36	62.2
	Over 5,779	52.80	16.9	50.98	48.2%	54.50	51.8
	Other	49.13	6.0	49.50	46.7%	48.81	53.3

Students (62.5%), men in their 20s (56.1%), people with personal monthly incomes of under USD 2,478 (55.4%), and women in their 20s (53.7%) were mainly determinists, whereas libertarians were prominent among men in their 40s (66.7%), supporters of the Bareunmirae Party (64.7%) and Liberty Korea Party (64.9%), and graduate-degree holders (62.9%). These two politically conservative parties had the biggest proportion of libertarians, who had the lowest AS, whereas libertarians who backed the Justice Party or were "uncommitted" had the highest AS (Table 12). The Liberty Korea Party and Bareunmirae Party were renamed. The Justice Party is a minor progressive party.

Most respondents favored expanding social welfare and wealth redistribution, i.e., were progressivist. A conservative favors cutting social welfare spending; a moderate supports freezing social welfare spending. Moderate determinists had the highest AS (55.11) (Table 13).

Table 12. Political party support by determinist/libertarian leanings and AS (for 18 questions)

	Political stance	Persons	AS	%	Determinists		Libertarians	
					AS	%	AS	%
Democratic Party of Korea	Centrist	132	52.58	26.2	52.59	43.18	52.58	56.81
Liberty Korea Party	Very conservative	57	51.82	11.3	54.73	35.08	50.24	64.91
Bareunmirae Party	Conservative	17	50.79	3.4	51.33	35.29	50.50	64.70
Justice Party	Moderate left	44	56.63	8.7	55.61	40.90	57.33	59.09
Uncommitted		243	52.22	48.2	52.35	46.09	57.75	53.90
Other		11	55.00	2.2	53.43	63.63	52.10	53.90

Table 13. Sociopolitical opinions by determinist/libertarian leanings and AS (for 18 questions)

	Persons	AS	%	Determinists		Libertarians	
				AS	%	AS	%
Progressivist	321	52.31	63.7	52.01	43	52.54	57
Conservative	75	51.92	14.9	53.33	44	50.81	56
Moderate	108	54.24	21.4	55.11	45.4	53.51	54.6

About 27.6% of respondents correctly thought the composer of *Partiels* to be "logical and to have a plan". Another 15.7% correctly thought that she/he "seemed a little logical but a little free"; 9.5% correctly thought that the composer of *Ethers* was "very logical and had an elaborate plan"; 19% felt that she/he "seemed logical and to have a plan"; 51.2% correctly identified the composer of *Bilude* as weakly libertarian: 17.9% correctly thought that she/he "seemed a little logical but a little free" and 33.3% also correctly thought that she/he "seemed free" (42.5% thought her/him to be "very free"); and 33.9% correctly thought that the composer of *Divinité* was "very free" (ACAR of A2-1 in Table 11). About 27% felt that she/he "seemed free". The average correct answer rate (ACAR) for a question is the percentage who correctly answered it. Women did better at assessing the composers' minds than did men. Determinists did better at perceiving SM than did libertarians and did worse at perceiving CM. Libertarians did better at perceiving CM than did determinists and did worse at perceiving *Partiels* (Table 14).

Table 14. ACAR for all questions by determinists/all respondents/libertarians (for 18 questions)

		Determinists (%)	All Respondents (%)	Libertarians (%)
ACAR to the Question A2-1 for	*Partiels*	43.7	43.3	43
	Ethers	9.1	9.5	9.9
	Bilude	48.7	51.2	53.2
	Divinité	35.0	33.9	33.1
ACAR to the Question A2-2 for	*Partiels*	87.3	86.1	85.2
	Ethers	46.4	48	49.3
	Bilude	69.5	69.8	70.1
	Divinité	63.2	67.3	70.4
ACAR to the Question A2-3 for	*Partiels*	71.8	68.8	66.5
	Ethers	50.5	51.4	52.1
	Bilude	28.6	28.6	28.5
	Divinité	64.1	64.1	64.1
ACAR to the Question A2-4 for	*Partiels*	82.3	80.7	79.4
	Ethers	87.4	83.8	81.1
ACAR to the question A2-5 for	*Bilude*	34.9	43.8	50.6
	Divinité	40.4	44.3	47.3

For *Partiels*, 86.1% of respondents correctly chose Escher's pieces; for *Ethers*, 48% correctly chose Escher; for *Bilude*, 69.8% correctly chose the collage; and for *Divinité*, 67.3% correctly chose the collage. Except for *Ethers*, the four working hypotheses were supported on the whole (ACAR of A2-2 in Table 14). Women's high capacity for perceiving analogies between the visual images and music was not identified. There was a dramatic rise and drop in ACAR: 58.9% of men in their 50s correctly grasped Grisey's mind, 30.7 % of men in their 60s correctly did so; 45.7% of women in their 50s correctly did so; and 35.9% of women in their 60s correctly did so.

For *Partiels*, of the 68.8% of respondents who correctly guessed at an orchestra, 80.7% correctly guessed at ordinary instruments; for *Ethers*, of the 51.4% who correctly guessed at an orchestra, 83.8% did it correctly; for *Bilude*, of the 71.4% who guessed the orchestra incorrectly, 85.8% incorrectly guessed at ordinary instruments: 92.9% of conservatives, 91.7% of blue-collar workers, 90.6% of women in their 60s, and 90.3% of men in their 60s felt this way, misperceiving *Bilude*. There were 65.1% of determinists who guessed at an orchestra, but 50.6% of libertarians disagreed. There were 35.9% who misperceived *Divinité*; among them, 87.3% incorrectly thought that ordinary instruments were played, including all women respondents in their 60s or older and all blue-collar workers. There were 64.1% who correctly imagined a piece without orchestra; 44.3% of them correctly guessed at recorded and edited sounds. Women in their 20s (60%) and students (58.8%) did well on this question.

Summary and Discussion

The way in which Koreans perceive musical determinism depends on their individual psycho-social character. Ten tendencies were observable.

(1) Respondents who properly understood determinism/libertarianism did better at perceiving the deterministic spectral music and free concrete music than did individuals

who did not. We assume a very weak positive correlation between understanding of philosophical determinism/libertarianism and perceiving of musical determinism/libertarianism. Is the former the cause of the latter or vice versa? We could not identify it. The correlation was not statistically significant. Our SPSS could not calculate the correlation.

(2) Koreans appear to perceive determinism well in spectral music (SM) and concrete music (CM) on the visual-audio analogy. Koreans appear to perceive a similarity between the musical collage and the collage as a picture. This is borne out by the ACAR (average correct answer rate) for question A2-2, which was higher than that for A2-1 (Table 15). The way in which they perceive musical determinism/libertarianism may be associative/implicit.

Table 15. ACAR for all questions by determinists/all respondents/libertarians (for 18 questions)

	Partiels	*Ethers*	*Bilude*	*Divinité*
ACAR for A2-1	43.3%	9.5%	51.2%	33.9%
ACAR for A2-2	86.1%	48%	69.8%	67.3%
ACAR for A2-3	68.8%	51.4%	28.6%	64.1%
ACAR for A2-4	80.7%	83.8%		
ACAR for A2-5			43.8%	44.3%

(3) Many Koreans seemed limited in their musical theory of mind (MTOM) for SM/CM, as is indicated by the low ACAR for A2-1 (Table 15).

(4) Women appear to have relatively high MTOM, as was found by studies on the Empathy quotient: women tend to empathize better than men (Nettle, 2007, p. 237). The older people appeared to have relatively low MTOM.

(5) Few Koreans seek virtual causality of CM (A2-5 in Table 11). However, young people did better at perceiving virtual causality, perhaps because the electronic sound is more familiar to them. Libertarians/white-collar workers did well, whereas determinists/blue-collar workers did worse. For *Bilude*, 34.9% of determinists and 22.2% of blue-collar workers correctly guessed, compared with 50.6% of libertarians and 48.1% of white-collar workers. For *Divinité*, 40.4% of determinists and 35.7% of blue-collar workers answered correctly, compared with 47.3% of libertarians and 39.9% of white-collar workers.

(6) Overall, libertarians (56.3%) outnumbered determinists, but (7) determinists were the most common among the students (62.5%), men in their twenties (56.1%), women in their twenties (53.7%), people whose household monthly income under USD 2,478 (55.4%), and had a high-school diploma or less (49.3%). These subgroups are marginal in Korean society.

(8) Across 45 subgroups, the 30 subgroups of determinists showed greater philosophical/logical reasoning and musical perceptive ability. Overall, Korean determinists seem to be a clever musical minority, as do a few subgroups of libertarians.

(9) Determinists did better at perceiving SM and worse at perceiving CM. Libertarians did better at perceiving CM, and worse at perceiving *Partiels*. Being determinist or libertarian is like a measurable indicator of perceptions about the world. According to Shermer, what one believes is what one sees. Theory molds data, and concepts determine percepts (2011, p. 21). Beliefs provide a way to prepare oneself to interact with things (MacKay, 1991, p. 112). For many Korean respondents, beliefs seem to influence listening: what they believe may be what they listen to. Their beliefs thus provide

a way to prepare themselves to interact with music. Does this study suggest that all hearing is epistemic? As O'Brien (2016, p. 72) suggests, is the relation between experience and thoughts holistic?

(10) We identified a positive correlation between the Korean respondents' social achievements and their interconnected mental abilities of musical perception on SM/CM and logical thinking on determinism/libertarianism.

Limitations of the Study and Suggestions for Future Work

These phenomenological, descriptive, and correlative findings arrived at empirically restricted reception aesthetics as a snapshot in a specific period, whereas a cross-sectional study involves observations of some populations at one time. Longitudinal and comparative studies on this subject are necessary. We did not provide statistical results; factor analyses, analyses of variances, and other statistical studies are necessary. The findings are intertwined; we cannot yet identify their chains of causality. Identifying relations/causalities are necessary. More opinion questions that ask about the respondents' beliefs need to be added to question A1-1, and more information questions that ask about whether the respondents properly understand determinism and free will also need to be added to A1-2 and A1-3. The dualism underpinning the concepts of fate/freedom is artificial and useful only up to a point (Critchlow, 2019, p. 8). This research was done in the context of dualism. Richer studies beyond dualism are necessary.

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Biodata of Author

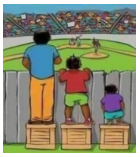
Jinho Kim is a professor of musicology and musical composition of the Department of Music at Andong National University, in South Korea. He studied with Dr. Marc Battier at Paris-Sorbonne University, also known as Paris IV, where he earned a doctorate in musicology. He has written several Koreal articles and books on musicology, and composed contemporary music. His recent publications include Mozart Homo sapiens (Galmuri, Seoul, 2017) and Timbre of Attraction (Galmuri, 2014). His recearch interests included the cognitive model of musical composition, the evolutionary psychology applied to musicology, socio-psychology on the way how different people listen to the music, etc. ORCID: 0000-0002-9688-3148 Email: sultasto@andong.ac.kr

Appendix 1. A Data Collection tool <Determinism/Libertarianism in Musico-Philosophical Disposition Inventory>

A1-1. Among these two propositions, which do you agree with more?

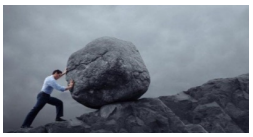
(1) Everything in the world results from a cause or causes. Your dreams, preferences, will, thinking, imagination, creativeness, and moral passions are results of your brain's specific working. This universe is described as chains of causality like following table.

Cause (1)	->	Result (1) as Cause (2)	->	Result (2) as Cause (3)
My social/physical/ chemical environment and my biological traits		My brain's specific working		My dreams, preferences, thinking, imagination, will, creativeness, emotion, and moral passions





(2) In the physical world there may be causality. However, one cannot give a causal explanation of human consciousness and intentions. With dreams, will, thinking, etc., I overcome my socio-physical environment and select something I want: I have free will.


A1-2. Select one proposition that does not seemingly correspond to proposition (1) of A1-1.
(1) There are inevitable laws.
(2) I do what I want. I determine what I want.
(3) Sometimes I cannot control myself. That is not my responsibility.
(4) My moral belief is given by society. I have little choice but to accept it.

A1-3. Select one proposition that does not seemingly correspond to proposition (2) of A1-1.
(1) My will changes my biological and social states.
(2) My spirit cannot be explained by natural laws and social environments I live in.
(3) I with free will am different from me who enters into certain biological/social states.
(4) Criminal cannot overcome their socio-physical environments: They do not have free will.

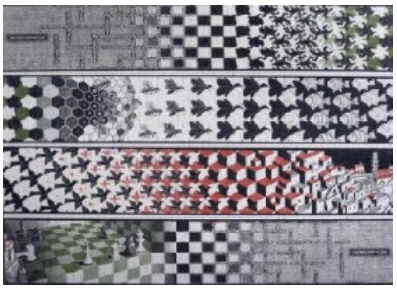
A2-1. What is your feeling for the composer of the music that you just listened to? (Respondents listen to 4 stimuli in the following order: *Partiels, Ethers, Bilude, Divinité.*)
(1) She/He seems very logical and to have an elaborate plan.
(2) She/He seems logical and to have a plan.
(3) She/He seems a little logical but a little free.
(4) She/He seems free.
(5) She/He seems to have no plan and very free.

An image of logical composer who has an elaborate plan:

Two images of free composers:

A2-2. Which of these images does the music you just listened to most resemble?

(1)



(2)

A2-3. Is this piece played by an orchestra? (1) Yes. (2) No.

A2-4. If this piece is played by an orchestra, how would you describe its musical instruments?

(1) The musical instruments are alien to me.

(2) The music is played by ordinary instruments.

A2-5. If this piece is not played by an orchestra, how would you describe this music?

(1) Some performers play unusual instruments that I had no knowledge of.

(2) I guess that recorded and edited sounds have been used.

Appendix 2.

1. Case Processing Summary

		N	%
Cases	Valid	504	100.0
	Excluded*	0	0
	Total	504	100.0

* Listwise deletion based on all variables in the procedure

Reliability Statistics

Cronbach's Alpha	N of Items
0.342	2

Item Statistics

	Mean	Std. Deviation	N
Question A2-1	2.14	1.247	504
Question A2-2	1.14	0.346	504

Item Total Statistics

	Scale Mean if Item Deleted	Scale variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Question A2-1	1.14	0.120	0.400	
Question A2-2	2.14	1.556	0.400	

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
3.28	2.021	1.422	2

2. Case Processing Summary

		N	%
Cases	Valid	504	100.0
	Excluded*	0	0
	Total	504	100.0

* Listwise deletion based on all variables in the procedure

Reliability Statistics

Cronbach's Alpha	N of Items
0.079	2

Item Statistics

	Mean	Std. Deviation	N
Question A2-1	2.14	1.247	504
Question A2-3	1.31	0.464	504

Item Total Statistics

	Scale Mean if Item Deleted	Scale variance if Item Deleted	Corrected Item-Total Correlation
Question A2-1	1.31	0.125	0.063
Question A2-3	2.14	1.556	0.063

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
3.46	1.843	1.358	2

3. Case Processing Summary

		N	%
Cases	Valid	347	68.8
	Excluded*	157	31.2
	Total	504	100.0

* Listwise deletion based on all variables in the procedure

Reliability Statistics

Cronbach's Alpha	N of Items
-0.012: The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item codings.	2

Item Statistics

	Mean	Std. Deviation	N
Question A2-1	2.09	1.267	347
Question A2-4	1.81	0.395	347

Item Total Statistics

	Scale Mean if Item Deleted	Scale variance if Item Deleted	Corrected Item-Total Correlation
Question A2-1	1.81	0.156	-0.011
Question A2-4	2.09	1.604	-0.011

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
3.90	1.750	1.323	2

4. Case Processing Summary

		N	%
Cases	Valid	157	31.2
	Excluded*	347	68.8
	Total	504	100.0

* Listwise deletion based on all variables in the procedure

Reliability Statistics

Cronbach's Alpha	N of Items
-0.031: The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item codings.	2

Item Statistics

	Mean	Std. Deviation	N
Question A2-1	2.26	1.199	157
Question A2-5	1.41	0.494	157

Item Total Statistics

	Scale Mean if Item Deleted	Scale variance if Item Deleted	Corrected Item-Total Correlation
Question A2-1	1.41	0.244	-0.021
Question A2-5	2.26	1.438	-0.021

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
3.68	1.657	1.287	2

5. Case Processing Summary

		N	%
Cases	Valid	504	100.0
	Excluded*	0	0.0
	Total	504	100.0

* Listwise deletion based on all variables in the procedure

Reliability Statistics

Cronbach's Alpha	N of Items
0.095	2

Item Statistics

	Mean	Std. Deviation	N
Question A2-2	1.14	0.346	504
Question A2-3	1.31	0.464	504

Item Total Statistics

	Scale Mean if Item Deleted	Scale variance if Item Deleted	Corrected Item-Total Correlation
Question A2-2	1.31	0.215	0.052
Question A2-3	1.14	0.120	0.052

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
2.45	0.351	0.593	2

6. Case Processing Summary

		N	%
Cases	Valid	347	68.8
	Excluded*	157	31.2
	Total	504	100.0

* Listwise deletion based on all variables in the procedure

Reliability Statistics

Cronbach's Alpha	N of Items
-0.115: The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item codings.	2

Item Statistics

	Mean	Std. Deviation	N
Question A2-2	1.13	0.333	347
Question A2-4	1.81	0.395	347

Item Total Statistics

	Scale Mean if Item Deleted	Scale variance if Item Deleted	Corrected Item-Total Correlation
Question A2-2	1.81	0.156	-0.055
Question A2-4	1.13	0.111	-0.055

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
2.93	0.253	0.503	2

7. Case Processing Summary

		N	%
Cases	Valid	157	31.2
	Excluded*	347	68.8
	Total	504	100.0

* Listwise deletion based on all variables in the procedure

Reliability Statistics

Cronbach's Alpha	N of Items
-0.125: The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item codings.	2

Item Statistics

	Mean	Std. Deviation	N
Question A2-2	1.17	0.373	157
Question A2-5	1.41	0.494	157

Item Total Statistics

	Scale Mean if Item Deleted	Scale variance if Item Deleted	Corrected Item-Total Correlation
Question A2-2	1.41	0.244	-0.061
Question A2-5	1.17	0.139	-0.061

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
2.58	0.361	0.601	2

8. Case Processing Summary

		N	%
Cases	Valid	347	68.8
	Excluded*	157	31.2
	Total	504	100.0

* Listwise deletion based on all variables in the procedure

Reliability Statistics

Cronbach's Alpha	N of Items
8.438E-15	2

Item Statistics

	Mean	Std. Deviation	N
Question A2-3	1.00	0.000	347
Question A2-4	1.81	0.395	347

Item Total Statistics

	Scale Mean if Item Deleted	Scale variance if Item Deleted	Corrected Item-Total Correlation
Question A2-3	1.81	0.156	0.000
Question A2-4	1.00	0.000	0.000

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
2.81	0.156	0.395	2

9. Case Processing Summary

		N	%
Cases	Valid	157	31.2
	Excluded*	347	68.8
	Total	504	100.0

* Listwise deletion based on all variables in the procedure

Reliability Statistics

Cronbach's Alpha	N of Items
0.000	2

Item Statistics

	Mean	Std. Deviation	N
Question A2-3	1.41	0.244	0.000
Question A2-5	2.00	0.000	0.000

Item Total Statistics

	Scale Mean if Item Deleted	Scale variance if Item Deleted	Corrected Item-Total Correlation
Question A2-3	1.41	0.244	0.000
Question A2-5	2.00	0.000	0.000

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
3.41	0.244	0.494	2

10. Case Processing Summary

		N	%
Cases	Valid	157	31.2
	Excluded*	347	68.8
	Total	504	100.0

* Listwise deletion based on all variables in the procedure

Reliability Statistics

Cronbach's Alpha	N of Items
0.000	2

Item Statistics

	Mean	Std. Deviation	N
Question A2-4	2.00	0.000	157
Question A2-6	1.41	0.494	157

Item Total Statistics

	Scale Mean if Item Deleted	Scale variance if Item Deleted	Corrected Item-Total Correlation
Question A2-4	1.41	0.244	0.000
Question A2-5	2.00	0.000	0.000

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
3.41	0.244	0.494	2